

# 55<sup>th</sup> Annual National Conference of **NUTRITION SOCIETY OF INDIA**

**Theme: Nutricereals for One Health**

**25<sup>th</sup> - 26<sup>th</sup> November, 2023**

**Programme, Proceedings & Abstracts**



**icmr** | **NIN**  
INDIAN COUNCIL OF  
MEDICAL RESEARCH | NATIONAL INSTITUTE  
OF NUTRITION

Venue:

**ICMR-National Institute of Nutrition**  
Indian Council of Medical Research  
Beside Tarnaka Metro Rail Station  
Hyderabad-500 007, Telangana, INDIA

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**NUTRITION SOCIETY OF INDIA**

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# NUTRITION SOCIETY OF INDIA

## EXECUTIVE COMMITTEE

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President	: Dr.R.Hemalatha
Vice-President-HQ	: Dr.B.Dinesh Kumar
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# **Welcome**

It is indeed a great pleasure to invite one and all to the 55<sup>th</sup> Annual Conference of the Nutrition Society of India, an august gathering of nutrition stalwarts.

India is the leading producer of millets in the world contributing to 80% of Asia's millet production and 20% of global production. Keeping in view of the importance of sustenance of millets, Government of India has declared 2018 as the National year of Millets and had proposed to United Nations for declaring 2023 as International Year of Millets (IYOM). The proposal of India was supported by 72 countries, and United Nation's General Assembly (UNGA) declared 2023 as International Year of Millets on 5th March, 2021. This year's theme "Nutricereals for one Health" fittingly reverberates the international theme and our conference aims to bring all stakeholders for one last swan song at the end of the year to promote the quintessential "poor man's food". No longer, are millets the food for the masses. The growing green revolution in the 1960's has contributed to the decline in the share of land by more than 50% and the contribution to total food grain basket reduced from 20% (1965-70) to just 6% (2015-20). During the same period the production of rice and wheat has increased 800 times, while the production of millets has been stagnant. This has resulted in the per capita consumption falling from 33 kg to 4 kg per capita per year.

Millets are known as "nutricereals" due to its nutritional value. Apart from protein, millets are rich in minerals, such as iron, zinc, and calcium, which deliver health benefits to all age groups and genders. The green revolution resulted in increased consumption of refined cereals, which can be offset by the consumption of wholesome millets, which are also rich sources of fiber and antioxidants (polyphenols) that have been associated with reduced risk of developing chronic diseases such as obesity, diabetes, hypertension, cancer etc. Millets are also known as "smart foods" as they are not only good for the human health, but due to low usage of ground water, it is drought resilient and climate friendly. This year theme aims to bring about a discussion on the aspects in stemming the declining millet consumption and promoting the smart foods as a part of the "sustainable healthy diets".

The conference begins with a keynote on the theme that sets the tone for the rest of the conference. The symposium on "Sustainable Food Systems for One Health" brings together experts from various domains from agriculture, nutrition and health and share their valuable knowledge that can bring awareness and guide policy makers for a better mother earth. The panel discussion on "Health Benefits of Millets" will bring about a forthright discussion that will enable the promotion of millets with leaders from scientific community, policy makers, industry get around to discuss the burning issues that prevent millets from going mainstream. The debate "Can additional taxation on HFSS foods bring down NCDs in India?" further adds to the discussions of changes in policy that can bring about changes in food systems and thereby a change in food environment at the household.

We welcome you all to this scientific feast. There is no better place than India's oldest and pre-eminent nutrition research institute, NIN, Hyderabad to hold this conference. As you deep dive into the science of nutrition, I am sure your stay in this beautiful city will be memorable. We hope that you take back great memories while you leave the city of pearls.

**Dr. R. Hemalatha**  
President, NSI

**Dr. Avula Laxmaiah**  
Organizing Secretary, NSI

# ***Presidential Address***

**Dr. R.Hemalatha**

President, Nutrition Society of India, India &  
Director, ICMR-National Institute of Nutrition  
Hyderabad

Dear members

Millets, celebrated for their inherent nutritional richness, serve as a health-conscious dietary choice and play a pivotal role in fostering environmental sustainability. Abounding in essential nutrients such as fibre, vitamins, and minerals, millets offer a multitude of health benefits, including improved digestion, reduced susceptibility to chronic diseases, and sustained energy release. Beyond their nutritional significance, millet crops exhibit environmental friendliness, requiring fewer water and fertilizer resources compared to conventional grains like rice and wheat. Their adaptability to diverse growing conditions makes millets a sustainable preference for farmers, contributing to biodiversity and soil health. Integrating millets into both our diets and agricultural practices aligns with a holistic approach to well-being, benefiting both individuals and the planet.

As we delve into the conference proceedings, it is crucial to acknowledge the diverse challenges faced by different states in millet cultivation. The success of the millet campaign in Odisha, Gujrat and other states can be attributed to a comprehensive awareness program that disseminated information about millet recipes and their health benefits. Within state missions, farmers have been guided and assured, ensuring an uninterrupted demand and supply chain through the establishment of Minimum Support Price (MSP) for millets. The setup of processing units, buyback schemes, and subsidized initiatives for local millet production has not only fostered sustainability among farmers but has also empowered millions of women to innovate and produce millet-based products for Integrated Child Development Services (ICDS), Mid-Day Meal (MDM), Public Distribution System (PDS), and other programs.

Recognizing the diverse agricultural challenges faced by different states, such as terrain, rainfall, transportation, or technology disparities, millets have emerged as a common solution. Whether addressing economic concerns, mitigating distress migration, or tackling health-related issues like diabetes, hemoglobin levels, and anemia, millets have proven to be versatile and effective. The involvement of public-private partnerships has been instrumental in these efforts.

Millets, with their high-quality fat content, substantial levels of essential nutrients, gluten-free nature, and low glycemic index, stand as a nutritional powerhouse. Presently, India cultivates nearly nine varieties of traditional millets, contributing significantly to global millet production. This positions India among the top five global exporters of millets, experiencing steady growth over the last five years.

India strategically positions itself to safeguard food and water security by acknowledging millets as robust, resilient, and adaptable crops that can thrive in challenging environments. Despite their advantageous qualities, a decline in millet production has been witnessed over the past few decades due to shifting consumer preferences and a predominant focus on rice and wheat. In response to changing demands, India has taken proactive measures, designating 2018 as the National Year of Millets and proposing 2023 as the International Millet Year, underscoring its global leadership in the resurgence of millets.

India's initiative extends to leveraging global market demand through innovative practices in millet cultivation, marketing, promotion, research, development, and policy. This collaborative effort involves various stakeholders, including central ministries, state-level governments, research institutes, non-governmental organizations, and industries, with the overarching mission of enhancing millet production, consumption, and popularization.

Challenges such as low yields, perishability, and aflatoxin presence are addressed through advanced technology, improved storage, and post-harvest processing. Addressing low millet yields necessitates a comprehensive approach encompassing soil health, water management, pest control, access to improved seeds, and the adoption of modern farming practices. Community-based seed banks play a vital role in preserving native seeds, ensuring the success of millet reintroduction.

Government initiatives like Nutritional Security through Intensive Millet Promotion (INSIMP) and Rainfed Area Development Program (RADP) focus on increasing millet output and enhancing farm returns. Collaborative efforts with research institutes and Farmer Producer Organizations (FPOs) aim to promote millet products globally. Innovative models under zero tillage conditions and utilizing rice fallow for sorghum cultivation tackle millet seed supply concerns.

In conclusion, embracing the potential of millets can revolutionize diets, agriculture, and environmental sustainability. As we delve into the knowledge shared at NSI 2023, let us collectively work towards a healthier future and a more resilient planet.

Good wishes

**Dr.R.Hemalatha**

# Keynote Address

## “Nutri-Cereals for One Health”

**Dr. Neelam Patel**

Senior Adviser (Agriculture)  
NITI Aayog

India's agriculture sector has witnessed significant achievements in terms of quantity, diversity, and quality since independence. The drastic increase in per capita food production (almost 50% between 2004-05 and 2020-21), however, has not translated into improved nutrition and health outcomes. 16.6 percent of our population (233.9 million) is hungry or undernourished. The incidence of stunted and underweight children as well as prevalence of anemia among children and women remains high. The percentage of overweight women has doubled between 2005-06 and 2020-21.

Food availability, food distribution, awareness about nutrition, eating habits and preferences, hygiene and food diversity play an important role of in determining nutrition intake and health outcomes. Shifting the focus of production on nutritive and healthy food has become highly important, given the challenges of nutrition, health and climate change. Millets not only have a lower cost of cultivation, but their “true cost” in terms of GHG emissions and water footprint is also much lower. The true cost of producing a kilogram of rice or wheat is 1.6 or 1.3 times more as compared to producing a kilogram of millets. Bajra, Jowar, and Ragi have approximately 6, 10, and 7 times, respectively, more iron content than rice. The climate resilient millet crops are also required to meet the estimated deficit of green fodder (11.24%), dry fodder (23.4%) and concentrates (28.9%), essential for improving animal productivity.

Government of India is actively extending policy support to promote and create demand for millets. It renamed millets as “Nutri-Cereals” in 2018, dispensing with the nomenclature “coarse cereals”. Further, year 2018 was declared and celebrated as National Year of Millets. A sub-mission of nutri-cereals is being implemented under National Food Security Mission since 2018 in identified 212 districts of 14 states. Millets have been included under Poshan Mission Abhiyaan and state missions have been launched in Karnataka, Odisha, Tamil Nadu, and Chhattisgarh. Following India's proposal to the United Nations General Assembly on 5th March, 2021, year 2023 has been declared as the International Year of Millets.

Efforts are being made to promote bio-fortification of millets and increase dietary diversity for improving the nutrition and health of all age groups. I would sincerely urge everyone to gradually move away from a polished rice/wheat-based diet to an unpolished millet-based diet for not just their own better health, but also of the planet.

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# 55<sup>th</sup> Annual Conference of NUTRITION SOCIETY OF INDIA

25–26 November, 2023

Pre-conference workshops on 24<sup>th</sup> November, 2023

**Venue:** ICMR-National Institute of Nutrition (ICMR-NIN), Hyderabad

## WORKSHOP I

### Nutrient Requirements and Adequacy: Recommended Dietary Allowances (RDA) & Estimated Average Requirements (EAR)

**Moderated by:** Dr. Radhika M & Dr. Raja Sriswan

**Venue:** Assembly Hall

**Time:** 9:30 am – 4:00 pm

Time	Topic	Resource person
9:30 – 9:45 am	Welcome and Inaugural address for Workshop-1 & 2	<b>Dr. R. Hemalatha</b> Director, ICMR-NIN & President, NSI <b>Dr. A. Laxmaiah</b> Organising Secretary & Secretary, NSI <b>Dr. Sylvia Fernandez Rao</b> Joint Organizing Secretary
9:45 – 10:15 am	Keynote address on “EAR & RDA 2020 for Indian population”	<b>Dr. R. Hemalatha</b> Director, ICMR-NIN & President, NSI
10:15 – 11:00 am	Basics of nutrient adequacy using EAR cut point method and probability of adequacy	<b>Dr. Balakrishna N</b> Retd. Deputy Director, ICMR-NIN
11:00 – 11:15 am	<b>Tea break</b>	
11:15 – 11:45 am	Role of diet surveys in accurately estimating nutrient adequacy	<b>Dr. Raja Sriswan</b> Scientist D, ICMR-NIN
11.45 – 12.15 pm	Meal Planning for General Community	<b>Dr P Janaki Srinath</b> Assistant Professor, Dept of foods & Nutrition, College of Community Science, Professor Jayashankar Telangana State Agriculture University
12.45 – 1:00 pm	Meal planning for special cases	<b>Dr. Venkatesh</b> Scientist-E, ICMR-NIN
1.00 – 2.00 pm	<b>Lunch</b>	
2:00 – 2:45 pm	Practical demonstration on EAR cut point method for assessing nutrient adequacy.	<b>Dr. Raghavendra</b> Scientist-B, ICMR-NIN <b>Dr. Karthikeyan</b> Scientist-B, ICMR-NIN
2:45 – 3:30 pm	Practical demonstration on probability of adequacy	<b>Dr. Balakrishna N</b> Retd. Deputy Director, ICMR-NIN
3.30 pm – 3.45 pm	<b>Tea Break</b>	
3.45 pm – 3.55 pm	<b>Q &amp; A</b>	<b>Dr. Raja Sriswan</b> Scientist D, ICMR-NIN & <b>Dr. Radhika. M</b> Scientist ‘E’, ICMR-NIN
3.55 pm – 4.00 pm	Vote of Thanks	

## WORKSHOP - II

### Nutrition Survey Methods: Dietary recall, anthropometry, biochemical assessment and clinical examination

**Moderated by:** Dr. N. Arlappa & Dr. Hemant Mahajan

**Venue:** Conference Hall

**Time:** 9:30 am – 4:00 pm

Time	Topic	Resource person
9:30 – 9:45 am	Welcome and Inaugural address for Workshop-1 & 2	<b>Dr. R. Hemalatha</b> Director, ICMR-NIN & President, NSI <b>Dr. A. Laxmaiah</b> Organising Secretary & Secretary, NSI <b>Dr. Sylvia Fernandez Rao</b> Joint Organizing Secretary
09:45 -10:00 am	Keynote address on “Burden of Malnutrition in India”	<b>Dr. A. Laxmaiah</b> Organizing Secretary & Former Scientist 'G' & Head, Public Health Nutrition, ICMR-NIN
10:00 – 10:30 am	Importance of Anthropometry, Biochemical (laboratory), Clinical examination, and Diet data in Nutrition survey	<b>Dr. Samarasimha Reddy</b> Scientist 'E', Clinical Epidemiology, ICMR-National Institute of Nutrition <b>Dr. Hemant Mahajan</b> Scientist 'D', Public Health Nutrition, ICMR-National Institute of Nutrition
10:30 am -11:00 am	Research Methodology and Development of Research Protocols in Nutrition	<b>Dr Sai Ram C</b> Scientist 'E' & Head, Maternal & Child Health Nutrition, ICMR-NIN
11.00 am – 11.15 am	<b>Tea break</b>	
11.15 am – 11.45 am	The Art of Anthropometry	<b>Dr. Raghavendra P</b> Scientist 'C', Public Health Nutrition, ICMR-National Institute of Nutrition
11.45 am – 12.30 pm	Clinical features of Nutrients' Deficiency	<b>Dr. A. Arlappa</b> Scientist 'G' & Head, Public Health Nutrition, ICMR-National Institute of Nutrition
12.30 – 1.00 pm	Dietary Methods in Nutrition Survey	<b>Ms. Neeraja</b> Technical Officer: Dietetics   Public Health Nutrition, ICMR-National Institute of Nutrition
1.00 pm – 2.00 pm	<b>Lunch Break</b>	

<b>Time</b>	<b>Topic</b>	<b>Resource person</b>
2:00 -2:45 pm	Anthropometry measurements Demonstration	<b>Dr. Raghavendra P</b> Scientist 'C', Public Health Nutrition, ICMR-National Institute of Nutrition <b>Mr. Sreeramakrishna</b> Technical Officer - A, Public Health Nutrition, ICMR-National Institute of Nutrition
2.45 pm - 3.30 pm	Diet assessment Demonstration	<b>Ms.Neeraja</b> Technical Officer: Dietetics   Public Health Nutrition, ICMR-National Institute of Nutrition
3.30 pm – 3.45 pm	<b>Tea Break</b>	
3.45 pm – 3.55 pm	Q & A	<b>Dr. A. Arlappa</b> Scientist 'G' & Head, Public Health Nutrition, ICMR-National Institute of Nutrition  <b>Dr. Hemant Mahajan</b> Scientist 'D', Public Health Nutrition, ICMR-National Institute of Nutrition
3.55 pm – 4.00 pm	Vote of Thanks	

# 55<sup>th</sup> Annual Conference of NUTRITION SOCIETY OF INDIA

25–26 November, 2023

Pre-conference workshops on 24 November, 2023

**Venue:** ICMR-National Institute of Nutrition, Hyderabad

**Theme:** Nutricereals for one health

## MAIN PROGRAMME

**Venue:** Auditorium

**Date:** 25<sup>th</sup> November 2023

Breakfast	7:30 – 8:30 am		
Registration	8:00 – 9:00 am		
9:00 - 10:00 am <b>Inauguration of conference</b>			
9:00 - 9:15 am	Welcome and Secretary report by <b>Dr. Avula Laxmaiah</b> , Organizing Secretary, NSI (Retd. Scientist G, ICMR-NIN)		
9:15 - 9:20 am	Remarks by Immediate Past President, <b>Dr. B. Sesikeran</b> (Former Director, ICMR-NIN)		
9:20 - 9:30 am	Presidential address by <b>Dr. R. Hemalatha</b> (Director, ICMR-NIN)		
9:30 - 9:35 am	<b>RELEASE OF SOUVENIR BOOK</b>		
9:35 - 09:55 am	Keynote address by Guest of Honour <b>Dr. Neelam Patel, Senior Adviser, Government of India, NITI Aayog, New Delhi</b>		
09:55 - 10:00 am	Vote of thanks by <b>Dr. B. Dinesh Kumar</b> , Vice President, NSI (Retd Scientist G, ICMR-NIN)		
10:00 – 11:00 am <b>Debate: “Can additional taxation on HFSS foods bring down NCDs in India?”</b> <b>Moderator</b> Dr.Anura V Kurpad Prof. Dept. of Physiology, St John's Medical College, Bangalore & Past President, NSI			
10:00 - 10:10 am	Flagging of issues by the moderator		
10:10 - 10:50 am	<b>FOR THE MOTION</b>		
	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>Speaker 1:</b>  <b>Dr. Rijo M John</b> Associate professor, Ragagiri College of Social Sciences, Kochi, Kerala, Research Consultant (Health Economics &amp; Public Health Policy), Ernakulam, Kerala, India.         </td> <td style="width: 50%; vertical-align: top;"> <b>Speaker 2:</b>  <b>Dr. SubbaRao M Gavaravarapu</b>, Scientist 'F' - Sr. Deputy Director &amp; Head, Nutrition Information, Communication &amp; Health Education (NICHE) Division, ICMR-National Institute of Nutrition, Hyderabad         </td> </tr> </table>	<b>Speaker 1:</b> <b>Dr. Rijo M John</b> Associate professor, Ragagiri College of Social Sciences, Kochi, Kerala, Research Consultant (Health Economics & Public Health Policy), Ernakulam, Kerala, India.	<b>Speaker 2:</b> <b>Dr. SubbaRao M Gavaravarapu</b> , Scientist 'F' - Sr. Deputy Director & Head, Nutrition Information, Communication & Health Education (NICHE) Division, ICMR-National Institute of Nutrition, Hyderabad
<b>Speaker 1:</b> <b>Dr. Rijo M John</b> Associate professor, Ragagiri College of Social Sciences, Kochi, Kerala, Research Consultant (Health Economics & Public Health Policy), Ernakulam, Kerala, India.	<b>Speaker 2:</b> <b>Dr. SubbaRao M Gavaravarapu</b> , Scientist 'F' - Sr. Deputy Director & Head, Nutrition Information, Communication & Health Education (NICHE) Division, ICMR-National Institute of Nutrition, Hyderabad		
	<b>AGAINST THE MOTION</b>		

	<b>Speaker 1:</b> <b>Arpita Mukherjee</b> , Professor, Indian Council for Research on International Economic Relations (ICRIER) New Delhi	<b>Speaker 2:</b> <b>Dr. William Joe</b> , Institute of Economic Growth, New Delhi
10:50 - 11:00 am	Discussion	
11:00 - 11:30 am	<b>Inauguration of Stalls &amp; POSTER SESSION – I &amp; TEA</b>	
<p>11:30 - 12:15 pm  <b>35<sup>th</sup> Dr. S.G. SRIKANTIA MEMORIAL LECTURE AWARD</b>  on  <b>“Micronutrient deficiencies are affecting cognitive functioning of school going children in India”</b>  by  <b>Dr. Shally Awasthi</b>  Professor, Department of Paediatrics  King George’s Medical University  Lucknow, Uttar Pradesh</p>		
<p>12:15 – 1:20 pm  <b>INDUSTRIAL SESSION</b>  <b>[Parallel Sessions – Executive Committee Meeting]</b></p>		
12:15 - 12:30 pm	Representative from PepsiCo	<b>EXECUTIVE COMMITTEE MEETING</b> Venue: Conference Hall <b>(Parallel Session)</b>
12:30 - 12:45 pm	Representative from Coca-Cola	
12:45 - 01:00 pm	Representative from Kellanova	
01:00 - 01:15 pm	Representative from Unilever	
01:15 - 01:20 pm	Representative from Ataraxia Life Pvt. Ltd.	
1:20 - 2:15 pm	<b>LUNCH</b>	
<p>2:15 – 4:15 pm  <b>Young Scientist Award Session (Experimental Nutrition)</b>  <b>[(Parallel Sessions – Free communications - Oral Presentations -Session-I) &amp; POSTER SESSION – II]</b></p>		
2:15 - 4:15 pm	Young Scientist Award session (Experimental Nutrition)	Free communications - Oral Presentations-Session-I <ul style="list-style-type: none"> <li>• Food Science Nutrition - 1</li> <li>• Community Nutrition -1</li> <li>• Clinical Nutrition - 1</li> <li>• Experimental Nutrition</li> </ul>
4:15 - 4:30 pm	<b>TEA</b>	

<b>4:30 - 6:00 pm</b> <b>Panel discussion on "Health Benefits of Millets"</b> <b>Moderator:</b> Dr. B Dayakar Rao, Principal Scientist, ICAR-Indian Institute of Millets Research (IIMR) <b>Chair:</b> Dr. (Mrs.) C Tara Satyavathi, Director, ICAR - Indian Institute of Millets Research, Hyderabad <b>Co-chair:</b> Dr. Raj Bhandari, Member, National Millets Task Force, Government of India, New Delhi	
4.30 – 6.00 pm	<b>Prof Faraz Farishta</b> Director of FS Endocrine & Diabetic Centers Consultant Care Hospital
	<b>Mr. Anand K Kadali</b> Managing Trustee, Annapoorna Trust
	<b>Dr Venkatesh Bhat B</b> Principal Scientist, IIMR
	<b>Dr. Devraj JP</b> Scientist D, Division of Clinical Epidemiology ICMR-National Institute of Nutrition, Hyderabad
	<b>Dr. Rebecca Kuriyan Raj</b> Professor, Department of Physiology, St John's Medical College Bangalore
6:00 - 6:30 pm	<b>TEA</b>
<b>6:30 - 7:30 pm</b> <b>47<sup>th</sup> GOPALAN MEMORIAL ORATION</b> On <b>"Decoding India's Nutrition Puzzle: Some Options for Future"</b> By <b>Prof. Ramesh Chand</b> Member, NITI Aayog, New Delhi	
7:30 - 8:30 pm	<b>Cultural activities and followed by dinner</b>

**Venue: Auditorium**

**Date: 26<sup>th</sup> November 2023**

<b>8:30 - 9:30 am</b> <b>NSI Annual General Body Meeting</b>		
9:30 am – 11:00 am <b>Young Scientist Award (Community Nutrition) /</b> <b>Parallel Sessions – Oral Presentations - II/ POSTER SESSION – III</b>		
9:30 - 11:00 am	Young scientist Award session (Community Nutrition) <ul style="list-style-type: none"> <li>• Junior Award</li> <li>• Senior Award</li> </ul>	Free communications - Oral Presentations-Session-II <ul style="list-style-type: none"> <li>• Food Science Nutrition-2</li> <li>• Community Nutrition-2</li> <li>• Clinical Nutrition-2</li> </ul>

		<ul style="list-style-type: none"> <li>• Nutrition Education &amp; Communication; Sports Nutrition; Nutrition &amp; Health Policy Research</li> </ul>
11:00 - 11:15 am	<b>TEA</b>	
<p>11:15 – 12:00 noon</p> <p><b>14<sup>th</sup> DR. RAJAMMAL P DEVADAS MEMORIAL AWARD LECTURE</b></p> <p>On</p> <p><b>“Technological interventions for the preparation of protein ingredients and supplementary foods”</b></p> <p>by</p> <p><b>Dr. Sridevi Annapurna Singh</b></p> <p>Director</p> <p>CSIR-Central Food Technological Research Institute, Mysuru</p>		
<p>12:00 - 12:10 pm</p> <p><b>PRESENTATION OF 10<sup>th</sup> DR. B.K. ANAND MEMORIAL AWARD</b></p> <p>to</p> <p><b>Dr. Ramesh Bijlani</b></p> <p>Ex Prof of Physiology</p> <p>AIIMS, New Delhi</p>		
<p>12:10 – 1:30 pm</p> <p><b>Symposium on - “Sustainable Food Systems for One Health”</b></p>		
12:10 - 12:30 pm	<p><b>Dr. Saikat Datta Mazumdar</b></p> <p>Principal Scientist</p> <p>Global Research Program on Enabling Systems Transformation</p> <p>ICRISAT</p>	
12:30 -12:50 pm	<p><b>Mr. Padmanaban</b></p> <p>CEO, No Food Waste</p>	
12:50 - 1:10 pm	<p><b>Dr. Sai Ram Challa,</b></p> <p>Scientist E &amp; Head, Division of MCHN</p> <p>ICMR-National Institute of Nutrition, Hyderabad</p>	
1:10 - 1:30 pm	<p><b>Dr. R. Ananthan</b></p> <p>Scientist E, Food chemistry Division</p> <p>ICMR-National Institute of Nutrition, Hyderabad</p>	
1:30 - 2:30 pm	<b>Lunch</b>	
<p>2:30 – 3:30 pm</p> <p><b>Concluding Ceremony</b></p>		
3:30 pm onwards	<b>TEA</b>	

# GOPALAN MEMORIAL ORATION

## THE AWARD

The Gopalan Oration Award was instituted in the year 1974 by the Nutrition Society of India in honour of its Founder-President, Dr. C. Gopalan, who has been the guiding force behind the Society since its inception. In his capacity as the Founder-President and as a permanent Executive Committee Member, Dr. Gopalan has nurtured the Society and has built it up to its present stature. The Society, as it is today, bears testimony to his genius as an architect and father of nutrition sciences in India.

Dr. Gopalan was the founder President of Nutrition Foundation of India. He was a scientist of international eminence and has spearheaded the cause of nutrition science for over four decades. His contribution towards the betterment of nutrition of population has benefited not only India but other developing countries as well. It has helped to strengthen and inspire movements for the eradication of under-nutrition among the underprivileged in many Third World countries.

Dr. Gopalan had a brilliant academic career at the Madras Medical College and obtained a Doctoral degree in Medicine. During his illustrious career, Dr. Gopalan has held several prestigious positions with distinction that has brought fame not only to him but to his country as well. He was the first Asian to be elected the President of the International Union of Nutrition Sciences and the first Chairman of the Regional Advisory Committee on Medical Research for South-East Asia of WHO. He was on several World Health Organisation Expert Panels for many years and was the Chairman of the Technical Session of the World Health Assembly. He was elected Fellow of the Royal Society of London. He was also the first Nuffield Foundation Fellow from India in Medical Research Council of United Kingdom and a Rockefeller Foundation Fellow.

The National Institute of Nutrition (NIN), Hyderabad, India, was nurtured by Dr. Gopalan with rare dedication as its Director from 1960 to 1974. Dr. Gopalan was also responsible for forging a fraternity of Asian nutrition scientists and initiating the first Asian Congress of Nutrition and promoting the subsequent ones, which led to the formation of the Federation of Asian Nutrition Societies. He is an able administrator and a visionary. During his tenure, as the Director of NIN and later as the Director-General of ICMR, the country as a whole focussed its attention on nutritional and medical problems of public health importance. Under his leadership a wealth of information was generated to tackle problems such as Protein Energy Malnutrition, Vitamin A deficiency, Phrynoderma, Lathyrism, Fluorosis and Pellagra. The foundation of the National Nutrition Monitoring Bureau was laid by him. Dr. Gopalan has also created the Nutrition Foundation of India, which has a wide interdisciplinary research network in the country and has brought out valuable reports which are of great value to nutrition scientists, administrators and policy makers. Some of the renowned national and international honours bestowed on him for his outstanding contributions include Dr. B.C. Roy National Award (1974), Dhanvanthri Award (1978), WHO Health for All Medal (1988), Sir C.V. Raman Gold Medal of the Indian National Science Academy (1988), International Union of Nutrition Sciences Award (1989), R.D. Birla Award (1990) and Fellow of the International Union of Nutrition Sciences (1993) and ICMR – NIN centenary award (2018). He was also conferred the prestigious civilian awards Padma Shri in 1970 & Padma Bhushan in 2003 by the Government of India.

Living Legend Awards from International Union of Nutritional Sciences -IUNS (2003) and Federation of Asian Nutrition Societies – FANS (2019). Dr. Gopalan passed away after a 100 fruitful years of life on 3<sup>rd</sup> October, 2019. The Gopalan Oration Award is given every year to an expert who has made significant contributions in the field of nutrition and allied sciences.

The Nutrition Society of India is proud to announce that the 47<sup>th</sup> Gopalan Oration will be delivered by **Prof. Ramesh Chand**, Member, NITI Aayog, New Delhi on “**Decoding India's Nutrition Puzzle: Some Options for Future**”.



## RECIPIENTS OF GOPALAN ORATION AWARD

- 1977 Dr. D. B. Jelliffe  
**World Trends in Infants Feeding.**
- 1978 Dr. J. Cravioto  
**Intersensory Integration as a Function of Nutrition and Stimulation.**
- 1979 Dr. M. Behar  
**National Nutrition Policy & Trace Elements and Metabolism.**
- 1980 Dr. M. S. Swaminathan  
**Green Power and Freedom from Hunger.**
- 1981 Dr. V. M. Dandekar  
**Measurement of Undernutrition.**
- 1982 Dr. S. Varadarajan  
**Technology for Better Nutrition.**
- 1983 Dr. H. K. Jain  
**Evolutionary March of Indian Agriculture.**
- 1984 Dr. S. G. Srikantia  
**Nutrition Adaptation in Man.**
- 1985 Dr. K. T. Achaya  
**Invisible Fats Revised.**
- 1986 Dr. V. Kurien  
**Oils and Fats Beyond Nutrition.**
- 1987 Dr. R. K. Chandra  
**Nutrition Immunity and Clinical Outcome.**
- 1988 Dr. Anand S. Prasad  
**Human Zinc Deficiency.**
- 1989 Dr. J.V.G.A. Durnin  
**Is Satisfactory Energy Balance Possible on Low Energy Intake?**
- 1990 Dr. J. C. Waterlow  
**A New Look at Protein-Energy Malnutrition - Controversies and Challenges.**
- 1991 Dr. Vernon R. Young  
**Amino Acids Kinetics in Humans**
- 1992 Dr. M. C. Latham  
**Alleviating Malnutrition in the developing countries of the World.**
- 1993 Dr. Nevin S. Scrimshaw  
**Complementarities among foods and nutrients.**
- 1994 Dr. W.P.T. James  
**Assessing Energy Need : Recent Advances.**
- 1995 Dr. Florentino S Solon  
**Food Fortification Programme Development in the Philippines.**
- 1996 Dr. John D Potter  
**Plant Foods and Cancer Risk - Science and Tradition.**
- 1997 Dr. B. N. Tandon  
**Nutrition Intervention in 2000 AD**
- 1998 Dr. Artemis P. Simopoulos  
**Genetic variation and nutrition**
- 1999 Dr. R.S. Paroda  
**Household Food and Nutritional Security through Advances in Agriculture**
- 2000 *Dr. Gurdev S. Khush*  
**Strategies to meet the global food and nutrient needs in the New Millennium**

- 2001 Dr. B.S. Narasinga Rao  
**Newer perspectives in energy nutrition and malnutrition and their relevance to India.**
- 2002 Dr. Chen Chunming  
**Nutrition and Economic Development**
- 2003 Dr. Prakash Shetty  
**Non-communicable diseases in developing societies: causes, costs and consequences**
- 2004 Prof. Mark L. Wahlqvist  
**The New Nutrition Science: Solution for Development**
- 2005 Dr. Shanti Ghosh  
**For better health and nutrition, prioritise the young child**
- 2006 Prof. M.K. Bhan  
**Preparing to Face the Challenge**
- 2007 Prof. Ricardo Uauy  
**Nutrition Challenges for the 21<sup>st</sup> Century: The double burden of disease**
- 2008 Prof. John M Pettifor  
**Vitamin D and Calcium Nutrition in Children in Developing Countries**
- 2009 Prof. K. Srinath Reddy  
**Public health nutrition in India : Moving from science to policy and action**
- 2010 Prof. David Barker  
**Nutrition in the Womb**
- 2011 Prof. Barry M Popkin  
**The Global Dynamics of Diet, Activity and Body Composition : Rapid Shifts in the Stages of the Nutrition Transition**
- 2012 Dr. Reynaldo Martorell  
**The First 1000 Days and Human Development: Implications for India**
- 2013 Dr. Robert E Black  
**Fetal Growth Restriction: Nutritional Determinants, Consequences in Childhood and Interventions**
- 2014 Dr. Michael S Kramer  
**International Standards For birth weight- Does One size fit all?**
- 2015 Dr. Prema Ramachandran  
**India's Nutrition Challenges**
- 2016 Dr Anura V Kurpad  
**The health-nutrition-agriculture connect for protein in India**
- 2017 Prof. C.S. Yajnik,  
**In Search of Modifiable Susceptibility to Diabetes in Indians: Story of a Hungry Indian Fetus**  
*(Due to personal reasons Prof. C.S. Yajnik was not delivered the oration lecture in 2017. It was delivered in 2018 conference.)*
- 2018 Prof. John H Cummings  
**50 years of dietary fibre**  
  
Dr. Kamala Krishnaswamy - **Honoured by Gopalan Centenary Award (one time award)**
- 2019 Dr.K.M. Venkat Narayan  
**Back to the Future: Historic Roots of Diabetes Point to Unknown Solutions**
- 2020 Prof.Christopher Paul Duggan  
**Race, Caste and Nutrition in the 21st Century: Select Studies in Maternal and Child Health**
- 2021 Dr. V. Mohan  
**The diabetes epidemic in India: Some lessons learnt**
- 2022 Prof. Caroline Fall  
**"Mothers, Babies and Health in Later Life".**

# **47<sup>th</sup> GOPALAN MEMORIAL ORATION**

## **“Decoding India’s Nutrition Puzzle: Some Options for Future”**

**Prof. Ramesh Chand**  
Member, NITI Aayog

### **THE RECIPIENT**

Prof. Ramesh Chand is currently Member of NITI Aayog (in the rank of Union Minister of State) and Chairman of the Institute of Economic Growth, New Delhi. He has a Ph.D. in Agricultural Economics from Indian Agricultural Research Institute (IARI), New Delhi. In the past, he was also Member of the Fifteenth Finance Commission. He is also member of Board of Trustees of International Maize and Wheat Improvement Center (CIMMYT), Mexico; Australian Center for International Agricultural Research (ACIAR), Canberra and World Economic Forum.

Prof. Ramesh Chand has worked in senior academic positions at ICAR, Institute of Economic Growth and Punjab Agricultural University. He was Visiting Professor at University of Wollongong, NSW Australia and at Institute of Developing Economies, Chiba Shi, Japan. He has also been Consultant with international organizations such as FAO, UNDP, ESCAP, UNCTAD, Commonwealth and World Bank.

Prof. Chand has authored seven books and published more than 150 research papers in reputed national and international journals in the areas of agriculture, growth, food policy, farmers’ issues, markets and trade. In recognition of his contributions, Prof. Ramesh Chand has received several national and international awards.

## **ABSTRACT**

India has witnessed an impressive growth in food production after the adoption of Green Revolution technology. As a result, per capita food production witnessed an increase of 25% in thirty years between 1970 and 2000. The recent two decades showed about 50% increase in per capita food production as well as availability. Such an increase in food production is expected to bring significant improvement in nutrition and health of the Indian population.

Strangely, the studies using the consumer expenditure data of the NSSO main Surveys paint a different picture of nutrition, which is based on dietary energy intake (Calorie intake and norms) during 1983 and 2011-12. In contrast to this, the FAO reports much lower incidence of undernutrition which also show a decline over time. Even the FAO data shows slower improvement in undernutrition in India compared to the rest of the world, despite per capita food production in India growing faster than the rest of the world. Some sources describe India's nutrition number as an enigma in the light of trend in food production and export from the country. There is a need to collate the findings related to nutritional status from various sources to understand nutritional complexity of India. It also calls for the close look at social and cultural aspects and dietary patterns specific to India that shape the country's nutrition outcome. There is also a need to adapt international and national nutritional norms to the Indian situation to bring out a clear picture of nutrition based on the latest situation of food production and consumption in the country.

# Dr. S.G. SRIKANTIA MEMORIAL LECTURE AWARD

## THE AWARD

Dr.S.G.Srikantia Memorial Lecture Award was instituted in 1989 by the Nutrition Society of India to honour late Dr.S.G.Srikantia, one of the Founder-Members of the Society. As a Member, and later as its Treasurer (1974-1978) and Vice-President (1978-80), Dr.Srikantia was instrumental in building, expanding and consolidating the activities of the Society.

Dr. Srikantia was born in 1926 in an illustrious family in Mysore. After his brilliant undergraduate career in Mysore Medical College, he joined the National Institute of Nutrition - then known as the Nutrition Research Laboratories, Coonoor, in 1951. He served the Institute with rare distinction and dedication for more than three decades till his voluntary retirement in 1980. From 1974 to 1980, he was the Director of the Institute and contributed to the growth and development of the Institute.

Dr. Srikantia was an internationally renowned nutrition scientist and made outstanding contributions in clinical nutrition. He was a versatile, knowledgeable and well informed scientist not only in clinical nutrition but also in nutritional biochemistry and public health nutrition. Under his able stewardship, the National Institute of Nutrition diversified its research activities and had a coordinated approach, which added new dimension and depth to nutrition research.

A scientist with ideas, vision, initiative and drive, he could enthuse colleagues in an inimitable, gentle and persuasive manner. His elegant studies on the role of ferritin in the pathogenesis of nutritional oedema have attracted considerable attention. His pioneering research contributions on protein energy malnutrition, vitamin A deficiency, nutritional anaemias, pellagra and fluorosis have earned him academic recognition. He led the studies on the prevention and control of vitamin A deficiency in the country and was the man behind the National Vitamin A Prophylaxis Programme. Even after his voluntary retirement, he continued to be active in research and teaching, and was associated with the University of Mysore and served as Temporary Adviser, WHO. He was a member of the Editorial Board of the Indian Journal of Medical Research and was valued for his unbiased critical and mature views on a wide range of topics.

Dr.Srikantia has several publications to his credit including Chapters in books. He was frequently invited by national and international agencies to be on their expert committees.

He was a tower of support and strength to the Nutrition Foundation of India and played a leading role in the formulation and implementation of many of its research projects and in the preparation of its scientific reports.

A man of simple habits and sterling qualities; upright, sincere and devoted to scientific pursuits and loyal to the committed cause, Srikantia was a friend, philosopher and guide to many a junior colleagues. He was a diamond among men, transparent in his dealing with people, dazzling in intelligence, hard in getting the work done and sharp in seeing through people.

The Nutrition Society of India is proud to announce that the 35<sup>th</sup> Dr. Srikantia Memorial Lecture will be delivered by **Dr. Shally Awasthi**, Professor & Head, Department of Paediatrics, King George's Medical University, Lucknow, Uttar Pradesh on "**Micronutrient deficiencies are affecting cognitive functioning of school going children in India**".

## PREVIOUS RECIPIENTS

- 1989 *Dr.P.S.Shetty*  
Energy Metabolism in Chronic Energy Deficiency.
- 1990 *Dr.M.Gabr*  
Better Nutrition for the World Poor : A Challenge of the Future.
- 1991 *Dr.B.N.Tandon*  
Malnutrition and Gastroenterological Disorders.
- 1992 *Dr.B.S.Narasinga Rao*  
Current concepts in human nutrient requirements and allowances - A critique of their use in practice and a need for an alternative.
- 1993 *Dr.Rajammal P. Devadas*  
Empowering women towards improving family nutrition.
- 1994 *Dr.Tara Gopaldas*  
Problems and prospects in upscaling Nutrition-Research-Action Projects or Pilots to Programmes.
- 1995 *Dr. Vinodini Reddy*  
Dietary approaches to combat vitamin A deficiency.
- 1996 *Dr. N. Kochupillai*  
Micronutrient Deficiency and Human Health and Development.
- 1997 *Dr. M. V. Rao*  
Population - Food - Nutrition : Challenges and Options Before India.
- 1998 *Dr. Shanti Ghosh*  
Nutrition, Growth and Development - The first two years are crucial.
- 1999 *Dr. Mahtab S. Bamji*  
Understanding and combating recognized and less recognized vitamin deficiencies.
- 2000 *Dr. S. Rajagopalan*  
Perspective Planning for Human Development.
- 2001 *Dr. Prema Ramachandran*  
Research Studies on Mother Child Dyad - Foundation for National Programmes.
- 2003 *Dr. M. S. Swaminathan*  
Ensuring Ecological, Social and Economic Access to Balanced Diets and Safe Drinking Water.
- Prof. K. N. Agarwal*  
Nutrition and Brain.
- 2004 *Dr. Kamala Krishnaswamy*  
Turmeric – The Salt of the Orient is the Spice of Life.

- 2005 *Dr. Subadra Seshadri*  
The Persistent Problem of Iron Deficiency Anaemia and its Consequences: A Life Cycle Approach is Critical for its Control.
- 2006 *Dr. K. Vijayaraghavan*  
Community Nutrition Research in India – Contributions, Constraints and Controversies.
- 2007 *Dr. V. Prakash*  
Nutrition Links in the Food Chain.
- 2008 *Dr. Ramesh V Bhat*  
Status of Food Safety in India : Past, Present and Future.
- 2009 *Prof. H.P.S. Sachdev*  
Improving Nutrition through Relevant Evidence: Transforming an Indian Dream into Reality.
- 2010 *Dr. B. Sivakumar*  
Carotene conversion to vitamin A is not inefficient.
- 2011 *Dr. B. Sesikeran*  
Technology for Better Nutrition
- 2012 *Dr. B. S. Ramakrishna*  
Gut Microbiota: Roles in Nutrition and Perturbations in Disease
- 2013 *Dr. Sheila C Vir*  
Scaling Up Nutrition Interventions : Key Learnings and Challenges
- 2014 *Dr. Anura V Kurpad*  
Poverty and the State of Protein Nutrition in India
- 2015 *Dr. Vinod K Paul*  
International Fetal Growth Standards - Should we or should we not adopt them?
- 2016 *Dr GNV Brahmam*  
Dietary diversification as a means of prevention of micronutrient deficiencies in the communities: A distant dream?
- 2017 *Maj. Gen. Raman K Marwaha*  
“Wonder Vitamin of Recent Times: Vitamin D”.
- 2018 *Dr. Biplab K. Nandi*  
Food and Nutrition Security as Fundamentals of Human Development: National Perspective International Agenda
- 2019 *Dr. K. Madhavan Nair*  
“NUTRITION FOR ANEMIA”
- 2020 *Dr. Siddharth Ramji*  
“Optimizing nutrition in Low Birth weight Infants”
- 2021 *Dr. Avula Laxmaiah*  
“Time trends in triple burden of malnutrition in India - Pilot intervention models for low and middle income countries”
- 2022 *Dr. R. Hemalatha*  
“Nutrient recommendations and food consumption pattern among adults in India”

## 35<sup>th</sup> Dr. SRIKANTIA MEMORIAL LECTURE

### Micronutrient deficiencies are affecting cognitive functioning of school going children in India

**Dr. Shally Awasthi**

Professor & Head, Department of Paediatrics  
King George's Medical University  
Lucknow, Uttar Pradesh  
Email: [shally07@gmail.com](mailto:shally07@gmail.com)

#### THE RECIPIENT

**Prof. Shally Awasthi** is Vice Chancellor of Bodhisatva University, U.P. She was former Head, Department of Pediatrics, & Head, Department of Medical Education, former Dean R & D, at King George's Medical University (KGMU), UP, Lucknow. She did MBBS (1976-81) from KGMU and received Gold medals and Certificates of Honor in all the subjects and was awarded the prestigious Hewett Medal. She MD Pediatrics (1985) from KGMU and received - Gold medal for the best student. She did Masters in Clinical Epidemiology and Health Economics from University of Pennsylvania USA through INCLEN Fellowship (1990-92) and PhD from KGMU – 2020.

She has received Fellowship of Indian National Sciences Academy (INSA), 2021; Hony Fellowship of Royal Society of Pediatrics and Child Health (Glasgow), 2018; Fellowship of Indian Academy of Pediatrics, 2011; Fellowship of National Academy of Medical Sciences, 2010; Fellowship of Indian Academy of Sciences, Bangalore, 2010; Fellowship of National Academy of Sciences, Allahabad, 2010. Her H Index is 60; i10 Index 214; Citations 16555; Publications >300; and has been in top 2% scientists by Stanford Univ got last 4 yrs. She has 40 years of experience with extramural fundings. She is a Member ICMR- BMR course.

She is the recipient of 35th SriKantia Memorial Award Lecture from Nutritional Society of India, 2023; ICMR Award "Basanti Devi Amir Chand Award" for the year 2016; National Award for Outstanding efforts in Science and Technology Communication through Innovative and Traditional Methods for 2016; ICMR "Amrut Mody Unichem Prize" for the year 2010; Woman Achiever Award by Lucknow Management Association (LMA) awarded on 2007; Dr. BC Roy Silver Jubilee Research Award of Medical Council of India for the year 2003; ICMR "Dr. HR Dingley Memorial Award for Pediatrics Research" – 1996; International Award for Research by the Ambulatory Pediatrics Association of USA, 1994.

She is Member/Chair of policy making national and International Committees, such as WHO-HIS TAG. Areas of research focus are-community acquired pneumonia, nutrition, sepsis in newborns and helminthic infestations. As a result of her research, several policy changes have occurred such as- 3 days of oral amoxicillin (instead of 5 days) became a guideline for the treatment of erstwhile termed "non-severe" pneumonia; as a result of systems strengthening and IEC activities I improved care seeking for pneumonia in the public facilities. This was the basis of GOIs "SAANS" program; provided evidence for the effectiveness of PCV against radiological pneumonia in India which has boosted vaccine coverage; provided evidence for Home based treatment of neonatal sepsis; Dewormed almost 1 lac under-five children as a part of the DEVTA trial which was the foundation of national deworming day.



## ABSTRACT

Micronutrient deficiencies (MD) affect almost one-third of the world's population. Our data shows that one or more MD was present in almost one half of school going children. Overall, a large population of India is suffering from MD despite sustained efforts to ameliorate it at national and local levels. MD contribute not only to impaired growth, for which there is large global data, but also to poor intellectual development, where there is knowledge gap specifically from India. The objective of this presentation is to showcase association of MD with general intelligence and specific cognitive functions in urban school going children aged 6 to 16 years from ten cities of India.

In a cross-sectional multicentric study, participants were enrolled from randomly selected urban schools from Bangalore, Bhubaneswar, Chandigarh, Dibrugarh, Jodhpur, Lucknow, Manipal, Patna, Srinagar and Thiruvananthapuram. Inclusion criteria of children were age between 6–16 years, residing within five kilometers radius of school, parents provided written informed consent and BMI  $\geq$ 12.5. Blood samples were collected for biochemical analysis of calcium, iron, zinc, selenium, folate, vitamin A, D and B12, in serum. Method of biochemical analysis and cut-offs to assess deficiency are given in table 1.

Table 1: Method of estimation of micronutrient deficiency and anemia, its prevalence and comparison with results of Comprehensive National Nutrition Survey (CNNS)				
Micronutrient	Method of estimation	Cut off levels	Prevalence of deficiency	Findings of CNNS (Group 1 = 5-9 years Group 2 = 10-19 years)
S. Calcium	Fully automatic analyzer	<10 mg/dl	59.9%	Not assessed
S. Iron		<70 $\mu$ g/dl	49.4%	Not assessed
S. Selenium	Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES)	< 5.5 $\mu$ g/dl	10.4%	Not assessed
S. Zinc		<70 $\mu$ g/dl	6.8%	Group 1 – 17.0% Group 2 – 32.0%
S. Vitamin A	Enzyme Linked Immunosorbent Assay (ELISA)	<20.0 $\mu$ g/dl	1.6%	Group 1 – 22.0% Group 2 – 16.0%
S. Vitamin D	Chemiluminescence	<12 ng/ml	39.7%	Group 1 – 18.0% Group 2 – 24.0%
S. Folate		<3 ng/ml	22.2%	*Group 1 – 28.0% Group 2 – 37.0%
S. Vitamin B12		<203 pg/ml	33.4%	Group 1 – 17.0% Group 2 – 31.0%
Anemia (Blood)	Spectrophotometry	WHO defined hemoglobin levels	17.6%	Group 1 – 24.0% Group 2 – 28.0%
* CNNS defines folate deficiency as serum erythrocyte folate <151 ng/ml				

From April 2019 to February 2020, 2428 participants (49.8% boys) were enrolled from 60 schools. Participants were categorized as having no MD, any one MD and any  $\geq$ 2 MD. No MD was found in 7.0%, any one MD in 23.8% and

any  $\geq 2$  MD were found in 69.2% participants. No MD ( $n=134$ ) was statistically significantly associated with younger age (6 to 11 yrs) as compared older (12 to 16 yrs) [Unadjusted Odd Ratio (UOR) 1.85 (95% CI: 1.28 to 2.66)] and those living in families having  $\leq 5$  members [UOR 1.47 (95% CI: 1.0 to 2.17)] or were 1st/2nd born [UOR 3.13 (95% CI: 1.67 to 5.85)]. However, BMI indicators were not associated with MD.

General intelligence was assessed using Colored Progressive Matrices / Standard Progressive Matrices (CPM/SPM). Attention-concentration ability was assessed by using digit span test, working memory by arithmetic test and visual-spatial abilities by coding test, by trained psychologists. On basis of performance, participants were categorized into five categories namely borderline, dull normal, average, above average and superior.

The performance in cognitive tests was dichotomized by combining borderline or dull normal and average or above average or superior. We found that borderline or dull normal performers in general intelligence test (CPM/SPM) was 31%, in visual-spatial ability test (coding) 22.2%, in attention concentration (digit span) 53.2% and in working memory (arithmetic) test was 41.9%.

Controlling for gender, socioeconomic status and BMI indicators, performance of participants with  $\geq 2$  MD had adjusted odds ratio for borderline or dull normal performance in (a) general intelligence (CPM/SPM) of 1.63, (95% CI: 1.05-2.52), (b) visual-spatial ability test (coding) of 1.66 (95% CI: 1.02- 2.71), (c) attention concentration (digit span) of 1.55 (95% CI: 1.06-2.25) and (d) working memory (arithmetic) of 1.72 (95% CI: 1.17- 2.53). Also,  $\geq 2$  MD translates into putting 15.51% school going children at risk of borderline or dull normal performance in CPM/SPM, 8.92% in coding, 10.28% in digit span and 12.84% in arithmetic tests.

The crude odd ratio of anemic participants for borderline or dull normal performance in (a) general intelligence (CPM/SPM) was 2.03 (95% CI: 1.64–2.52), (b) visual-spatial ability test (coding) was 1.41 (95% CI: 1.11– 1.79), (c) attention concentration (digit span) was 1.41 (95% CI: 1.14–1.75) and (d) working memory (arithmetic) was 1.60 (95% CI: 1.29– 1.97). Also, anemia translates into putting 9.19% school going children at risk of borderline or dull normal performance in CPM/SPM, 4.96% in coding, 2.8% in digit span and 4.84% in arithmetic tests.

The crude odd ratio of anemic participants for having  $\geq 2$  MD was 2.16 (95% CI: 1.22-3.81). Hence children with  $\geq 2$  MD or anemia were at increased odds of having borderline or dull normal performance in cognitive tests. Since anemia has a statistically significant association with  $\geq 2$  MD, therefore it may be used as a single surrogate marker for presence of  $\geq 2$  MD. This is also an easy and cost-effective measure.

Cognitive abilities contribute to school performance and societal well-being. This also directly or indirectly contribute to attainment of sustainable developmental goal. Thus, national programs must effectively work towards elimination of MD and anemia in children to ensure their intellectual well-being and long-term contribution to societal development.

#### **References:**

1. Awasthi S, Kumar D, Mahdi AA, et al. (2022) Prevalence of specific micronutrient deficiencies in urban school going children and adolescence of India: A multicenter cross-sectional study. PLoS ONE 17(5): e0267003. <https://doi.org/10.1371/journal.pone.0267003>.
2. Singh S, Awasthi S, Kumar D, et al. (2023) Micronutrients and cognitive functions among urban school-going children and adolescents: A cross-sectional multicentric study from India. PLoS ONE 18(2): e0281247. <https://doi.org/10.1371/journal.pone.0281247>.

# Dr. RAJAMMAL P DEVADAS MEMORIAL LECTURE AWARD

## THE AWARD

The Rajammal P Devadas Memorial Lecture Award was instituted by the Nutrition Society of India, in association with Avinashilingam Education Trust and Avinashilingam University for Women in the year 2009. Dr. Rajammal P Devadas (lovingly called 'amma' by her colleagues and students) had made significant contributions for the cause of Nutrition Science, Home Science and Women's development in the country. She was the President of the Nutrition Society of India during 1987 to 1991.

Born in Kallikulam in Tirunelveli District of Tamil Nadu, Dr. Devadas had her early education in Chennai and graduated from Women's Christian College. She received her Ph.D. degree from Ohio State University, USA, with copious honours in 1950, and her Post Doctoral D.Sc. degree from the University of Madras in 1978. As a leading nutritionist of international reputation, Dr. Devadas, in her various capacities as Principal, Vice Chancellor and Chancellor, had a stupendous academic record throughout. Dr. Devadas held several celebrated positions such as Chief Home Economist and Joint Director (Home Science), Directorate of Extension, Ministry of Food and Agriculture, Government of India (1955-1961) and Assistant Director General (Nutrition) ICAR (1975-76). She also served with immense merit as the Regional Vice President - International Federation for Women in Agriculture (IFWA), Regional Coordinator for Research-World Alliance for Breast Feeding and the First Vice President of the World Food Conference convened by the FAO in 1970 in The Hague, Holland, besides holding many other memorable advisory positions in National and International Organizations.

Dr. Devadas's major scientific contributions in the area of Home Science and Community Nutrition has resulted in various implementable programmes. To name a few, nutrition consultation in the colossal State-wide Nutritious Noon Meal Programme of the Government of Tamil Nadu, organization of training programmes for thousands of workers involved in nutrition intervention programmes, direction of a project in five states to commence Nutrition/Health Education and Environmental Sanitation in primary schools in which 10,000 teachers from five districts of Tamil Nadu were skilled in nutrition. In the academic year 1991-1992, she integrated NSS into the undergraduate curriculum of the Avinashilingam University giving it credits and an academic status. She toiled hard to educate the community on the significance of nutrition by developing educational materials and conducting research and community outreach programmes. She was the chief editor of the Indian Journal of Nutrition and Dietetics, Research Highlights and the Tamil Science monthly Vignana Chudar. She has left behind to her credit over 500 research papers and 57 books. She represented India in more than 50 International Nutrition/Home Science Conferences in about 40 countries.

She received many awards from various national and international organizations for her commendable and priceless service in different fields including the Tagore Literacy award (1991), Padma Shri from Government of India (1992) and Dr. B.C.Guha memorial award (1993). She was awarded the Honorary Degree of Humane Letters from Oregon State University (1993) and Ohio State University (1994), Honorary D.Sc. from Chandrasekar Azad University of Agriculture and Technology, Kanpur (1994), Honorary Degree of D.Sc. from University of Ulster, Northern Ireland (1996), G.D. Birla award (1998), the Malcolm S. Adiseshiah award (2000) and the prestigious International Union of Nutrition Sciences (IUNS) award in 2001 at Vienna, Austria.

The phenomenal growth of the Avinashilingam Institutions to the present heights is only due to the consistent and unstinted efforts of Dr. Devadas. Sri Avinashilingam Home Science College for Women was established in 1957, the Home Science College acquired the Deemed University status in 1988 with Dr. Rajammal P. Devadas as its first Vice Chancellor.

Dr. Rajammal P. Devadas Memorial Lecture Award is given every year to an outstanding women nutrition scientist of Indian origin working in India who has made noteworthy contributions in the field of applied nutritional sciences.

The Nutrition Society of India is proud to announce that the 14<sup>th</sup> Dr. Rajammal P. Devadas Memorial Lecture Award will be delivered by **Dr. Sridevi Annapurna Singh**, Director, CSIR-Central Food Technological Research Institute, Mysuru on "**Technological interventions for the preparation of protein ingredients and supplementary foods**".

## PREVIOUS RECIPIENTS

- 2010 *Dr. Mahtab S Bamji*  
Striving for village-level nutrition security - Challenges and opportunities
- 2011 *Dr. Rita S Raghuvanshi*  
Reorganizing Nutrition for a Better Tomorrow
- 2012 *Prof. (Mrs.) Vijayakhader*  
Impact of Economic Empowerment of Women on Health Security – Lessons from Studies in Andhra Pradesh; Karnataka, Kerala, Tamil Nadu and Kenya.
- 2013 *Prof. Jamuna Prakash*  
Exploring Food Based Approaches for Translational Nutrition : From Research to Practice
- 2014 *Prof. G. Subbulakshmi*  
Farm Foods and Pharm Foods
- 2015 *Prof. Satyavati Rana*  
Nutrition and Disease – An Interaction
- 2016 *Dr R. Hemalatha*  
Mother and Child Nutrition- Life Cycle Approach
- 2017 *Dr. Asna Urooj*  
Translational nutrition research for sustainable dietary management of diabetes mellitus
- 2018 *Dr. Sadhana Ramchandra Joshi*  
Maternal Nutrition and Placental Programming: Implications for Long Term Health
- 2019 *Dr. S.Kowsalya*  
Nutritional Potentials of Functional Foods
- 2020 *Dr Seema Puri*  
Mainstreaming nutrition from pre-conception to old age: the life course approach
- 2021 *Dr. Bharati Kulkarni*  
Iron nutrition and anemia in India: some insights from recent research
- 2022 *Prof. Anupa Siddhu*  
Maternal Nutrition; Issues and Initiatives

# 14<sup>th</sup> DR. RAJAMMAL P. DEVADAS MEMORIAL LECTURE

## Technological interventions for the preparation of protein ingredients and supplementary foods

**Dr. Sridevi Annapurna Singh**

Director

CSIR-Central Food Technological Research Institute, Mysuru

### THE RECIPIENT

**Dr. Sridevi A Singh** is serving as the Director of CSIR-Central Food Technological Research Institute at Mysuru and its regional centres since Jan 2021. She is a seasoned food technologist with nearly 3 and a half decades of experience in the field both in industry and at CSIR-CFTRI, Mysuru. A gold medallist in graduation from University of Mysore, she completed MSc (Food Technology) from CSIR-CFTRI with distinction and joined Kissan Products Ltd. Bengaluru in 1988. Later, in 1991, she joined CSIR-CFTRI as a junior scientist and grew to become Head and Chief Scientist, Protein Chemistry and Technology Department in 2016. She received her doctoral degree in food science from the University of Mysore in 2001 under the guidance of Dr. A. G. Appu Rao, former Chief Scientist and Head, Protein Chemistry and Technology, CSIR-CFTRI, Mysuru.

Dr. Sridevi worked extensively on both basic and applied aspects of food science, especially structure, stability and food applications of proteins and enzymes, nutraceuticals & their mode of action, design and development of protein ingredients and supplementary foods for combating malnutrition in children. She has focused on technologies for improving the digestibility of proteins, protein supplementary foods, fortified foods and value addition to indigenous oilseeds. She has facilitated transfer of 6 technologies, many of which are patented, to around 40 entrepreneurs, including Energy Food (New formulation), soy protein hydrolysate, heat resistant sesame seeds and dry dehulling of sesame seeds. She holds 8 active patents. Her research is published in peer-reviewed journals and she has also contributed to book chapters. She has been invited to present her work to several countries including USA, Finland, Germany, Thailand and France. She has been recipient of Best Paper and Best Technology awards during the Foundation day celebrations of CSIR-CFTRI.

Dr. Sridevi has guided several PhD and postgraduate students and continues active research. She has been the principal investigator or co-investigator of several projects funded by industry, DBT, DST, CSIR, DRDO, CCRAS and plan projects. Currently, she is mission director of the Millets Mission project funded by CSIR. Dr. Sridevi has been part of several nutrition intervention programs and collaborations with various state government agencies, institutes and private organizations to address undernutrition in children, particularly in Odisha, Karnataka and West Bengal. She is chairperson/ member of several governing councils, Taskforces, national committees of national institutes, FSSAI, DBT, DST and board of studies of Universities. Dr. Sridevi is on the editorial board of 'The Indian Journal of Nutrition and Dietetics', Food Science and Technology (ACS, USA) and was Associate Editor of Journal of Food Science and Technology (2012 – 2015). She is also advisor for Indian Food Industry of AFST(I). She is life member of many scientific associations and has been involved in the organization of several international and national conferences and delivered invited lectures including two convocation addresses. She has been awarded DAAD fellowship, INF-Kraft fellowship and recently she was conferred Hon. Fellowship of Karnataka Science and Technology Academy in social sciences.

## ABSTRACT

Undernutrition, encompassing protein-energy as well as micronutrient deficiencies, has been and continues to be a major health concern in many countries including India. It is well documented that consumption of the right foods have the power to heal, enhance immunity and delay aging even as an inappropriate diet could contribute lead to illness and premature death.

Protein is not only an essential nutrient but is the largest component of the body next to water. It provides energy and essential amino acids nutritionally, while functionally, it affects the physicochemical and sensory properties of various foods. Dietary surveys have indicated protein deficiency among our population and is a contributing factor in several health and nutritional ailments. The role of proteins in the diet as physiologically active components has also been increasingly acknowledged. Many dietary proteins possess specific biological properties which make these components potential ingredients of functional or health-promoting foods. Such proteins or their precursors may occur naturally in raw food materials exerting their physiological action direct or upon enzymatic hydrolysis, in vitro or in vivo.

Indians source their proteins from plant sources, mainly legumes (seed proteins). Plant proteins are preferred for their cost effectiveness, easy availability and cultural preferences. Plant seeds have protein contents in the range of 20 – 40%; they also contain fat, minerals, vitamins, minor chemical substances identified as antinutrients apart from carbohydrates and fibre. Proteins exhibit their functional properties or bioactivities more effectively in isolated form than in the complicated food matrix. Understanding the chemistry of the ingredients, technological requirements for isolation and characterisation of ingredients with specific composition and properties for food application and commercial viability are quite challenging.

Protein quality is defined based on the ability of the body to digest, absorb and utilize the dietary protein. Plant proteins are considered as low in quality due to:

- Lack one or more essential amino acids to the levels required.
- Seed storage proteins are generally high molecular weight and require intensive processing before consumption.
- Antinutrients like phytates, trypsin inhibitors, lectins and tannins adversely affect digestibility and bioavailability of nutrients, especially proteins.
- Presence of allergens.
- 

Quality and digestibility of protein ingredients and products from plant sources can be improved through processing and technological interventions.

My research, spanning over 3 decades, in the area of protein chemistry and technology, comprises both basic and applied aspects of plant proteins including soybean, jowar, groundnut, horsegram and sesame. This includes development of age-appropriate supplementary protein ingredients and foods with improved nutritional quality, digestibility and bioactivities through biotechnological interventions as well as impact studies on dietary interventions in children and training of self-help groups involved in the manufacturing of supplementary foods. Nutritional quality and digestibility of the protein was improved by the removal of antinutrients through preparation of protein concentrates, processing using enzymatic and heat processing and blending of proteins to get the right balance of essential amino acids in the product for target population.

The spectrum of my research includes :

1. Development of protein ingredients and foods with improved quality and digestibility for children – work carried out on basic aspects of enzymes, design of high protein ingredients and supplementary foods for children in nutritional intervention programs
  - o Technologies for calorie dense foods like sesame based nutritional supplement and energy food (new formulation) were developed. These technologies, developed and scaled up with a team of scientists, engineers and technologists, have been successfully transferred to multiple entrepreneurs and are being used in intervention programs.

- o Isolation of enzymes from natural sources for food applications - Fungal enzymes as green and cost effective processing aids – proteases, amylases, galactosidases, cell wall degrading enzymes like pectinases were characterized and used for preparation of specialty foods. Specialty products like cheese and lactose free milk were developed. Enzyme thermal stability as related to structure and function for modification of food ingredients. The work is valuable for its application in increasing the nutrient density of supplementary foods for children. Additives like emulsifiers could be replaced by the use of enzymes to obtain superior quality baked foods.
  - o Removal of antinutrients from oilseeds - dehulled seeds, protein concentrates. The oilseed hulls rich in antinutrients are removed by simple physical or chemical methods to improve nutritional quality. Removal of antinutrients are carried out by keeping the protein insoluble thereby increasing its content and quality in the ingredient. Natural food grade enzymes were used to improve digestibility and bioavailability – protein hydrolysates and concentrates from soybean and horsegram. These ingredients can be used in any food including geriatric and sports nutrition. Soy protein hydrolysate process has been successfully transferred to multiple entrepreneurs.
2. Proteins and protein products as bioactives for health – proteins, peptides or amino acids were used to understand their effect on metabolic pathways. Specific small molecules, present along with seed proteins were also studied to validate traditional health claims.
- o Modulation of dietary amino acid ratios for better cardiovascular health in animal model. Arginine rich peptides are having protective cardiovascular effect as arginine is a precursor of nitric oxide – vasodilator.
  - o Deciphering the mode of action of edible seed nutraceuticals for combating obesity and inflammation - Myricetin and horsegram proteins as modulators of insulin secretion and sensitivity, sesame lignans as anti-inflammatory molecules, isoflavones from soybean and curcumin from turmeric.
  - o By-products of the silk industry – sericin and silkworm pupae for food and feed purposes. Silkworm pupae has higher amount of omega-3 fatty acids and are good sources of essential amino acids. Protein isolate and fat extraction and storage for use in foods is a value addition to the by-product of silk industry.
3. Nutritional impact of supplementary foods on children (3-5 years).
- o Nutritional intervention studies were carried out with a range of CSIR-CFTRI designed supplementary foods in anganwadi children identified as undernourished and severely malnourished children to improve their nutritional status, both protein-calorie and iron deficiency anemia, in Karnataka, Odisha and West Bengal that showed positive impact on iron deficiency.
  - o Acceptability studies of Pushti (Take home ration of Karnataka) in collaboration with St. John's Research Institute and Spirulina Foundation of Karnataka. Advisory role to Govt. of Karnataka and Govt. of Odisha for millet-based and spirulina-based products on nutritional status in children.
4. Training of WCD officials and women involved in the preparation of supplementary foods.
- o Training of self-help groups has been extensive both in the field as well as women who have come to the institute for training, especially self-help groups that produce supplementary foods and supply to anganwadis run by the state governments. Scoping studies in the state of Odisha has been undertaken to optimize the operation, supply and nutritional composition of the manufacturing of supplementary foods.

The high protein ingredients and foods, developed with lower antinutrients, improved digestibility and quality offer immense possibilities for the food industry for niche markets in the era of personalized nutrition targeting health and wellness through the diet.



## Dr. B.K. ANAND MEMORIAL AWARD

### THE AWARD

This was instituted by the Nutrition Society of India, in association with B. K. Anand Benevolent Trust, New Delhi, in the year 2014 in memory of Prof. Bal Kishan Anand, an internationally renowned physiologist.

Dr. Anand was born on September 18, 1917 in Lahore (now in Pakistan). All through his formative years, he was rated as an excellent student and won many scholarships, medals and prizes. He graduated in Medicine from King Edward Medical College, Lahore in 1940 and went on to do M.D. in three subjects - Medicine, Pathology and Physiology. Prof. Anand joined the Lady Hardinge Medical College as a Professor of Physiology at a tender age of 32 in 1949. As the first Rockefeller Foundation Fellow, he went to Yale University in 1950 and discovered the existence of a neural substrate which is responsible for regulating food intake that is now known as the Feeding Centre. In 1952, he returned to India and joined the Lady Hardings Medical College as Professor and Head, Department of Physiology. Under his leadership it became the first Medical College in the country to introduce human and mammalian experiments in Physiology in 1953. By 1955, Lady Hardings Medical College was recognized to start an M.D. course in Basic Medical Sciences and he also got the credit of establishing the first Neurophysiology Research Unit in Lady Hardings Medical College in the same year.

Dr. B K Anand joined the All India Institute of Medical Sciences (AIIMS) in 1956 as its first Professor in the Department of Physiology. He demonstrated his dynamic leadership by helping to structure the MBBS course to three phases of three semesters, each followed by a year of internship that included three months of rural posting. This pattern was quickly followed throughout the country. Dr. Anand was a member of the core team which laid down the policies and curriculum for postgraduate training in AIIMS that was soon accepted by the Medical Council of India for all Medical Colleges in India. In 1969, he went on to become the Dean of AIIMS.

Dr Anand's tryst with science continued till the end of his long and distinguished scientific career by raising further questions related to the Neurobiology of feeding and satiety. The Neurophysiology Research Unit started by him at AIIMS continues to flourish even today. Besides understanding the neural basis of feeding and satiety, Dr. Anand and his team undertook studies to understand the role of limbic system in emotional and aggressive behaviour, the role of hypothalamus in reproduction as well as in cardiovascular, respiratory and gastrointestinal activities.

In 1955, Dr. B K Anand was instrumental in establishing the Association of Physiologist and Pharmacologists of India affiliated to the International Union of Physiological Sciences. In 1957, he also started the publication of Indian Journal of Physiology and Pharmacology that is now one of the best medical journals published in India. In 1974, he worked for the World Health Organization in New Delhi. Working in Health Manpower Development Division in South East Asia, he rendered advice for policy matters relating to education, nursing and paramedical manpower in the member countries. In 1977, he joined the Family Planning Foundation as its Biomedical Doctor and he held this position till his retirement in 1982 after successfully steering research in India in Biomedical Sciences especially in the development of contraceptives. In 1982, after retiring from the Family Planning Foundation, he took up yet another challenge of establishing a Postgraduate Medical Institute in Srinagar at the behest of the late Shri Sheikh Abdullah. During the period 1982-1985, he served as the Director of Sher-i-Kashmir Institute of Medical Science, Srinagar. Throughout his career, he guided many students, practitioners, researchers and faculty. He authored numerous research publications.

Dr. Anand won numerous national and international awards and accolades. Most significant among them are the Shanti Swarup Bhatnagar Prize for Science and Technology in Medical Sciences in 1963 and Padma Shri in Medicine in 1969 from Government of India.

The Nutrition Society of India is proud to announce the 10<sup>th</sup> Dr. B.K. Anand Memorial Award is given to **Dr.Ramesh Bijlani**, Ex Prof of Physiology, AIIMS, New Delhi, India.

## 10<sup>th</sup> B. K. ANAND MEMORIAL AWARD

### THE RECIPIENT

A product of the All India Institute of Medical Sciences (AIIMS), **Dr. Ramesh Bijlani** joined on the faculty of the Department of Physiology at his alma mater in 1977, became a full Professor in 1987, and Head of the Department in 1996. After obtaining a master's degree in nutrition from the Massachusetts Institute of Technology, Cambridge, USA in 1979, he engaged in research on diet in relation to cardiovascular disease and diabetes for more than 25 years. In the year 2000, he was instrumental in establishing at AIIMS a patient care facility for providing courses on yoga for prevention and management of chronic disease in tune with the latest advances in mind-body medicine. He took voluntary retirement from AIIMS in 2005 to find more time for disseminating yoga.

He was elected a Fellow of the National Academy of Medical Sciences (India) in 2005, and conferred an honorary D.Sc. in Yoga by Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA), Bangalore in 2006.

Prof. Bijlani is the author of more than 25 books, more than 250 research articles, more than 100 popular articles and more than 250 blogs on spiritual subjects on the spiritual networking website, The Speaking Tree, managed by the Times of India group. Besides writing, he has been speaking on yoga and related subjects since 1995. Currently he stays and works at Sri Aurobindo Ashram – Delhi Branch, where he gives talks, conducts courses on yoga and mind-body workshops, and continues to write.

### PREVIOUS RECIPIENT

2014 *Dr. Prema Ramachandran*

2015 *Dr. Dr. K. Satyanarayana*

2016 *Dr Mario Vaz*

2017 *Dr.B.Sivakumar*

2018 *Dr. William Selvamurthy*

2019 *Dr. Sucharita Sambashivaiah*

2020 *Dr. K.K.Deepak*

2021 *Dr.B.Dinesh Kumar*

2022 *Dr. H.P.S Sachdev*

# **DEBATE**

## **on**

### **“Can additional taxation on HFSS foods bring down NCDs in India?”**

**“Can additional taxation on HFSS foods bring down NCDs in India?”**

**Dr.Anura V Kurpad**

Prof. Dept. of Physiology, St John's Medical College, Bangalore &  
Past President, NSI

The link between easy availability and higher consumption of High-fat sugar salt (HFSS) foods and growing rate of overweight-obesity and metabolic disorders is well established. The easy availability of unhealthy highly processed foods at affordable prices even at the remotest places in India is no doubt fuelling higher consumption of these items. The annual per capita sugar consumption in India is 20 times higher than the global recommendations. This particularly may be one of the contributing factors for the growing rates of overweight/obesity across the age groups in India. With a year-on-year growth of over 13% over the last two decades of so, India is turning out to be a fertile market for ultraprocessed foods which are adding up to the already rising consumption of HFSS from other sources.

With overweight and obesity gradually becoming a public health concern in India, various strategies to reduce the consumption of non-nutritive caloric intake are gaining importance. One such strategy, that is increasingly being adopted in several countries across the globe has been taxation of unhealthy foods and beverages. Call it fat tax, sugar tax or sin tax, they have proven to be effective in reducing the purchase of HFSS foods in countries like Denmark, Hungary, the United Kingdom, the United States, and Mexico. Even in the Indian context, the ‘fat tax’ introduced in Kerala has shown initial positive outcomes before the GST regime had set in. Hence, increasing the taxes on unhealthy foods in India may have the potential to discourage the consumption of HFSS foods by adolescents by making these less affordable for them.

Whether taxing HFSS foods to discourage consumption or subsidies on healthier foods is a better alternative to change eating behaviour of the population and result in productivity gains to society remains a debatable issue. Are fiscal policies alone enough to change the current scenario or these must be treated as just one component of the effective intervention package including appropriate food labelling, setting nutrient limit targets, advertisement and marketing regulations, involvement of industry and mass media campaign, nutrition education? Should traditionally-produced HFSS foods in the unorganised sector be taxed? or only industry manufactured HFSS be liable to tax slabs? How can taxation be tackled during inflation and degrading economic situation of the country? What should be the ideal utilization of the revenue generated from tax on HFSS foods? Here we debate these issues and many more.

## **“Can additional taxation on HFSS foods bring down NCDs in India?”**

### **FOR THE MOTION**

**Dr. Rijo M John**

Adjunct Professor, Ragagiri College of Social Sciences, Kochi,  
Kerala, Research Consultant (Health Economics & Public Health Policy),  
Ernakulam, Kerala, India.

### **Urgent Need for HFSS Taxation in India: A Public Health Imperative**

In India, the consumption of High in Fat, Salt, or Sugar (HFSS) foods including SugarSweetened Beverages (SSBs) is a major contributor to a host of health issues, ranging from obesity and diabetes to high blood pressure and asthma. Childhood obesity rates range from 4% to 12%, with over 21% of adults facing overweight concerns. The annual rate of increase in obesity has reached 12.5% for boys and 8.4% for girls. Alarmingly, up to 2.75 million individuals die and 81 million disability-adjusted life years (DALYs) lost annually in India due to diseases related to the consumption of unhealthy products such as tobacco, alcohol, and unhealthy diet. More than 40% of it is contributed by dietary risks.

India, being the world's largest producer and consumer of sugar, has witnessed an alarming surge in the consumption of HFSS foods. The Non-Communicable Diseases (NCDs) burden has skyrocketed from 38% in 1990 to 65% in 2019. Sales of snacks and soft drinks have tripled over the past decade in India, exceeding \$30 billion last year, indicating a disturbing trend in dietary habits. This not only poses severe health risks but also impacts productivity and economic growth, necessitating urgent interventions to curtail the rising consumption of these products.

The imperative for taxing HFSS and SSBs arises from significant market failures associated with their consumption, contributing to negative externalities and internalities. Negative externalities manifest as societal costs in the form of increased healthcare expenditures. For example, the escalation of diabetes and obesity due to increased HFSS consumption leads to external costs imposed on society, necessitating substantial healthcare expenditures, borne through elevated taxes to finance public health insurance. Meanwhile, internalities, stemming from consumers' limited understanding influenced by aggressive marketing, result in inadvertent harm to themselves. Taxes, particularly excise taxes, offer a targeted and effective means to curb detrimental consumption habits, thereby reducing societal burdens. Implementing such taxes has shown promise in various countries, demonstrating a reduction in the purchase of unhealthy items.

Despite ethical concerns, escalating availability and affordability of HFSS foods warrant intervention. There is a global trend of utilizing fiscal measures to combat obesity. While SSB taxation is far more wide and used in more than 60 countries, the taxation on HFSS food is less common, although rapidly increasing. Some 16 countries including USA, Denmark, Mexico, France, South Africa, Hungary and the United Kingdom, among others, now have HFSS food tax. Most recently, Colombia's "junk food law" introduces a gradually increasing levy on ultraprocessed foods, providing a model for other nations. The state of Kerala also had introduced a 'fat tax' way back in 2016 which later got subsumed into India's GST in 2017.

If properly designed, HFSS food tax can be both non-regressive, and fiscally neutral. A recent study on South Africa's Health Promotion Levy showed that there was larger relative reductions in purchases of taxable beverages among lower SES households compared with reductions observed in higher SES households making such taxes non-regressive. Tax rates needs to be differentiated based on nutritional quality of the food so as to incentivize product reformulations. For example, it is possible to have a GST system with HFSS foods in the highest rate structure while their healthier alternatives have either zero or minimal tax rates so that the net tax burden on a household's food consumption basket remains the same. Current GST rates on ultra-processed foods, like salty snacks and SSBs, lack alignment with nutritional content or FSSAI classifications. For example, tax on SSBs with a 28% GST rate and 12% compensation cess, overlooks sugar content. All aerated beverages are taxed uniformly as well. Similarly Juices face a flat 12% rate, irrespective of its sugar content. Salty snacks are taxed at 12%

regardless of their salt content. Such inconsistencies fail to consider the varying nutritional impact of these products and does not result in altering consumption baskets in favour healthier alternatives.

The urgent need for HFSS taxation in India is not merely an economic or fiscal policy concern but a public health imperative. Effectively designed taxes can act as a deterrent to consuming HFSS and promote healthier dietary choices, incentivise product reformulation in favour of healthier products, improve public health outcomes as a result of reduced health burden on the healthcare system, and foster long-term dietary habits that are conducive to overall well-being. Aligning tax rates with nutritional content and incentivizing reformulation can pave the way for a healthier India, combating the rising epidemic of overweight and obesity. Taxation on HFSS foods can help to level the playing field between healthy and unhealthy food options, making healthier choices more affordable and accessible. The revenue generated from increased taxation on HFSS foods can be directed towards funding public health initiatives, such as nutrition education programs, physical activity programs, and subsidizing the production and consumption of nutritious foods. Overall, the evidence suggests that increased taxation on HFSS foods is a promising strategy for promoting healthier dietary choices and improving public health outcomes. By addressing the root causes of diet-related NCDs, such taxes can help to create a more sustainable and equitable food system.

## **AGAINST THE MOTION**

### **“Can additional taxation on HFSS foods bring down NCDs in India?”**

**Prof. Arpita Mukherjee**

Professor

Indian Council for Research on International Economic Relations (ICRIER) New Delhi, India

I don't think that additional taxation on HFSS foods can bring down NCDs in India. This is because, around 80% of the food processing covering HFSS foods are in the informal sector and this sector is not covered by taxes. Taxes can only cover the formal sector. Hence, the coverage of taxes, in itself, is low. Higher tax will lead to a growth of the informal sector vis-a-vis the formal sector, leading to further reduction in the tax collection in the future. Second, tax can reduce NCDs is based on the assumption that taxes will increase the final price of the product and make them less affordable. But this may not be the case. Let us take the example of sugar sweetened beverages. If sugar is subsidized, as in case of India, imposition of 28% GST plus 12% compensation cess on carbonated beverages, has not lead to a price increase of such products by 40%. Infact, the consumption data for sugar-sweetened beverages in India is showing a growth inspite of high taxes. A recent study on the beverages market in India found that the market for carbonated beverages is projected to grow at a compound annual growth rate 5.57% during FY 2022 to FY 2027 to reach INR 185.96 billion in 2027.

The impact of taxes on consumption depend on many factors including price elasticity of demand, availability of substitute products and excluded products. Many products may be excluded from the ambit of higher taxes due to social or political reasons or lobbying by certain groups or for other reasons. Unless similar type of products (based on nutrition content) face similar taxes, the benefits of taxes may not be achieved as consumers may continue to buy those which have lower prices.

In India, the consumption of processed HFSS foods is much lower than developed countries. Most of the food is cooked at home. Hence, only focusing on additional taxes on HFSS foods, without looking at the dietary guidelines, consumption patterns across population, needs and lifestyle, will not lead to lower NCDs.

In a number of countries like Brazil, which had earlier imposed high taxes on products like sugar sweetened beverages, taxes have been later been rolled down/reduced as they were unable to tackle NCDs. So global examples show that higher taxes alone have not often been able to reduce NCDs, unless there are other initiatives like subsidies on healthier products which lower the costs of healthier products, strong consumer awareness campaigns and partnership with the industry to reformulate and develop healthier products. Hence, taxes along cannot bring down NCDs.

Last, but not least, in India, there is a lack of data on consumption of HFSS food by income groups. There is also a lack of data in public domain on tax collection by product subcategories of HFSS foods. Such data is needed for evidence-based policymaking. There is an absence of an agreed definition and classification of HFSS foods. There is also an absence of an overarching roadmap targeting a reduction in the consumption of unhealthy foods. Without that how do one identify the products categories and subcategories for imposing higher taxes?

# **SYMPOSIUM on “Sustainable Food Systems for One Health”**

## **“Promoting climate resilient, gender- and nutri-sensitive sustainable local food systems, leveraging “Smart Food”**

### **Dr. Saikat Datta Mazumdar**

Principal Scientist

[Cluster Leader Nutrition, Dietary Behavior & Smart Food  
And Chief Operating Officer, NutriPlus Knowledge (NPK) Program,  
Agribusiness and Innovation Platform, Enabling Systems Transformation  
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India]

The concept of “One Health” highlights that human health is not isolated but connected to the health of soils, plants, animals and the environment. Sustainable food systems for “One Health” represent an integrated approach that recognizes the interconnections of human, animal, and environmental health. This concept involves interaction of various important components such as climate resilient food systems, environmental stewardship, nutrition and well-being by providing nutritious and safe food for both human and animal consumption, inclusive food system to promote social equity, circular economy to promote resource efficiency as well as reduce the environmental footprints of food systems etc.

Currently, global food systems are failing both people and the planet due to overarching interconnected challenges. These include climate change, natural resource depletion, biodiversity loss, triple burden of malnutrition, food insecurity, lack of dietary diversity and prevalence of unhealthy diets, lack of knowledge on nutrition, health and hygiene, lack of local-efficient processing technologies and infrastructure, limited availability and affordability of nutritious food products, gender inequality etc. All of these challenges are exacerbated by the fragmentation of food systems and policy incoherence.

Towards promoting sustainable food systems that support “One Health”, it is imperative to embrace innovative approaches. With this background, the talk shall focus on ICRISAT’s innovative initiatives towards promoting climate resilient, gender- and nutri-sensitive sustainable local food systems leveraging “Smart food”.

“Smart Food” is a global initiative conceived and led by ICRISAT, along with its partners in Asia and Africa. “Smart Food” is food that fulfills 3 major criteria: “good for you”, “good for the planet” and “good for the farmer”. Given the ongoing celebrations of the UN-FAO International Year of Millets 2023 (IYM 2023) the talk shall especially focus on ICRISAT’s efforts to mainstream millets into local food systems and empowering the local women and youth towards ensuring their Inclusive Market Oriented Development (IMOD). The talk shall cover:

- ICRISAT’s successful approach of strengthening local food systems by linking “Agriculture-Nutrition-Entrepreneurship” with an aim to achieve healthy, diverse and affordable diets and sustainably produced foods.
- Studies undertaken by ICRISAT to understand drivers of consumer choices and strengthen local value addition & food safety infrastructure, towards mainstreaming millets into food systems.
- The impacts of the innovative successful “Convergence model” that has been successfully implemented by ICRISAT in the tribal areas of India (Telangana and Odisha states), leading to establishment of “Smart Food”-based tribal women and youth run enterprises.

# The Complexity of Food Systems and the Life Course Approach to Overweight and Obesity Risk Mitigation

**Dr Sai Ram Challa**

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The prevalence of overweight and obesity is a significant global public health concern. Addressing this complex issue requires a multifaceted approach that considers the interplay of food systems, individual behaviours, and life course experiences. Food systems encompass the interconnected processes involved in the production, distribution, and consumption of food. The current global food system is characterized by an abundance of processed and ultra-processed foods, high levels of food marketing, and limited access to healthy foods, particularly in low-income communities. These factors contribute to unhealthy dietary patterns and an increased risk of overweight and obesity.

A life course approach recognizes that overweight and obesity are influenced by exposures throughout an individual's life, from early childhood to adulthood. Early life factors, such as parental feeding practices, physical activity levels, and socioeconomic status, can have a lasting impact on weight status. Additionally, lifestyle changes during adolescence and adulthood, such as increased sedentary behavior and unhealthy food choices, can further contribute to weight gain.

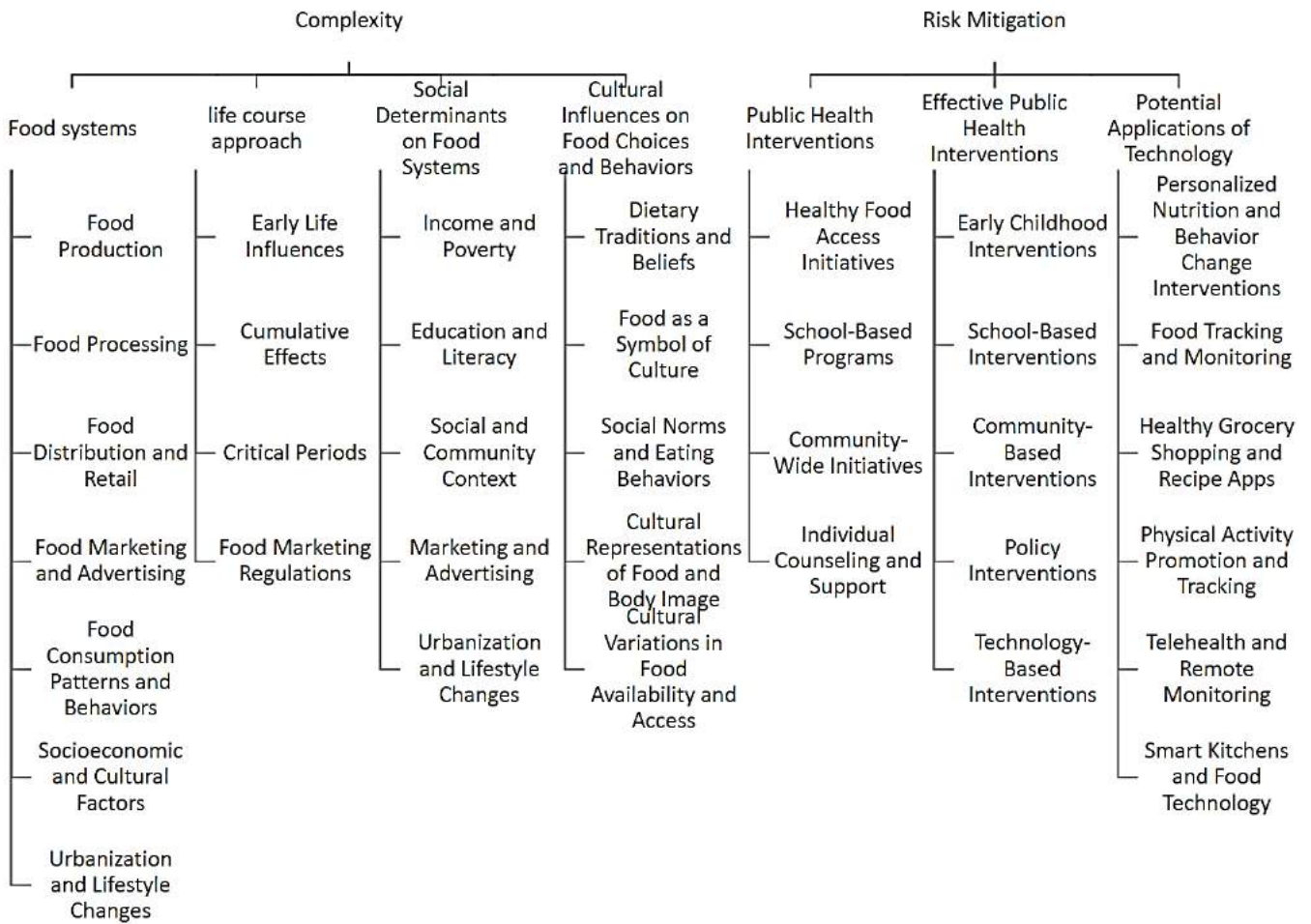
Mitigating overweight and obesity risk requires interventions that address the complexity of food systems and adopt a life course perspective. Comprehensive interventions should target multiple levels of influence, from individual behaviours to food environments and social determinants of health. Promising interventions include early childhood nutrition programs, school-based health education, community-based initiatives, and policy and regulatory measures that promote healthy food systems. Additionally, technological innovations, such as mobile apps and personalized nutrition counselling, can provide individuals with tailored support and promote healthy behaviours.

By implementing comprehensive interventions that consider the interplay of food systems, individual behaviours, and life course experiences, we can create a healthier environment for all individuals and reduce the burden of overweight and obesity.

**Keywords:** Food Systems, Life Course Approach, Overweight, Obesity, Risk Mitigation



**Fig: The Complexity of Food Systems and the Life Course Approach to Overweight and Obesity Risk Mitigation (Source: by the authors)**



## **Mainstreaming millets: sustainable millet food system for healthy life and healthy planet**

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Our current food systems are increasingly homogenised due to rapid urbanisation and modified lifestyle, in a way that is not healthy for humans as well as the planet. Only a few crops (rice, wheat, maize and potato) contribute to more than 60 per cent calorie requirements of the world's population. But cultivation and consumption of many staple agricultural crops including millets were in past traditional practice. Traditionally millets are consumed as rice with pulses or vegetables, porridge or rotis. It was observed that millet consumption in India has declined over the years which can be mainly attributed to the consumption of rice and wheat as major staples and the distribution of rice and wheat through government policies.

Nutritionally millets are equivalent or superior to other staple food like rice, wheat, maize etc. Millets are a good source of protein (7-12%), dietary fibre (15-20%) vitamins, minerals and many phytochemicals. Minerals such as iron, zinc, calcium, phosphorus and magnesium are abundantly found in millet which is comparatively higher than in rice and wheat. Millets also contain a good amount of B-vitamins especially B2 (riboflavin), B3 (niacin) and B9 (folic acid). Due to elevated levels of dietary fibre and reduced glycaemic carbohydrates, millets are reported as low Glycaemic Index (GI) food (<55 GI).

Understanding the importance of millets, the Indian government has taken many initiatives to increase the production and consumption of millet (Shree Anna). The National Food Security Mission (NFSM) has laid down specific operational guidelines focusing on increasing the production and distribution of quality seeds and training on modern agricultural technologies for increased millet production.

Nevertheless, mainstreaming the millet in-terms of cultivation and consumption certainly improves the food and nutrition. The inclusion of millet in our regular diet along with other staple crops such as rice and wheat improve the dietary diversity which will lead to benefit not only the health of humans but also the planet.

## YOUNG SCIENTISTS AWARDS SESSION - I

25<sup>th</sup> November 2023

Venue: Auditorium main hall

2:30 pm – 4:00 pm.

<b>SENIOR AWARD IN EXPERIMENTAL NUTRITION</b>					
<b>Abstract ID</b>	<b>Presenter name</b>	<b>Affiliation</b>	<b>City</b>	<b>Email</b>	<b>Title of Presentation</b>
YS-2023-0005	Ms.ATHIRA A S	ICMR NIN	HYDERABAD	athiraabc111@gmail.com	Vitamin D Deficiency and Insufficiency Induce ER Stress Leading To Apoptotic Cell Death In The Rat Heart
YS-2023-0008	Ms.Ayesha Ashraf Kherani	College of Home Science, Nirmala Niketan, Mumbai	Mumbai	ayeshakherani2595@gmail.com	Impact Of Curcuminoids And Piperine Supplementation On Systemic Inflammation, Pain And Physical Functioning In Patients With Knee Osteoarthritis
YS-2023-0010	Mr.Krishna Kalyan Kalahasti	ICMR-National Institute of Nutrition	Hyderabad	Kalahastikrishnakalyan@gmail.com	Attenuation of cataracts through a functional food mix in a diabetic rat model
YS-2023-0017	Ms.Nikita Joshi	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune	joshinikita706@gmail.com	Fatty acids and their metabolites (resolvins) are altered in women with gestational diabetes mellitus (GDM)
YS-2023-0022	Ms.Rajashri	CSIR-CFTRI, Mysuru	Mysuru	rajashrikulal872@gmail.com	Enhancing the efficacy of spice oleoresins in alleviating depression symptoms: a nano-formulation approach using hydroxypropyl-beta-cyclodextrin
YS-2023-0027	Dr.Divika Sapehia	PGIMER Chandigarh	Chandigarh	divika90@gmail.com	Trimethyl profile of histones H3 lysine 4 of Dlk1 and Grb10 imprinted genes affects the outcomes of pregnancy due to excess folic acid and low vitamin B12 dietary manipulation
YS-2023-0034	Ms.Archana Molangiri	National institute of nutrition	Hyderabad,	molangiri.archana@gmail.com	Gestational exposure to endocrine-disrupting bisphenol alters the expression of transporter activities in the placenta: implications for offspring obesity

YS-2023-0005

**Abstract Title: VITAMIN D DEFICIENCY AND INSUFFICIENCY INDUCE ER STRESS LEADING TO APOPTOTIC CELL DEATH IN THE RAT HEART**

**Ms. ATHIRA A S**, PhD scholar, athiraabc111@gmail.com , ICMR NIN, Hyderabad; Dr. Ayesha Ismail, scientist –F, ICMR-NIN, Hyderabad, Telangana; Dr. Shabna Aboo, scientist-B, ICMR-NIN, Hyderabad, Telangana

**Background:** Vitamin D is known to have a biological role in many extraskeletal tissues in the body including the heart. Vitamin D acts as an anti-oxidant and has been shown in several studies to lower the risk of cardiovascular disease both in animals and humans. In the present study, using a rat model we examined if vitamin D deficiency or insufficiency leads to oxidative stress, ER stress, and apoptotic cell death of cardiac cells. **Methods:** A preclinical rat model of vitamin D deficiency or insufficiency was employed for the study. Serum vitamin D-dependent parameters were estimated using standard methods or commercial kits. The levels of markers of protein oxidation, lipid peroxidation, nitrosative stress, and activities of antioxidant markers were estimated by spectrophotometric methods. 8-hydroxy-2-deoxyguanosine (8OHdG) in the heart was estimated using the kit method. Gene expression was done by qPCR, and protein expression was assessed by western blotting. **Result:** Serum levels of 25OHD3 which reflect Vitamin D status were significantly decreased in both the vitamin D deficient [VDD] and low vitamin D [LVD] groups compared to the normal vitamin D [NVD] group. The levels of markers of lipid, protein, and DNA oxidation were increased whereas activities of antioxidant enzymes were significantly decreased in the VDD group in comparison to the NVD group, suggestive of an increase in oxidative stress in the heart. Protein expression of the antioxidant transcription factor, NRF2 as well as expression of its downstream target proteins were decreased in the VDD and LVD heart. Furthermore, the expression of genes and proteins involved in ER stress was significantly increased in VDD hearts compared to controls. Expression of pro-apoptotic markers was elevated, while the anti-apoptotic marker was reduced in the VDD heart. **Conclusion:** Our data demonstrates that chronic vitamin D deficiency or insufficiency can lead to an increase in oxidative stress which in turn may increase ER stress thereby inducing apoptosis in the heart.

**Keywords:** Vitamin D, Heart, Apoptosis, Oxidative

YS-2023-0008

**Abstract Title: IMPACT OF CURCUMINOIDS AND PIPERINE SUPPLEMENTATION ON SYSTEMIC INFLAMMATION, PAIN AND PHYSICAL FUNCTIONING IN PATIENTS WITH KNEE OSTEOARTHRITIS**

**Ms. Ayesha Ashraf Kherani**, PhD scholar (UGC-NET senior research fellow), College of Home Science, Nirmala Niketan, Mumbai, Maharashtra, [ayeshakherani2595@gmail.com](mailto:ayeshakherani2595@gmail.com); Dr. Geeta Ibrahim, Former Principal, College of Home Science, Nirmala Niketan, College of Home Science, Maharashtra, Mumbai; Dr. Zubair Sorathia, Director and Orthopaedic surgeon, Medicare Hospital, Medicare Hospital, Marol, Mumbai, Maharashtra, Mumbai.

**Background:** Knee Osteoarthritis (OA), also known as degenerative arthritis is an inflammatory condition which causes a progressive loss of articular cartilage. Current mainstay of therapy is analgesics and NSAIDs that have partial efficacy with diverse side effects. Effective and safer complementary therapies are needed for treatment of knee OA in Indians. Aims and objectives: The objective of this study was to investigate the impact of curcuminoids on systemic inflammation, pain and physical functioning in patients with knee osteoarthritis. **Methods:** This study was a randomized, parallel group, single-blind, placebo-controlled trial where 101 patients with radiographic evidence of Knee OA were randomized to receive either curcuminoids (1500mg/day, n=51) or matched placebo (n=50) for a period of 3 months. Each curcuminoid capsule contained 500 mg curcuminoids (curcumin, demethoxycurcumin, bisdemethoxycurcumin) and 5mg piperine extract to enhance the bioavailability of curcuminoids. Inflammatory markers (high-sensitivity C- Reactive Protein-hsCRP; and Erythrocyte Sedimentation Rate-ESR), pain (using Visual Analogue Scale or VAS score) and physical functioning

(using Western Ontario and McMaster Universities Osteoarthritis Index or WOMAC score and 6-minute walk test) were assessed at baseline and end of trial. All statistical procedures were performed using SPSS Software. Normality was assessed using Shapiro Wilk test. Between and within group comparisons were performed using ANOVA and paired samples t-test. Two-sided p-value of <0.05 was considered to be statistically significant. **Result:** A significant reduction in hsCRP (p=0.001) and ESR levels (p=0.001) was noted in the curcuminoids group as compared to the placebo group. There was a significant reduction in VAS and WOMAC (subscales and total WOMAC) from baseline to end of trial in both the groups (p=0.001). A significant improvement in 6-minute walk test was observed at the end of trial in both the groups (p<0.05). There was a significantly greater percentage improvement in hsCRP, ESR, VAS, WOMAC (subscales and total WOMAC) and 6-minute walk test in the curcuminoids group as compared to the placebo group (p<0.05). **Conclusion:** Supplementation with curcuminoids resulted in a significant reduction in inflammation and pain and improvement in physical functioning and thus could be a safe and effective complementary therapy in patients with knee OA.

**Keywords:** Curcumin, Inflammation, Osteoarthritis, Pain, WOMAC

#### YS-2023-0010

**Abstract Title: Attenuation of cataracts through a functional food mix in a diabetic rat model**

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**Background:** Globally, more than 537 million people are affected by diabetes mellitus. Cataracts are a significant cause of visual impairment due to diabetes, as the incidence and progression of cataracts are higher in patients with diabetes mellitus. Among adults aged 45 and over with diagnosed diabetes, 32.2% had cataracts, and 9.2% had vision loss due to cataracts. The current study was designed to investigate a functional food (FF) mixture containing bioactive compounds with aldose reductase and non-enzymatic glycation inhibitory potential for its effect on onset and progression of cataracts in a diabetic rat model. **Methods:** Two months old Sprague Dawley rats were grouped as control (C), diabetes untreated (D), and diabetic rats treated with FF at two doses (FF1= 1.35 g and FF2=6.25 g/100g of diet). Diabetes was induced by a single injection of streptozotocin. The FF is a mixture of amla, turmeric, black pepper, cinnamon, ginger, and fenugreek added to the AIN-93 rodent diet. The status of cataracts was monitored weekly by a slit lamp microscope examination for 20 weeks, after which animals were sacrificed to collect eye lenses for estimating biochemical and enzyme activities. **Result:** Feeding FF to diabetic rats showed reduced fasting blood glucose and prevented body weight loss compared to the diabetic group. FF delayed cataract progression, loss of lens crystallins, and their insolubilization in diabetic rats. The antioxidant potential of FF was evident with the lowered protein carbonyls, lipid peroxidation, and prevention of altered antioxidant enzyme activities induced by diabetes. **Conclusion:** FF with the mixture of amla, turmeric, cinnamon, black pepper, ginger, and fenugreek through multiple actions with its synergistic effect delayed cataract progression in diabetic rats.

**Keywords:** Diabetes, Cataract Progression, Functional Food

#### YS-2023-0017

**Abstract Title: Fatty acids and their metabolites (resolvins) are altered in women with gestational diabetes mellitus (GDM)**

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Professor, Interactive Research School for Health Affairs (IRSHA), Bharati Vidyapeeth (Deemed to be University), Pune; Dr. Ghattu Krishnaveni, Epidemiology Research Unit, CSI Holdsworth Memorial Hospital, Mysore; Dr. Sanjay Gupte, Gupte Hospital and Research Centre, Pune; Dr. Sadhana Joshi, Professor and Head, Interactive Research School for Health Affairs (IRSHA), Bharati Vidyapeeth (Deemed to be University), Pune

**Background:** An imbalance in dietary consumption of polyunsaturated fatty acids (PUFA) has been suggested to be a risk factor for the development of gestational diabetes mellitus (GDM). Omega-3 fatty acids like EPA and DHA are precursor for the biosynthesis of E-series (RvE) and D-series resolvins (RvD) respectively. These potent lipid mediators are known to possess both pro-resolving and anti-inflammatory properties. This study reports the levels of maternal and placental fatty acids and placental resolvins and their association in GDM and non-GDM women. **Methods:** The current study was undertaken as a part of the Indian Council of Medical Research-Centre for Advanced Research (ICMR-CAR). Women were recruited in early pregnancy and maternal blood [at 11–14 (V1), 18–22 (V2), 26–28 (V3) weeks and at delivery (V4)] and placenta was collected. A total of 209 GDM and 207 non-GDM women were included in the study. Fatty acids were estimated using gas chromatography. The protein levels of resolvins (RvE1, RvE2, RvD1 and RvD2) were assessed using commercially available ELISA kits. **Result:** Total polyunsaturated fatty acids (PUFA), linoleic acid (LA) and arachidonic acid (AA,  $p < 0.01$ ) were lower in women with GDM. In contrast, total saturated fatty acids (SFA,  $p < 0.05$ ), alpha-linolenic acid (ALA) and eicosapentaenoic acid (EPA,  $p < 0.05$ ) were higher. Placental AA was lower ( $p < 0.05$ ) in women with GDM. Placental protein levels of RvE1, RvD1 and RvD2 were lower ( $p < 0.001$  for all) in GDM group. Maternal erythrocyte proportions of omega-3 fatty acids, omega-6 fatty acids and total PUFA were negatively associated with RvE2 in GDM at early pregnancy. Placental ALA was positively associated with RvD2 ( $p < 0.05$ ) in GDM group. **Conclusion:** Maternal fatty acid status influences pro-resolving mediators which are likely to lead to increased inflammation in GDM.

**Keywords:** Fatty acids, resolvins, GDM

YS-2023-0022

**Abstract Title: Enhancing the efficacy of spice oleoresins in alleviating depression symptoms: a nano-formulation approach using hydroxypropyl-beta-cyclodextrin**

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**Background:** Depression is a debilitating mental health disorder affecting millions of people worldwide. Despite the availability of various pharmaceutical interventions, the search for novel and effective treatments continues. Recent research has shown promising therapeutic potential in natural compounds, including spice oleoresins, due to their diverse bioactive constituents. This study investigates the use of a nanoformulation technique involving Hydroxypropyl-beta-cyclodextrin (HPBCD) to enhance the bioavailability and efficacy of spice oleoresin in alleviating depression symptoms in a mice model. **Methods:** Turmeric and chilli oleoresins were extracted using ethanol, and an inclusion complex was prepared using Hydroxypropyl beta-cyclodextrin (HPBCD). Further, the oleoresin-HPBCD inclusion complex was characterised by SEM, XRD, particle size, zeta potential, FTIR, in-vitro dissolution and bioavailability study. After the efficacy study, the stress was given to all groups of animals for 21 days. Nanoencapsulated turmeric oleoresin (NTOR) and Nanoencapsulated chilli oleoresin (NCOR) (20 mg/kg) were administered to the Swiss albino mice for 21 days. Further, animals were evaluated for behavioural activity, and brain samples were analysed for neurotransmitter level and other biochemical parameters. **Result:** The particle size and zeta potential of NTOR were 153nm and -38.67 mV, and for NCOR, they were 169.1nm and -40.43 mV, indicating stability. The percentage of amorphous was increased after the encapsulation from 45 to 50%, which indicates the solubility. The in-vitro drug release study showed that the highest percentage of the drug was released in the intestine phase rather than in the stomach and colon. The percentage of the active component released in the intestine was 89 and 88% by NTOR and NCOR, respectively. The bioavailability of these oleoresins was also improved up to 40-50 %. The administration of NTOR and NCOR for 21 days has

elevated behavioural activity and neurotransmitter levels. The monoamine oxidase enzyme activity was reversed after the treatment of encapsulated oleoresins. **Conclusion:** This research investigates the potential of utilizing HPBCD-based nanoformulation to enhance the therapeutic effectiveness of spice oleoresins in mitigating depression, shedding light on a novel approach to mental health treatment.

**Keywords:** Hydroxypropyl-beta-cyclodextrin, Spice oleoresin, Nano-encapsulation, Depression

#### YS-2023-0027

**Abstract Title: Trimethyl profile of histones H3 lysine 4 of Dlk1 and Grb10 imprinted genes affects the outcomes of pregnancy due to excess folic acid and low vitamin B12 dietary manipulation**

**Dr. Divika Sapehia**, Research Associate, PGIMER Chandigarh, [divika90@gmail.com](mailto:divika90@gmail.com); **Dr. Aatish Mahajan**, Post-doc research scholar, PGIMER, Chandigarh; **Mr. Parampal Singh**, PhD research Scholar, PGIMER, Chandigarh; **Prof. Jyotdeep Kaur**, Professor, PGIMER, Chandigarh

**Background:** Due to the participation of vitamin B12 and folic acid in the regulation of methylation through the one-carbon metabolic cycle, their deficiency and excess in early development may impair imprinting, and can hence impact fetal development. **Methods:** We used a transgenerational C57BL/6J mice model in which animals were fed with dietary combinations of folic acid and low vitamin B12 in four different groups. Mating was carried out within each group in the F0 generation, and after weaning for 3 weeks in the F1 generation each group was divided into two sub-groups, while one group of mice was continued on the same diet (sustained group), the other was shifted to a normal diet (transient group) for 6–8 weeks (F1). Mating was carried out again within each group, and on day 20 of gestation, the maternal placenta (F1) and fetuses (F2) were isolated. Expression of imprinted genes, gene-specific promoter methylation, histone modifications, and fetal growth parameters were studied. We further validated the epigenetic mechanism in a human placental cell line. **Result:** We observed generation-wise opposing methylation trends in the promoters of the two developmental genes Dlk1 and Grb10, which might not be the regulatory one. However, enrichment of H3K4me3, an activating mark in vitamin B12 deficient and excess folic acid group was seen in F1 placental tissue in association with increased gene expression in both sustained and transient dietary groups. On correlating fetal growth parameters and gene expression, a significant negative correlation was found between Dlk1 expression and placental weight ( $r = -0.49$ ,  $p < 0.05$ ) and Grb10 expression and crown-rump length ( $r = -0.501$ ,  $p < 0.05$ ) of fetuses of F2 generation. In congruence with these results, we also found H3K4me3 at the promoter of Grb10 and Dlk1 gene negatively associated with all fetal growth parameters of the same generation. We further treated placental cells with vitamin B12 deficiency and modulated folic acid levels and upon treatment of the cells with a demethylating agent, there was an increase in gene expression. **Conclusion:** Our findings suggest that balance in vitamin B12 and folic acid levels is important for maintaining the adequate transcriptional status of fetal growth-related imprinted genes and fetal development.

**Keywords:** Placenta, Vitamin B12, Folic acid

#### YS-2023-0034

**Abstract Title: Gestational exposure to endocrine-disrupting bisphenol alters the expression of transporter activities in the placenta: implications for offspring obesity**

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**Background:** Bisphenol A (BPA) is a ubiquitous plastic-derived chemical, present in food contaminant that can seep into food or beverages from containers made with BPA, ultimately entering the circulatory

system. Previously, we demonstrated that BPA exposure during pregnancy results in obese offspring and metabolic dysfunction due to obesity. As the mothers were exposed to BPA, the offspring developed obesity, anchoring the placenta as an interphase between mother and fetus. The placenta is a transient organ whose effect is imaginably at risk from the action of endocrine-disrupting chemicals, primarily BPA. The role of the placenta in leading to offspring obesity due to BPA exposure is unknown. This study is the first of its kind to understand the role of the placenta on gestational BPA exposure and its implication for offspring obesity **Methods:** The effects of bisphenol exposure on the placenta were examined in Wistar rats, where dams were orally gavaged with BPA (0.4 and 4.0  $\mu\text{g}/\text{kg}$  bw) and continued to receive from embryonic day (ED) 4 to 14.5. The placental tissues were harvested and compared with the unexposed control dams. The placental tissues were measured for protein and gene expression involving lipid and glucose transporter proteins, proteins related to lipid storage, and leptin receptor signalling proteins. **Result:** The expression of lipid biogenesis mediators (ADRP, LPL, and PPAR $\gamma$ ), lipid storage proteins, and leptin receptor (LepR) were highly elevated in the placental unit, indicating prominent fat accumulations in the placenta. The expression of placental intracellular fatty acid trafficking protein (FABP3), fatty acid transporter proteins (FATP1, FATP2), and glucose transporter protein (GLUT1) were significantly upregulated ( $p < 0.05$ ). The placental tissue upon BPA exposure was augmented by tissue inflammation due to increased expression of pro-inflammatory cytokines and transcription factors involved in the inflammation pathway (TNF $\alpha$ , NF $\kappa$ B, IL1 $\beta$ , and IL6). The placental glucocorticoid levels were upregulated due to corticosterone production (HSD11 $\beta$ ). The changes were modified epigenetically by altering the enzymes related to DNA methyltransferases (DNMT3a, DNMT3b). **Conclusion:** Overall, gestational BPA exposure alters the placental activities, indicating an excess supply of lipids and glucose to the fetus that might predispose to obesity in the offspring. ( $p < 0.05$ ).

**Keywords:** Placenta; Endocrine disruption; Bisphenol A



## JUNIOR AWARD IN EXPERIMENTAL NUTRITION

Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
YS-2023-0031	Ms.P. Harshitha Yadav	ICMR-National Institute of Nutrition	Secunderabad	harshithayadav538@gmail.com	Alterations In Gut Microbiota Composition Among Children Under Five Years with Uncomplicated Severe Acute Malnutrition (SAM)
YS-2023-0006	Ms.Siva Dharani T	Sri s. Ramasamy Naidu memorial college,	Sattur	sivadharanit@srnmcollege.ac.in	Insilico Studies Of the Rice Wafers Incorporated With Natural Plant Pigments
YS-2023-0012	Ms.Girija Umesh Damle	SVT College of Home Science (Empowered Autonomous)	Mumbai	damlegirija@gmail.com	Development and Standardization of Region Specific Indian Low FODMAP Recipes for Southern and Eastern India
YS-2023-0037	Ms.Anjali Gadwal	Akkamahadevi women's University Vijayapura	Vijayapura	anjalgadwal45@gmail.com	Development of Nitrate Rich Foods for Sports Person

### YS-2023-0031

**Abstract Title: ALTERATIONS IN GUT MICROBIOTA COMPOSITION AMONG CHILDREN UNDER FIVE YEARS WITH UNCOMPLICATED SEVERE ACUTE MALNUTRITION (SAM)**

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**Background:** Despite taking various measures, undernutrition remains a leading cause of morbidity and mortality in children under five. Childhood undernutrition is associated with various underlying factors such as diet, sociodemographic settings, gut microbiota composition, etc., which significantly determine nutritional status. Our study aimed to explore the role of gut microbiota in severe acute malnutrition in children under five years. **Methods:** In the current case-control study, we enrolled 115 children aged 6-59 months from Anganwadi centres in Hyderabad, Telangana. Based on weight-for-height (WHZ) standards calculated by the World Health Organization (WHO), 52 severely acute malnourished children (WHZ <-3SD) and 63 healthy children (WHZ between -1 and +1SD) were enrolled for the study. The diet and sociodemographic data of the subjects were assessed using three different questionnaires, namely a structured sociodemographic proforma, 24-hour dietary recall and food frequency questionnaire. The taxonomic composition of gut microbiota was determined from faecal samples by 16S ribosomal RNA gene sequencing targeting the V3-V4 region. Differences in the relative abundance of bacterial groups, alpha diversity and beta diversity were compared between SAM and healthy children. **Result:** The results of the 16S rRNA gene sequencing indicated that SAM children exhibited reduced bacterial diversity and richness when compared to their healthy counterparts.

Although both SAM and healthy children presented with four major phyla—Firmicutes, Bacteroidetes, Actinobacteria, and Proteobacteria—the abundance of these bacterial phyla differed significantly between the two groups. Furthermore, SAM children displayed notably higher levels of opportunistic pathogens such as *Campylobacter*, *Listeria*, *Enterococcus*, *Brevundimonas*, and *Succinivibrio*, suggesting the presence of gut dysbiosis. Additionally, the LefSe analysis unveiled differentially abundant bacterial groups at various taxonomic levels in SAM children in comparison to healthy controls. Moreover, it was found that diet and sociodemographic factors were associated with severe acute malnutrition. **Conclusion:** Our study provides a comprehensive insight into the altered gut microbiota composition of severely acute malnourished children compared to healthy children. In addition, our results also suggest the specific role of diet and sociodemographic factors in determining the nutritional status of children.

**Keywords:** Gut microbiota, SAM, Dysbiosis, Diet

**YS-2023-0006**

**Abstract Title: INSILICO STUDIES OF THE RICE WAFERS INCORPORATED WITH NATURAL PLANT PIGMENTS**

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**Background:** In order to attain the sustainable healthy eating, the present investigation is attempted to formulate and incorporate the extruded snacks like rice wafers with natural plant pigments i.e., betanins,  $\beta$ -carotene and chlorophyll. The study focused mainly on the possibility of intrusion of plant pigment in the extruded snack in a convenient way even in the level of cottage industry as they are the central distribution part of human society. The salient findings of the present investigation adding to the existing knowledge in the field. **Methods:** Through a quantitative research study on the formulated rice wafers, the nutrients and pigments of the formulated product with the standard product is compared and statistically analysed. Data for sensory evaluation is collected through a score card prepared specifically for the formulated product, type of respondents etc. Data for proximate and pigmentation profile was obtained through the laboratory reports. Data on Shelf-life study was acquired through observation manner. Studied the storage properties of the product and carried out the insilico studies of the formulated Rice Wafers. **Result:** This study was aimed to find a potential inhibitors of AChE protein from the bioactive compounds of Rice Wafers. It was found that Betanin from Beta Rice Wafers had highest affinity of -8.5 followed by Beta – carotene of Carota Rice Wafers with -7.7 and lowest being Caryophyllene from Minto Rice Wafers with -7.0 affinity towards the protein (AChE). **Conclusion:** Rice Wafers are formulated with a motto of providing a healthy snack with addition of plant pigments that not only add natural colorant but also supply enormous nutrition. Pigmentation profile was investigated to find any difference in the plant pigments such as Anthocyanin, Betalain, Beta – carotene, Chlorophyll and Vit C contents before and after frying of the Rice Wafers. It was found that there were no significant differences in the pigment contents.

**Keywords:** RICE WAFER, BETALAIN, CAROTENE, CARYOPHYLENE

**YS-2023-0012**

**Abstract Title: Development and Standardization of Region Specific Indian Low FODMAP Recipes for Southern and Eastern India**

**Ms. Girija Umesh Damle**, PhD Scholar, Assistant Professor (Contract), SVT College of Home Science (Empowered Autonomous), Mumbai; [damlgirija@gmail.com](mailto:damlgirija@gmail.com); **Ms. Sakshi Rajole-Patil**, Consultant Nutritionist, Splendour Nutrikingdom, Nashik; **Dr. Panchali Moitra**, Assistant Professor, SVT College of Home Science (Empowered Autonomous), SNDT Women's University, Mumbai,

Mumbai; Dr. Jagmeet Madan, Professor and Principal, SVT College of Home Science (Empowered Autonomous), SNDT Women's University, Mumbai.

**Background:** Irritable bowel syndrome (IBS) is a chronic gastrointestinal disorder characterized by altered bowel movements and abdominal discomfort among other symptoms that may affect the quality of life. A low FODMAP diet has been found to effectively manage IBS symptoms. However, the administration of the low FODMAP diet in the Indian population is challenging due to a lack of data about the FODMAP content of Indian foods and the diverse cuisines of the different regions across India. The present study aimed to develop a low FODMAP recipe database and standardize region-specific modified low FODMAP recipes for South and East India. **Methods:** The study was conducted in 3 phases. In phase 1, a database of recipes (n=178) consumed across south and east India was curated. The FODMAP content for these recipes was then computed using the Monash Online FODMAP Calculator. In the third phase, 20 high FODMAP recipes from each region were modified into two low FODMAP versions each by completely eliminating the high FODMAP ingredient or replacing it with a suitable low FODMAP ingredient. These were standardized and underwent sensory evaluation by a panel of community-living adults (using a 9-point hedonic scale. **Result:** Oligosaccharides are the major FODMAP group present in the South and East Indian diets. Onion, garlic, wheat, and lentils are the major contributors of oligosaccharides (fructans and galacto-oligosaccharides). The modified south and east Indian low FODMAP recipes were well accepted by the participants (n=8). The panelists found no significant difference in the taste, appearance, aroma, texture, and acceptability between the original and at least one modified version for 19 out of the 20 South Indian recipes and in all 20 East Indian recipes. **Conclusion:** The modified low FODMAP recipes were well accepted by the South and East Indian population. The database of recipes, their FODMAP content and the standardised modified low FODMAP recipes developed in the study can be used for conducting intervention studies to assess the efficacy of the low FODMAP diet for the management of IBS in the Indian population.

**Keywords:** FODMAP, IBS, Fructans, Recipes, SensoryEvaluation

YS-2023-0037

**Abstract Title: Development of Nitrate Rich Foods for Sports Person**

**Ms.AnjaliGadwal**, Student, Akkamahadevi women's University Vijayapura, Karnataka; [anjalgadwal45@gmail.com](mailto:anjalgadwal45@gmail.com); Dr.Renuka Meti, Professor, Akkamahadevi women's University Vijayapura, Karnataka.

**Background:** Innovation has always been at the forefront of sport. The International Olympic Committee working group on sports nutrition concludes that the amount, composition, and timing of food intake can profoundly affect sports performance. Good Nutritional practice will help athletes, train hard, recover quickly, and adapt more effectively with less risk of illness and injury (IOC Consensus Statement on Sports Nutrition, 2004). Nearing 2 decades after these recommendations remain pertinent. Despite all this progress, Scientific Endeavour, the ability to determine the impact of sports nutrition for different groups of athletes is still elusive. However, very recent research focuses on the importance of nitrates as a performance indicator. In the present study, cowpea products are experimentally developed by standardization of nitrate-rich Cowpea Burfi, with peanut Burfi as control and 3 variations of cowpea Burfi, cowpea-peanut Burfi, cowpea-rice Burfi, the other product was Cowpea- Barley protein powder which was made by a cereal-pulse combination which is also nitrate-rich source of cowpea and barley flavored with cocoa powder. Cowpea fries were also made with a simple frying method and flavored with certain spices. The protein powder product nutrition analysis was done by AOAC methods. the results of the nutrient analysis revealed that protein content was found to be (31.05g/100g), crude fiber (4.66g/100g), calcium(18.26mg/100g), and iron(3.12mg/100g) respectively. Sensory evaluation of cowpea Burfi, Cowpea- Barley protein powder, and cowpea fries were conducted by 9 9-point hedonic scale standard method. The products were evaluated for sensory attributes by a trained and untrained panelist from Teaching staff, non-teaching staff, scholars, and postgraduate students of Karnataka State Akkamahadevi Women University Vijayapura. The Overall Acceptability of B1, B2, B3 B4 were 8.5, 7.6, 8.4, and 4.3 respectively. The B3(Cowpea-peanut Burfi) was highly acceptable. The Overall Acceptability of protein powder variations like P1, P2, P3 P4 were

8, 9, 7.6, and 8 respectively, the variation P2(7gm of Cowpea- Barley protein powder in drink) was highly acceptable. The Cowpea fries had no variations and overall acceptability was 8.6 respectively. **Methods:** In the present study, cowpea products are experimentally developed by standardization of nitrate-rich Cowpea Burfi, with peanut Burfi as control and 3 variations of cowpea Burfi, cowpea-peanut Burfi, cowpea-rice Burfi, the other product was Cowpea- Barley protein powder which was made by a cereal-pulse combination which is also nitrate-rich source of cowpea and barley flavored with cocoa powder. Cowpea fries were also made with a simple frying method and flavored with certain spices. The protein powder product nutrition analysis was done by AOAC methods. the results of the nutrient analysis revealed that protein content was found to be (31.05g/100g), crude fiber (4.66g/100g), calcium(18.26mg/100g), and iron(3.12mg/100g) respectively. **Result:** Sensory evaluation of cowpea Burfi, Cowpea- Barley protein powder, and cowpea fries were conducted by 9 9-point hedonic scale standard method. The products were evaluated for sensory attributes by a trained and untrained panelist from Teaching staff, non-teaching staff, scholars, and postgraduate students of Karnataka State Akkamahadevi Women University Vijayapura. The Overall Acceptability of B1, B2, B3 B4 were 8.5, 7.6, 8.4, and 4.3 respectively. The B3(Cowpea-peanut Burfi) was highly acceptable. The Overall Acceptability of protein powder variations like P1, P2, P3 P4 were 8, 9, 7.6, and 8 respectively, the variation P2(7gm of Cowpea- Barley protein powder in drink) was highly acceptable. The Cowpea fries had no variations and overall acceptability was 8.6 respectively. **Conclusion:** The present study concludes that it's an effort to prepare nitrates-rich products based on the foods rich in nitrates which are good for sportspersons to improve their oxygen uptake. Furthermore, the research must be carried out in-depth on nitrates and other related biochemical parameters.

**Keywords:** Cowpea, Nitrates, Sports Nutrition, Protein

## YOUNG SCIENTISTS AWARDS SESSION - 2

26<sup>th</sup> November 2023

Venue: Auditorium main hall

9:30 am – 11:00 am.

<b>SENIOR AWARD IN COMMUNITY NUTRITION</b>					
<b>Abstract ID</b>	<b>Presenter name</b>	<b>Affiliation</b>	<b>City</b>	<b>Email</b>	<b>Title of Presentation</b>
YS-2023-0007	Ms. Ridhima Kapoor	Department of Food and Nutrition & Food Technology	New Delhi	kapoor.ridhima@li c.du.ac.in	Diet Optimization to ensure nutritious, culturally acceptable, and low-cost diets for Ho tribal women of Jharkhand, India
YS-2023-0009	Ms. Mugdha Deshpande	Hirabai Cowasji Jehangir Medical Research Institute, Savitribai Phule Pune University	Pune	msdeshpande96@gmail.com	Prevalence of maternal prenatal distress and poor sleep quality during early pregnancy
YS-2023-0021	Ms. Prathiksha R Bhat	Department of Food Science and Nutrition	Mysuru	prathiksha.bhat27@gmail.com	The Impact of Dietary Inflammatory Index on Biochemical and Body Composition Parameters in Pre-Dialysis Chronic Kidney Disease
YS-2023-0023	Ms. Rachael Alphonso	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	rachaelalphonso@gmail.com	Sustainability of Nutri-Cereals and The Future of Food Labelling: A Case Study Using Life Cycle Analysis (LCA)
YS-2023-0026	Dr. E R Nandeep	ICMR-NIN	Hyderabad	e.r.nandeep@gm ail.com	Implementation, delivery, and utilization of rice fortification program across different states in India: An exploratory mixed-method Study
YS-2023-0030	Ms. Shraddha S	Department of Studies in Food Science and Nutrition, University of Mysore	Mysuru	shraddha.shivaku mar@gmail.com	IMPACT OF PHYSICAL ACTIVITY AND BODY COMPOSITION ON OXIDATIVE STRESS IN WOMEN WITH AND WITHOUT POLYCYSTIC OVARY SYNDROME
YS-2023-0032	Dr. Bhavika Singhvi	ICMR-NIN	Hyderabad	singhvibhavika@g mail.com	IMPACT OF A COMPREHENSIVE INTERVENTION TO LOWER BLOOD PRESSURE AMONG HYPERTENSIVE ADULTS: EXPERIMENTAL-CONTROL STUDY
YS-2023-0033	Dr. C.S.SURYA GOUD	ICMR-NATIONAL INSTITUTE OF NUTRITION	Hyderabad	suryachuka@gma il.com	"Evaluation of Food-based Nutritional Security among Rural Households of Tamil Nadu and Orissa Participating in Nutrition Education and Nutri-Gardens Initiative-Unveiling the Qualitative Outcomes"

YS-2023-0007

**Abstract Title: Diet Optimization to ensure nutritious, culturally acceptable, and low-cost diets for Ho tribal women of Jharkhand, India**

**Ms. Ridhima Kapoor**, PhD Scholar, Department of Food and Nutrition & Food Technology, New Delhi, [kapoor.ridhima@lic.du.ac.in](mailto:kapoor.ridhima@lic.du.ac.in); Mr. Jawahar Manivannan, Senior Research Analyst, Division of Epidemiology, Biostatistics and Population Health, St. John's Research Institute, Bengaluru, Karnataka; Dr. Tinku Thomas, Professor and Head of the Department, Department of Biostatistics, St. John's Medical College; Dr. Manisha Sabharwal, Professor, Department of Food and Nutrition & Food Technology, Lady Irwin College, University of Delhi, Delhi; Dr. Suparna Ghosh-Jerath, Program Head, Nutrition, The George Institute for Global Health INDIA, Delhi

**Background:** Traditional food-based approaches often undermine the role of socioeconomic, cultural and political factors, which greatly influence the food consumption patterns in a population. The present study employed a mathematical modelling approach-linear programming, to develop nutritious, affordable and contextual diets for nutritionally vulnerable Ho tribal women of Jharkhand. **Methods:** The analysis was conducted using food consumption and price data collected during winter season from Ho tribal community, living in randomly selected villages of Khuntpani and Chakradharpur blocks of West Singhbhum district in Jharkhand. The food and nutrient intake data of Ho women (18-49 years) were elicited using 24 h recalls (n=284) and food frequency questionnaire (n=108). Market surveys (n=10) were conducted to document the local food prices. Linear programming was used to identify low-cost foods and their portion sizes that fulfilled the nutritional requirements of Ho women. Additional constraints on daily intakes of foods and food groups were also introduced to ensure that the diets were compatible with local food patterns. The community acceptability was explored using focus group discussions. **Result:** Two variants of optimized diets were developed-vegetarian and non-vegetarian. Both diets fulfilled 100% of EAR for all macronutrients and important micronutrients (including iron, calcium, zinc, vitamin A, C, and folate). Requirements of thiamine, niacin and pyridoxine were met at 90-96% EAR while requirements of riboflavin were met at 50-70% EAR. The per-day costs of these diets ranged between 31-33 INR. Qualitative enquiries with the community revealed a high acceptability of these diet recommendations. **Conclusion:** The present study showed that linear programming can be used to formulate evidence-based diet solutions for a nutritionally vulnerable population, utilizing their contextual foods. This approach considered factors like local dietary patterns, available foods, and their affordability to provide specific and nutritionally relevant food-based recommendations. Thus, linear programming technique could potentially be used towards designing future intervention strategies, that could be long-term solutions to address micronutrient malnutrition in vulnerable populations.

**Keywords:** diet optimization; evidence-based diets

YS-2023-0009

**Abstract Title: Prevalence of maternal prenatal distress and poor sleep quality during early pregnancy**

**Ms. Mugdha Deshpande**, Ph.D. Student, Hirabai Cowasji Jehangir Medical Research Institute, Savitribai Phule Pune University, Pune, Maharashtra, [msdeshpande96@gmail.com](mailto:msdeshpande96@gmail.com); Dr. Anuradha Khadilkar, Pediatrician, Deputy Director, Hirabai Cowasji Jehangir Medical Research Institute, Savitribai Phule Pune University, Pune, Maharashtra; Dr. Neha Kajale, Scientist, Hirabai Cowasji Jehangir Medical Research Institute, Savitribai Phule Pune University, Maharashtra, Pune; Dr. Anagha Pai Raiturker, Gynecologist, Pai Raiturker Clinic, Pune, Maharashtra; Dr. Sanjay Gupte, Gynecologist, Gupte Hospital and Research Centre, Pune, Maharashtra; Dr. Leena Patankar, Gynecologist, Patankar Nursing Home, Pune, Maharashtra

**Background:** Pregnancy, especially early pregnancy is a complex phase characterized by initiation of physiological and psychological changes which places pregnant women at a risk of psychological distress and poor sleep, which is known to cause adverse maternal and neonatal outcomes. Thus, the

study aimed to assess prevalence of maternal prenatal distress and sleep quality during early pregnancy and identify factors associated with prenatal distress among pregnant women from the urban and rural settings. **Methods:** The study was conducted with 325 pregnant women aged between 16-40 years (175 rural and 150 urban) as a baseline assessment as part of the ongoing MAI cohort, which is a longitudinal observational study in Pune, India. Data on socio-demography, anthropometry, clinical history, prenatal distress and sleep quality of women in early pregnancy (8-12 weeks of gestation) were collected between August 2020-March 2023 after obtaining written consent. Mann Whitney U test and multinomial regression were used to assess correlates of prenatal distress. **Result:** Over one-third (37.5%) of women experienced prenatal distress. Women from rural areas reported a higher prevalence (40%) of distress, as well as poorer sleep quality than urban women (51.4% vs 38.7%). High prenatal distress was moderately associated with poor sleep quality ( $\rho=0.308$ ,  $p$  value=0.001). After controlling for sociodemographic and clinical factors, rural residence (OR: 4.25; CI: 2.12-8.54), underweight BMI status (OR: 2.05; CI: 0.91-4.63), presence of episodes of vomiting (OR: 1.69; CI: 0.92-3.08) and poor sleep quality (OR: 0.69; CI: 0.36-1.30) significantly contributed to prenatal distress. **Conclusion:** Prenatal distress and poor sleep quality are common, yet significant concerns for pregnant mothers globally, and require early screening and management strategies in order to avoid adverse maternal and fetal outcomes.

**Keywords:** Prenatal-Distress, Sleep-Quality, Rural, Urban, Maternal-health

**YS-2023-0021**

**Abstract Title: The Impact of Dietary Inflammatory Index on Biochemical and Body Composition Parameters in Pre-Dialysis Chronic Kidney Disease**

**Ms. Prathiksha R Bhat**, UGC-Senior Research Fellow, Department of Food Science and Nutrition, Mysuru; [prathiksha.bhat27@gmail.com](mailto:prathiksha.bhat27@gmail.com); **Dr. Asna Urooj**, Professor, Department of Food Science and Nutrition, Mysuru; **Dr. Srinivas Nalloor**, Consultant Nephrologist and Transplant Physician, Apollo BGS Hospitals, Mysuru

**Background:** Dietary inflammatory index (DII) is a tool developed to quantify the inflammatory potential of a diet. A pro-inflammatory score on DII has been associated with an increased risk of several chronic and non-communicable diseases in addition to altered biochemical parameters. However, this has scarcely been explored in kidney disorders. Thus, this study aimed to evaluate the association of DII with disease related biochemical and body composition parameters in pre-dialysis chronic kidney disease. **Methods:** The present cross-sectional study included 143 pre-dialysis CKD patients of Mysuru whose DII scores were computed from a 24hr recall. Body composition analysis was performed using a bioelectric impedance-based InBody 770 analyzer. Malondialdehyde and Total antioxidant capacity were analyzed via spectrophotometric methods while other disease related biochemical parameters were analysed using diagnostic kits from Agappe. **Result:** The data was categorized to early-stage CKD with estimated glomerular filtration rate (eGFR) from 30 to 59 ml/min/m<sup>2</sup> (n=61) and late-stage CKD with eGFR <30 ml/min/m<sup>2</sup> (n=82). Serum calcium and phosphorus, extracellular to total body water ratio ( $p < 0.01$ ), and serum uric acid independent total antioxidant capacity ( $p < 0.05$ ) were significantly higher in the LS group compared to the ES group. Conversely, serum albumin, haemoglobin and whole-body phase angle were significantly higher in the ES group ( $p < 0.01$ ). Increase in DII score by one was significantly associated with a decline in eGFR by 2.306 ml/min/m<sup>2</sup> ( $p < 0.01$ ) and a decrease in phase angle by 0.110 degrees ( $p < 0.05$ ). An increase in 1g intake of the following decreased the DII score significantly: cereals and millets decreased the DII score by 0.009 ( $p < 0.01$ ), other vegetable intake decreased the DII score by 0.005 ( $p < 0.01$ ), roots and tubers decreased the DII by 0.012 ( $p < 0.01$ ), poultry decreased the DII by 0.020 ( $p < 0.01$ ), and intake of oils and fats by 1 g decreased the DII by 0.058 ( $p < 0.01$ ). **Conclusion:** An increase in DII scores indicating a pro-inflammatory diet was associated with disease progression and decreased cell integrity in pre-dialysis chronic kidney disease patients.

**Keywords:** inflammation, diet, eGFR, phase-angle, oxidative-stress

**YS-2023-0023**

**Abstract Title: Sustainability of Nutri-Cereals and The Future of Food Labelling: A Case Study Using Life Cycle Analysis (LCA)**

**Ms. Rachael Alphonso**, PhD Scholar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore; rachaelalphonso@gmail.com; Dr. A. Thirumani Devi, Professor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore; Dr. Venkata Ravi Sankar Cheela, Associate Professor, Department of Civil Engineering, MVGR College of Engineering, Vizianagaram-535005.

**Background:** The year of millets has drawn attention to the nutritional quality of millets compared to rice. Other than being a water-efficient and temperature-tolerant crop, there is little data on other environmental impacts of millets. Rice, however, has received surplus attention and available data makes it possible to assess the impact of rice cultivation on human health, resource utilisation, and Climate Change. Solutions to resolve one impact often exacerbate another. **Methods:** Using the example of rice, we performed a life-cycle analysis from farm to gate and present the impacts of food cultivation beyond food miles and greenhouse gas emissions, followed by a survey of nutritionists on their awareness and motivation towards sustainable food. **Result:** We found that when an Indian consumes an average of 81.6 kg rice per year, they are potentially responsible for 294.381 m<sup>3</sup> of water usage, 153.853 kg 1,4-DCB of terrestrial ecotoxicity, 28.641 m<sup>2</sup>a crop eq. of land use in addition to 44.369 CO<sub>2</sub> equivalents of Greenhouse Gas Emissions (GHGE). This effect multiplied by our population of 1.4 billion makes rice alone a significant contributor to climate change. The addition of natural inputs in the soil revealed that while they did not add toxins into the biosphere, they were not necessarily sustainable, nor cost-effective to the farmer. **Conclusion:** A serious market shift from the consumer's favourite rice towards nutri-cereals needs more such data and comparison, with collaboration from various stakeholders like farmers, agriculturists, consumers, nutritionists, food technologists, and governments. However, this is possible with widespread, comprehensive data from across the country to compare popular cereals, pinpoint hotspots of environmental impacts, and inclusive action. This could further research in food sustainability and develop prediction models so that consumers, scientists, and policy-makers can shift from untenable cereals towards sustainable crops and nutri-cereals.

**Keywords:** Climate Change, Rice, LCA, SDG

**YS-2023-0026**

**Abstract Title: Implementation, delivery, and utilization of rice fortification program across different states in India: An exploratory mixed-method Study**

**Dr. E R Nandeeep**, Scientist 'B' (Medical), ICMR-NIN, Hyderabad; e.r.nandeeep@gmail.com; Dr. Samarasimha Reddy N, Scientist 'E', ICMR-NIN, Hyderabad; Dr. Hemant Mahajan, Scientist 'D', ICMR-NIN, Hyderabad

**Background:** Food fortification with micronutrients is one of the cost-effective methods to decrease micronutrient deficiencies. The Indian government plans to supply rice fortified with iron, folic acid, and Vitamin B12 through various social welfare schemes in the entire country in a phased manner by 2024. Therefore, the objective of our study was to assess the rollout, storage, and supply chain, and to evaluate the access, availability, and utilization of fortified rice supplied through the Public Distribution System (PDS) by the beneficiaries of the program. **Methods:** This study was a mixed-method, sequential exploratory approach to understand the various dimensions of the rice fortification program in India. The study was conducted in six districts from six different states of India which had rolled out of fortified rice through PDS in pilot mode. In each district, the district supply officer of PDS, a Food Corporation of India or State Food Corporation Godown Supervisors, and four fair price shop (FPS) dealers were interviewed to understand the supply, storage, transport, and distribution of fortified rice. Under each FPS, a minimum of seven beneficiary households were randomly selected and interviewed using a structured questionnaire. An in-depth interview guide was used for interviewing the different stakeholders. **Result:** All the selected districts in India in the states of Maharashtra, Gujarat, Andhra



Pradesh, Tamil Nadu, Uttar Pradesh, and Jharkhand were supplying fortified rice through the PDS. Across the visited districts, there was a continuous supply of fortified rice (FFR) in all talukas/blocks. It is a well-established system with good distribution. We observed good acceptability and compliance with the iron-fortified rice. There were no reported gastrointestinal adverse outcomes following the introduction of the fortified rice. All the beneficiaries consumed the fortified rice either completely or partially. **Conclusion:** The fortified rice supply through the Public Distribution System is successfully being implemented on the ground and the public is utilizing the services. There is a feasibility of conducting a study to assess the impact of fortified rice on hemoglobin and iron storage at the community level.

**Keywords:** fortified-rice, anemia, PDS, rice-fortification program

**YS-2023-0030**

**Abstract Title: IMPACT OF PHYSICAL ACTIVITY AND BODY COMPOSITION ON OXIDATIVE STRESS IN WOMEN WITH AND WITHOUT POLYCYSTIC OVARY SYNDROME**

**Ms. Shraddha S**, UGC-Senior Research Fellow, Department of Studies in Food Science and Nutrition, Mysuru; shraddha.shivakumar@gmail.com; Prof. Asna Urooj, Professor, Department of Studies in Food Science and Nutrition, University of Mysore, Mysuru

**Background:** Polycystic ovarian syndrome (PCOS) is an array of clinical, hormonal, and morphological abnormalities caused by excess androgen in reproductive-age women. It is projected to arise from a complex interaction involving insulin resistance, oxidative stress, body composition, and lifestyle choices. This study aims to assess and compare the physical activity level, body composition, and oxidative stress in women with and without PCOS. In addition, it examines whether physical activity and body composition affect oxidative stress in the cohorts. **Methods:** This observational case-control investigation comprised 93 apparently healthy women and 93 women diagnosed with PCOS (Rotterdam Criteria, 2003) aged 19–35 years from a private-healthcare facility in southern Karnataka. Participants' body composition was measured using bio-impedance (Inbody770, Korea) and recent physical activity (PhyA) by International Physical Activity Questionnaire-Short Form. Oxidative stress (OS) markers were total antioxidant capacity (TAC) and lipid peroxidation product, malonaldehyde (MDA), measured by ferric reducing ability of plasma method and thiobarbituric acid method, respectively, and serum uric acid(UA) by enzymatic-kit method. The results were analysed using appropriate statistical tests of SPSS software (IBM, Ver.20). **Result:** In PCOS group, 43% engaged in moderate and low PhyA levels, in contrast to 58% and 28% controls, respectively. Total MET-min per week differed between groups, but not significantly ( $p=0.053$ ). PCOS subjects had significantly higher weight, BMI, skeletal-muscle-index, fat-free-mass-index, body-fat-mass, percent-body-fat, waist-hip circumferences and their ratio, visceral fat area ( $p<0.01$ ), phase angle, and bone mineral content ( $p<0.05$ ). Further, PCOS cohort had a higher TAC, MDA, and UA levels ( $p<0.01$ ). Only MDA differed significantly with PhyA levels ( $p<0.01$ ). Among controls, body-cell-mass (BCM), skeletal-mass-index (SMI) and bone-mineral-content (BMC) showed negative correlation with MDA-levels ( $p<0.05$ ). While, in PCOS, BCM, SMI, BMC and phase angle significantly predicted TAC ( $p<0.05$ ). **Conclusion:** The study asserts the advantageous impact of physical activity on oxidative stress, regardless of group. Based on the aforementioned findings, the assessment of physical activity and body composition in PCOS-diagnosed women is recommended to be considered an essential preliminary evaluation in the management of this syndrome.

**Keywords:** bioimpedance, phase-angle, total-antioxidant-capacity, malondialdehyde, total-MET-per-week

**YS-2023-0032**

**Abstract Title: IMPACT OF A COMPREHENSIVE INTERVENTION TO LOWER BLOOD PRESSURE AMONG HYPERTENSIVE ADULTS: EXPERIMENTAL-CONTROL STUDY**

**Dr. Bhavika Singhvi**, Project Field Manager, ICMR-NIN, Hyderabad; [singhvibhavika@gmail.com](mailto:singhvibhavika@gmail.com);  
Dr. Vishakha Singh, Associate Professor, College of Community and applied sciences, Udaipur

**Background:** WHO reports that majority of death due to cardiovascular diseases is due to uncontrolled blood pressure. Research suggests that control of hypertension at an early stage is possible with lifestyle modifications. Hence, the study was undertaken with the aim to assess the impact of a comprehensive intervention package on the BP among hypertensive individuals.

**Methods:** The study was an experimental – control design. Participants (n=100) aged 40 – 60 years were enrolled using purposive sampling through hospital and private clinics. Participants of both the genders were randomly divided into experimental group (n =50) and control group (n=50). Information of socio-demographics, physical activity and medication routine was collected through a questionnaire. A modified food frequency questionnaire was employed to assess the diet intake of a month. The intervention included an e-book on how to manage BP, illustrations related to diet, exercise and healthy tips, and online yoga classes for 17 weeks. The participants reported their BP measured on digital calibrated devices every week. **Result:** The participants were randomly divided into 2 groups. In experimental group, were equal in both the genders and in control group were 42% males and 50% females and literate. The participants in the experimental group post intervention had mean reduction in SBP (11.52 mm Hg), DBP (7.090 mm Hg) and mean arterial pressure (8.20) which was significant ( $p \leq 0.001$ ), and weight by 4.02 kg ( $p \leq 0.001$ ). In control group there was mean increase of SBP by 2 mmhg and reduction of DBP by 0.58 mmhg. The mean difference in both the groups was significant. Increase in adherence to medication (34%) also contributed in maintaining BP. Majority of the participants (73%) at the end of the program were able to do basic aasans. The change in dietary pattern of fruits, vegetables, salt, sugar, fried-chips and packaged food items in experimental group than control group was significant.

**Conclusion:** The reduction of BP was observed due to the cumulative effect of the intervention package i.e. change in dietary pattern, inclusion of yoga and loss of weight in the experimental group.

**Keywords:** Nutrition, Hypertension, Yoga, weight loss, knowledge, intervention

**YS-2023-0033**

**Abstract Title: Evaluation of Food-based Nutritional Security among Rural Households of Tamil Nadu and Orissa Participating in Nutrition Education and Nutri-Gardens Initiative-Unveiling the Qualitative Outcomes**

**Dr. C. S. SURYA GOUD**, SCIENTIST B (MEDICAL), ICMR NATIONAL INSTITUTE OF NUTRITION, HYDERABAD; [suryachuka@gmail.com](mailto:suryachuka@gmail.com); Dr. SUBBARAO M GAVARAVARAPU, SCIENTIST - F, ICMR-NATIONAL INSTITUTE OF NUTRITION, HYDERABAD; Dr. N. ARLAPPA, SCIENTIST - G, ICMR-NATIONAL INSTITUTE OF NUTRITION, HYDERABAD; Dr. RAJA SRISWAN MAMIDI, SCIENTIST-D, ICMR NATIONAL INSTITUTE OF NUTRITION; Dr. ABDUL JALEEL, SCIENTIST-B, ICMR-NATIONAL INSTITUTE OF NUTRITION, HYDERABAD

**Background:** The NUTRI-GARDEN PROJECT, led by the MS Swaminathan Research Foundation (MSSRF) and funded by BIRAC, endeavors to combat rural malnutrition in India by facilitating year-round cultivation of nutrient-rich foods and raising awareness about healthy dietary choices among the population. This study seeks to assess the perceptions of beneficiaries, aiming to evaluate the project's effectiveness in combatting malnutrition and promoting sustainable nutrition practices in the two study sites (Odisha and Tamil Nadu). **Methods:** Key informant interviews (KIIs), and Focused group discussions (FGDs) were conducted with volunteers, functionaries of the Krishi Vigyan Kendra (KVK), and village leaders, and women who held responsibilities for food preparation within their households. A total 12 FGDs and 6 KIIs were conducted. Each KIIs and FGDs were first transcribed and then

systematically coded. The information from these transcriptions which included relevant quotations were compiled into a single report under overarching themes. To ensure the reliability and validity of the findings, these reports underwent an independent review process involving a team of three researchers. Any discrepancies or differences in coding and interpretation were thoroughly discussed until a consensus was reached, ensuring inter-coder agreement. **Result:** The impact of the nutri-garden program was profound, with over 97% of households in the Odisha study site reporting increased food consumption, enhanced dietary diversity, and improved nutrition and health. In Tamil Nadu, more than 75% of households acknowledged that the program had improved their nutrition knowledge. Most participants in both Tamil Nadu and Odisha believed they could sustain their Nutri-gardens without external help from the program organizers. The Nutri-Garden program has several strengths, such as high participant acceptance, technical support from KVKs, a well-trained program staff, a comprehensive training module covering cultivation techniques and nutrition awareness, productive exposure visits, successful program expansion across multiple villages to combat malnutrition, enthusiastic community involvement, Dedicated Staff (Community Hunger Fighters), growing participant awareness of the importance of nutritious food for good health, and a proven ability to increase dietary diversity at the household level. **Conclusion:** The program holds promise for ongoing implementation, driven by the widespread problem of child and maternal malnutrition, inadequate dietary diversity, and the persistent food security challenges.

**Keywords:** Kitchen-Garden, Nutri-Garden, ICMR-NIN, MSSRF, Qualitative Research

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 1: ASSEMBLY HALL, MAIN BUILDING

25<sup>th</sup> November 2023

2:15pm – 4:15pm

### SESSION-1: COMMUNITY NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0013	Dr.Shubhra Saraswat	Dayalbagh Educational Institute, Agra	Agra	shubhrasaraswat@dei.ac.in	Success Story Of Dei - Feeding Millet Based Diet To The Last, The Least, The Lowest And The Lost To Combat Malnutrition
2.	OP-2023-0069	Dr.Hemant Mahajan	ICMR-NIN	Hyderabad	hemant.mahajan.84@gmail.com	Association of dietary inflammation with a multimorbidity of cardio-metabolic and mental health disorders in an urbanizing community of southern India: A cross-sectional analysis for the APCAPS cohort
3.	OP-2023-0110	Dr.Dripta Roy Choudhury	-	-	<a href="mailto:dr536@cornell.edu">dr536@cornell.edu</a>	Dietary intake of iron-biofortified pearl millet based complementary foods in children 12-18 months of age: Potential-to-benefit in children with anemia or iron deficiency
4.	OP-2023-0143	Ms.Shruti R. Pai	St. John's Research Institute	Bengaluru	<a href="mailto:shruti.pai@sjri.res.in">shruti.pai@sjri.res.in</a>	Comparison of growth pattern in the first year of life between term small for gestational age and appropriate for gestational age South Indian infants.
5.	OP-2023-0172	Ms.Ayushi Dhasmana	The George Institute for Global Health	Delhi	adhasmana@georgeinstitute.org.in	Perception of the grassroot-level key stakeholders on opportunities for enhancing dietary diversity and environmental sustainability of Public Food Procurement Programs in selected panchayats of Srika
6.	OP-2023-0178	Dr.Chilumula Monica	ICMR-NIN	Hyderabad	monica.chilumula102@gmail.com	Infant Morbidity Patterns during the First Six Months in an Urban Slum of Hyderabad: An Observational Cohort Study

## OP-2023-0013

**Abstract Title: SUCCESS STORY OF DEI - FEEDING MILLET BASED DIET TO THE LAST, THE LEAST, THE LOWEST AND THE LOST TO COMBAT MALNUTRITION**

**Dr. Shubhra Saraswat**, Assistant Professor, Dayalbagh Educational Institute, Agra, [shubhrasaraswat@dei.ac.in](mailto:shubhrasaraswat@dei.ac.in); Prof. Rupali Satsangi, Professor, Dayalbagh Educational Institute, Agra

**Background:** 45 % of global deaths among children under 5 are due to malnutrition SDG 2 aims to eliminate hunger by 2030. UN declared 2023 as IYOM. Millets are known as power foods. A joint survey (by government officials) in January 2021 identified over 5000 highly malnourished children in Agra city. Keeping in view the poor health situation of children the major objective of the study is to maximize the potential benefits of millets in treating malnutrition among children residing in rural areas of Agra city. **Methods:** 200 CHILDREN (2-8 YEARS) enrolled for the study. Millet based value added products such as cookies, naankhatai, cake, laddo, burfi and muffins made of Bajra, Jowar and Ragi are provided every Sunday since last 18 months. Parents at home are advised to feed millets-based diet and replace wheat in meals and compliance is noted. 100 children were kept as control. (16% attrition). Measurements such as Height, weight, Mid upper arm circumference, head circumference are taken every month. Mothers were educated to make right food choices and increase gender equality through group discussions. **Result:** The household dietary assessment, conducted before the start of the feeding program, indicated that wheat was a major staple occupying 70% of their diets. The children were weak and malnourished suffering from macro and micro nutrient deficiencies and were eating diet providing only 60% of the RDA as per the baseline data. No of food groups consumed in regular amounts was inadequate and foods rich in iron and calcium were low in particular. The results show a significant increase in Z-scores ( $\Delta$ ) for height, weight and MUAC and BMI, while the children in the control group showed no significant increase in Z-scores for the same. **Conclusion:** Millets are SMART FOODS to get the best of them, awareness, growth, demand and supply from farm to fork is of utmost importance. The results showed that adding millets to the everyday diet will help achieve food and nutritional security. Educating mothers on increasing the use of millets in everyday diet helped in capacity building among mothers to make right food choices and promoting gender equality.

**Keywords:** millets, value addition, undernutrition, education

## OP-2023-0069

**Abstract Title: Association of dietary inflammation with a multimorbidity of cardio-metabolic and mental health disorders in an urbanizing community of southern India: A cross-sectional analysis for the APCAPS cohort**

**Dr. Hemant Mahajan**, Scientist, ICMR-NIN, Hyderabad, [hemant.mahajan.84@gmail.com](mailto:hemant.mahajan.84@gmail.com); Dr. Judith Lieber, Research Fellow, LSHTM, London; Dr. Santosh Kumar Banjara, Scientist D, ICMR-NIN, Hyderabad; Prof. Sanjay Kinra, Prof & Head of Dept. of Non-communicable diseases, LSHTM, UK; Dr. Bharati Kulkarni, Scientist G, ICMR, Delhi; Dr. Poppy Alice Carson Mallinson, Research Fellow, LSHTM, London

**Background:** Habitual dietary pattern has been shown to be a major modulator of systemic inflammation and is considered a modifiable risk factor for cardio-metabolic diseases (CMDs) and mental health disorders. We examined whether dietary-inflammation is associated with the multimorbidity of CMDs and mental health disorders in urbanizing-villages in southern India. We hypothesized that the participants with higher dietary-inflammation would have a higher burden of multimorbidity. **Methods:** We conducted a cross-sectional analysis of 5984 adults (53% male) participating in the Andhra Pradesh Children and Parents' Study. We assessed dietary-inflammation using dietary inflammatory index (DII®) based on intake of 27 micro- and macro-nutrients which were measured using a validated food-frequency-questionnaires. The CMDs and mental health disorders were assessed using standardized clinical procedures and validated questionnaires. 'Multimorbidity' was defined as a co-existence of one or more CMDs (hypertension, diabetes, myocardial infarction, heart failure, angina and stroke) and one or more mental health disorders (depression and anxiety). The association of multimorbidity with dietary-inflammation was examined using robust Poisson regression. **Result:** The prevalence of multimorbidity was 3.5% and ~75% of participants were consuming a pro-inflammatory diet (DII >0.0). As compared to the 1st DII-quartile (least dietary-

inflammatory group), the adjusted prevalence ratio (95% confidence interval) for the presence of multimorbidity was 1.46(0.87, 2.46) for 2nd, 1.75(1.05, 2.89) for 3rd, and 1.77(1.06, 2.96) for 4th DII-quartile (p-trend=0.021). There was no evidence of an interaction between DII and sex on multimorbidity. **Conclusion:** Dietary-inflammation had a positive linear association with the multimorbidity, which suggest that even modest reduction in dietary-inflammation may reduce the multimorbidity burden.

**Keywords:** Cardiovascular, Diet, Inflammation, Mental, Multimorbidity

#### OP-2023-0110

**Abstract Title: Dietary intake of iron-biofortified pearl millet based complementary foods in children 12-18 months of age: Potential-to-benefit in children with anemia or iron deficiency**

**Dr. Dripta Roy Choudhury**, Post Doctoral Associate, [dr536@cornell.edu](mailto:dr536@cornell.edu); Dr. Samantha L. Huey, Post Doctoral Associate, Division of Nutritional Sciences, Cornell University, Ithaca, NY, USA; Center for Precision N, Mr. Jesse T. Krisher, Data Analyst; Prof. Jere D. Haas, Professor; Prof. Saurabh Mehta, Professor, Division of Nutritional Sciences, Cornell University, Ithaca, NY, USA

**Background:** Biofortification of staple crops is a sustainable strategy to improve micronutrient status and prevent anemia. In these analyses, we examined biological plausibility (dose-response) and potential-to-benefit of an iron-biofortified crops-based complementary feeding intervention. **Methods:** We conducted a randomized controlled trial (NCT02233764) of iron-biofortified pearl millet (FePM, Dhanashakti) among children 12–18 months of age, who were not severely anemic at baseline (hemoglobin  $\geq 9.0$  g/dL) in Mumbai, India. Children 12–18 months of age (n=223) received complementary foods prepared with FePM or conventional pearl millet (CPM), three times daily for 6 days in a week for 9 months. Weighed food records were used to measure daily intake of pearl millet (g) and iron (mg). Hemoglobin (Hb), serum ferritin, and C-reactive protein were evaluated at enrollment, midpoint, and endpoint during the trial. Restricted cubic splines were used to examine the dose-response and potential associations including non-linearity between dietary intake of pearl millet and iron intake, and hemoglobin (Hb) and serum ferritin concentrations. In potential-to-benefit analyses, we conducted analyses among children who had moderate anemia (Hb  $\geq 9.0$  to  $< 11.0$  g/dL) or iron deficiency (serum ferritin  $< 12.0$   $\mu\text{g/L}$ ) at baseline. **Result:** Children consumed a median [IQR] intake of 31.6 g [28.3-33.5 g] of FePM and 32.2 g [29.1-33.7 g] of CPM, resulting in 3.0 mg [2.7-3.1] and 1.0 mg [0.9-1.0] of iron intake daily, respectively. Daily iron intake from FePM was associated with increased hemoglobin concentrations in children, with greater improvements among children with anemia or iron deficiency at baseline, defined as serum ferritin  $< 12.0$   $\mu\text{g/L}$  (FePM: 0.10 [IQR: -0.90, 0.80] g/dL vs. CPM: -0.85 [IQR: -1.10, 0.30] g/dL; HLS 95% CI: (0.0, 1.1), p=0.04) or serum ferritin  $< 25.0$   $\mu\text{g/L}$  (FePM: 0.10 (-0.80, 0.80) g/dL vs CPM: -0.50 (-1.10, 0.40) g/dL; HLS 95% CI: (0.0, 0.9), p=0.04). Restricted cubic spline analyses showed a linear increase in hemoglobin concentrations with increasing intake, among children with anemia at baseline. **Conclusion:** Dietary intake of iron-biofortified pearl millet-based complementary foods improved hemoglobin concentrations among 12-18 months old children, with additional potential-to-benefit among children who had anemia or iron deficiency at baseline

**Keywords:** Pearl-millet, iron-biofortification, RCT, iron-deficiency, children

#### OP-2023-0143

**Abstract Title: Comparison of growth pattern in the first year of life between term small for gestational age and appropriate for gestational age South Indian infants**

**Ms. Shruti R. Pai**, PhD Scholar, St. John's Research Institute, Bengaluru, Karnataka, [shruti.pai@sjri.res.in](mailto:shruti.pai@sjri.res.in); Ms. Ramya Padmanabha, PhD Scholar; Ms. Sanjana Kamalakar, Nutritionist; Dr. Rebecca Kuriyan, Professor and Head, Division of Nutrition, St. John's Research Institute, St. John's National Academy of Health Sciences, Karnataka, Bengaluru; Dr. Srinivas K. Jois, Professor, Department of Obstetrics and Gynaecology, Bengaluru Medical College and Research Institute,

Karnataka, Bengaluru; Dr. Asha Kamath, Professor, Department of Data Science, Prasanna School of Public Health, Manipal Academy of Higher Education, Karnataka, Bengaluru

**Background:** Small for gestational age (SGA) infants are at increased risk of early-life morbidity, stunting,

and later-life metabolic alterations; early life growth trajectories of Indian SGA infants are sparse. This study aimed to compare longitudinal growth in Appropriate for gestational age (AGA) and SGA infants during their first year of life. **Methods:** Apparently healthy term neonates (52 SGA, 154 AGA) were recruited at birth ( $\leq 7$ d) and followed up longitudinally till 1 y. Parental and sociodemographic characteristics were recorded. Anthropometric measurements (weight, length, circumferences, skinfold thickness) were assessed at birth, 3, 6, 9 and 12 mo. of age; Z scores and growth velocity at 3 mo. interval were computed. Breast and complementary feeding patterns were recorded. Longitudinal measurements were compared between the two groups using the two-way Friedmans test. Median regression with mixed methods was used to adjust the covariates; p-value  $< 0.05$  was considered to be statistically significant. **Result :** Infants born AGA had significantly higher weight (kg) [2.3 (2.2,2.9) vs 1.9 (1.8,2.4)] at birth, [6.6 (6.1,7.2) vs 6.4 (5.8,6.7)] at 6 mo., [8.5 (8.2,8.8) vs 8.3 (7.9,8.7)] at 12 mo., length (cm) [(47.2 (45.9,48.1) vs 46.5 (45.2,47.2)] at birth, [64.2 (60.9,65.6) vs 62.8 (59.8,64.6)] at 6 mo., [73.2 (71.7,77.4) vs (72.0 (70.6,75.6)] at 12 mo., age (d) at 12 mo., head circumference, mid upper arm circumference, weight for age Z score and height for age Z score at 0,3,6,9 and 12 mo., and all skinfold thicknesses only at birth, when compared to infants born SGA. Exclusivity of breast feeding was significantly higher at 3 mo. in AGA, compared to SGA infants (80.9% vs 57.8%). AGA infants had higher growth velocity till 6 mo. for all anthropometric parameters, following which the SGA infants grew similar to the AGA infants from 6-12 mo. **Conclusion:** AGA infants had significantly higher anthropometric measurements compared to the SGA infants at all time points till 1 y; however, SGA infants showed similar growth velocity after 6 mo., suggesting catch-up growth. Longitudinal studies, using body composition are needed to determine the quality of growth, to inform nutritional interventions to promote optimal infant growth in India.

**Keywords:** AGA, SGA, Growth, Infancy, Indian

OP-2023-0172

**Abstract Title: Perception of the grassroot-level key stakeholders on opportunities for enhancing dietary diversity and environmental sustainability of Public Food Procurement Programs in selected panchayats of Srika**

**Ms. Ayushi Dhasmana**, Research Assistant, The George Institute for Global Health, Delhi, [adhasmana@georgeinstitute.org.in](mailto:adhasmana@georgeinstitute.org.in); Dr. Sahiba Kohli, Research Officer, The George Institute for Global Health, Delhi; Dr. Suparna Ghosh-Jerath, Program Head - Nutrition, The George Institute for Global Health, Delhi; Dr. Praveen Deversetty, Director, Better Care, The George Institute for Global Health, Hyderabad; Dr. Paraskevi Seferidi, Research Fellow, School of Public Health, Imperial College London, London; Prof. Vivekanand Jha, Executive Director, The George Institute for Global Health, Delhi

**Background:** Food systems need to be productive, inclusive to marginalized populations, environmentally sustainable and deliver healthy, nutritious diets to all. Public food procurement programmes (PFPP) are potential “game changers” and provide potential entry points to promote sustainable food systems and adoption of healthy diets. The EAT Lancet Commission (2020) identified PFP as a key food system transformation strategy. In current study, perceptions of grassroot level stakeholders on ways of diversifying ongoing PFPPs and incorporating environmental sustainability were explored. The PFPPs included supplementary feeding program under the Integrated Child Development Services (ICDS), Public Distribution System (PDS), and PM-POSHAN. **Methods:** A cross-sectional study was conducted in selected villages of Srikakulam district, Andhra Pradesh. Key grassroot-level stakeholders including Anganwadi supervisor, Anganwadi workers, helpers, schoolteachers, community leaders and panchayat representatives participated in the study. A network mapping exercise was conducted to understand the food supply chain, key actors and power dynamics. Key informant interviews and focus group discussions were conducted to explore opportunities of diversifying the foods supplied and ways of making the supply chain environmentally sustainable.

Thematic analysis was conducted after coding of transcripts using NVivo software. **Result:** Supply chain stages and key stakeholders involved in planning and implementation of PFPPs were mapped. Key influencers of programs along with the points in supply chain where diversity and sustainability could be enhanced were identified. Interconnection between various government departments was observed. Grassroot level stakeholders were well informed about food supply chain and provided valuable and contextual information. They perceived that supply chain for provision of raw food ingredients was smooth and variety of meals were served. Digital mobile applications were used for requisition and monitoring. Potential for community and institutional kitchen gardening (schools and anganwadi centers), incorporation of home-grown local foods (nutrient rich vegetables and millets), establishment of farmers' cooperatives and food procurement from local small-scale farmers were opportunities to further diversify foods and meals at the local level and shorten the food supply chain. Willingness, receptiveness, and support to incorporate suggestions and further diversify meals provided under PFPPs were observed. **Conclusion:** Sustainability and diversity can be incorporated into the ongoing PFPPs using existing resources, enforcing local activities and community engagement strategies at the ground level. These may provide additional benefits of further supporting local economy with livelihood generation.

**Keywords:** Public food programs, Diversify, Sustainability

**OP-2023-0178**

**Abstract Title: Infant Morbidity Patterns during the First Six Months in an Urban Slum of Hyderabad: An Observational Cohort Study**

**Dr. Chilumula Monica**, Scientist-B, ICMR-NIN, Hyderabad, Telangana, [monica.chilumula102@gmail.com](mailto:monica.chilumula102@gmail.com); Dr. Little Flower Augustine, Hub Manager, GCRF-AASH; Dr. Teena Dasi, Scientist – C; Dr. Santosh Kumar B, Scientist – D; Dr. Sai Ram Challa, Scientist- E; Dr. Bharati Kulkarni, Scientist- G, Hyderabad

**Background:** Infant morbidity is a major public health concern in developing countries, including India. Urban slums are particularly vulnerable to high rates of infant morbidity due to factors such as lack of exclusive breast feeding, poverty, overcrowding, and poor sanitation. Understanding the morbidity patterns in this vulnerable population during the critical first six months of life is essential for targeted healthcare interventions. Objective: To assess the morbidity status of infants from birth to 6 months in a Hyderabad urban slum and identify risk factors associated with increased morbidity. **Methods:** We conducted an observational cohort study of infants born to mothers living in a Hyderabad urban slum. Infants were followed from birth to 6 months of age and monitored for morbidity events. Morbidity events were defined as any illness that required medical attention, including respiratory infections, diarrhoea, and fever. Study setting: Addaguatta and Warasiguda Study design: Observational cohort study Study population: Infants from birth to 6 months of age Data collection: Field enumerators collected the morbidity data from the mothers every two weeks on phone call and also received the information about the medical records. **Result:** The study revealed that infants in urban slum areas of Hyderabad experience a high burden of morbidity during their first six months of life. Common health issues observed included respiratory infections, diarrheal diseases with antibiotic usage of about 31.5% and some requiring hospital admissions. Additionally, suboptimal living conditions might be key contributors to the morbidity patterns. The most common morbidity events were acute respiratory infections (52%), followed by diarrhoea (23%) with hospital admissions (6.06%) which is high when compared to NFHS -5 where prevalence of symptoms of acute respiratory infection in the two weeks preceding the survey was about 2.8%, children with diarrhoea was 7.3%. Risk factors associated with increased infant morbidity included: • Lack of exclusive breastfeeding • Poor maternal education • Household crowding **Conclusion:** Infant morbidity is a major health problem in Hyderabad urban slums. Risk factors for increased morbidity include household crowding, poor maternal education, and lack of exclusive breastfeeding. Interventions to reduce infant morbidity in this setting should focus on addressing these risk factors.

**Keywords:** Infant-morbidity, urban slum, risk factors



## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 2: CONFERENCE HALL, GOLDEN JUBILEE BLOCK

25<sup>th</sup> November 2023

2:00pm – 3:30pm

### EXPERIMENTAL NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0011	Ms.Pipika Das	Midnapore city college	Midnapore	daspipika191@gmail.com	Anti-obesity potentiality of linoelaidic acid isolated from tapra fish ( <i>Opisthopterus tardoore</i> ) oil on 3T3-L1 pre-adipocytes: A mechanistic study
2.	OP-2023-0023	Ms.Priyanka Raju Chougule	ICMR- National Institute of Nutrition, Tarnaka, Hyderabad	Hyderabad	chougulep033@gmail.com	Effect Of Ethyl Gallate And Propyl Gallate On Dextran Sulfate Sodium (DSS)-Induced Ulcerative Colitis In C57bl/6j Mice: Preventive And Protective
3.	OP-2023-0077	Ms.Julia Sebastian	NIN	Hyderabad	julialiba4@gmail.com	Effect of bamboo rice ( <i>Bambusa arundinacea</i> Willd) on RA induced animal model
4.	OP-2023-0131	Ms.Rachakatla Anuradha	ICMR-NIN	malkajgiri	rachakatlaanuradha3389@gmail.com	Effect of paternal calorie restriction of diet induced obese Wistar rats on metabolism of their offspring
5.	OP-2023-0141	Dr.Nisha. G. Kemse	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune	kemse.nisha@gmail.com	Maternal Omega-3 Fatty Acid Supplementation Improves Brain Neurotrophins and Angiogenic Markers in the offspring Born to Gestational Diabetes Mellitus Mothers
6.	YS-2023-0015	Ms.Doli Saikia	UPES	Dehradun	saikiadoli201@gmail.com	Leveraging Machine Learning Techniques to Analyze Nutritional Content in Processed Foods

OP-2023-0011

**Abstract Title: Anti-obesity potentiality of linoelaidic acid isolated from tapra fish (Opisthopterus tardoore) oil on 3T3-L1 pre-adipocytes: A mechanistic study**

**Ms. PIPIKA DAS**, Research Scholar, Midnapore City College, Midnapore, [daspipika191@gmail.com](mailto:daspipika191@gmail.com); ms. Riya Kar, Research Scholar, Midnapore City College, Midnapore; Ms. Titli Panchali, Research Scholar, Midnapore City College, Midnapore; Ms. Ananya Dutta, Research Scholar, Midnapore City College, Midnapore; Dr. Shrabani Pradhan, Assistant Professor, Midnapore City College, Midnapore

**Background:** Obesity is a condition of energy balance in which nutrient intake consistently exceeds energy expenditure, increasing the risk of various potentially fatal disorders. The capacity of 3T3-L1 preadipocytes to differentiate into mature adipocytes makes them an effective tool to investigate the function of adipocytes in vitro. The drugs currently used to treat obesity have unfavourable side effects and a strong demand for an anti-obesity drug that is safe but therapeutically effective to reduce fat mass. Currently, fish derived conjugate fatty acid-based drug development for obesity treatment is a trend to its massive beneficial potential. *Opisthopterus tardoore* is a marine fish available in Bay of Bengal region. However, its antiobesity effect has not been reported yet. Tapra fish (*Opisthopterus tardoore*) oil contains several polyunsaturated fatty acids (PUFA) and we got linoelaidic acid (isomer of linoleic acid) from this fish oil by GCMS study. The main aim of this investigation to explore the novel role of linoelaidic acid on lipid accumulation and the expression of genes relevant to anti-obesity on 3T3-L1 preadipocytes. **Methods:** 3T3-L1 preadipocytes were cultured in 90% DMEM high glucose media, 10% fetal bovine serum and 1.5% penicillin-streptomycin solution. Differentiated 3T3-L1 were treated with 2.5, 5, 7.5 μM linoelaidic acid. Then we performed cytotoxicity assay, Oil Red O staining, cellular redox potentiality, gene expression and immunoblotting analysis. **Result:** Linoelaidic acid treatment did not induce cytotoxicity in 3T3-L1 cells up to a concentration of 7.5 μM. The lipid contents were quantified by Oil Red O staining and results showed linoelaidic acid suppressed the differentiation of 3T3-L1 pre-adipocytes in a concentration-dependent manner. Linoelaidic acid can also consistently increased GSH levels with reduction of total nitric oxide by inhibiting lipid synthesis. Linoelaidic acid significantly enhanced the expression of genes related to adipogenesis, such as PPAR-α, leptin, adiponectin, LPL and inhibited those related to lipogenesis, such as SREBP-1c, FAS in 3T3-L1 cells. **Conclusion:** Our study shows that linoelaidic acid is capable of inhibiting the differentiation of 3T3-L1 pre-adipocytes, suggesting that tapra fish has a potential for therapeutic application in the protection of obesity.

**Keywords:** Fish, PUFA, linoelaidic acid, antiobesity

OP-2023-0023

**Abstract Title: EFFECT OF ETHYL GALLATE AND PROPYL GALLATE ON DEXTRAN SULFATE SODIUM (DSS)-INDUCED ULCERATIVE COLITIS IN C57BL/6J MICE: PREVENTIVE AND PROTECTIVE**

**Ms. Priyanka Raju Chougule**, PhD scholar (DST-Inspire SRF), ICMR- National Institute of Nutrition, Tarnaka, Hyderabad, [chougulep033@gmail.com](mailto:chougulep033@gmail.com); Dr. Sudip Ghosh, Scientist 'G', ICMR- National Institute of Nutrition, Tarnaka, Hyderabad, Telangana 500007, India, Hyderabad; Dr. Sukesh Narayan Sinha, Scientist G, ICMR- National Institute of Nutrition, Tarnaka, Hyderabad, Telangana 500007, India, Hyderabad

**Background:** Inflammatory bowel disease (IBD) is an idiopathic inflammatory condition of the digestive system marked by oxidative stress, leukocyte infiltration, and elevation of inflammatory mediators. In this study, we demonstrate the protective effect of ethyl gallate (EG), a phytochemical, and propyl gallate (PG), an antioxidant, given through normal drinking water (DW) and copper water (CW) in various combinations, which had a positive effect on the amelioration of DSS-induced ulcerative colitis in C57BL/6J mice. **Methods:** We successfully determined the levels of proinflammatory cytokines and antioxidant enzymes by ELISA, tracked oxidative/nitrosative stress (RO/NS) by in vivo imaging (IVIS) using L-012 chemiluminescent probe, disease activity index (DAI), histopathological and morphometric analysis of colon in DSS-induced colitis in a model. **Result:** The results revealed that oral administration of ethyl gallate and propyl gallate at a dose of 50 mg/kg considerably reduced the severity of colitis and improved both macroscopic and microscopic clinical symptoms. The level of proinflammatory cytokines

(TNF- $\alpha$ , IL-6, IL-1 $\beta$ , and IFN- $\gamma$ ) in colonic tissue was considerably reduced in the DSS+EG-treated and DSS+PG-treated groups, compared to the DSS alone treated group. IVIS imaging of animals from the DSS+EG and DSS+PG treated groups showed a highly significant decrease in RO/NS species relative to the DSS control group, with the exception of the DSS+PG/CW and DSS+EG+PG/CW treated groups. We also observed lower levels of myeloperoxidase (MPO), nitric oxide (NO), and lipid peroxidation (LPO) and restored levels of GST and superoxide dismutase (SOD) in DSS+EG-DW/CW, DSS+PG-DW, and DSS+EG+PG/DW groups compared to DSS alone treated group. In addition, we showed that the EG, PG, and EG+PG treatment significantly reduced the DAI score, and counteracted the body weight loss and colon shortening in mice with DSS-induced colitis compared to DSS alone treated group. In this 21-day study, mice were treated daily with test substances and were challenged to DSS from day-7 to 14. **Conclusion:** Our study highlights the protective effect of ethyl gallate and propyl gallate in various combinations which, in pre-clinical animals, serve as an anti-inflammatory drug against the severe form of colitis, indicating its potential for the treatment of IBD in humans. In addition, propyl gallate was investigated for the first time in this study for its anti-colitogenic effect with normal drinking water and reduced effect with copper water. **Keywords:** Ethyl gallate, Propyl gallate, Ulcerative colitis.

**OP-2023-0077**

**Abstract Title: Effect of bamboo rice (*Bambusa arundinacea* Willd) on RA induced animal model**

**Ms. Julia Sebastian**, PhD scholar, NIN, Hyderabad, Telangana, India 500007, [julialiba4@gmail.com](mailto:julialiba4@gmail.com); Dr. R. Ananthan, Scientist E, NIN, Hyderabad; Mr. Subhash Kalpuri, Technical Officer -B, NIN, Hyderabad; Dr. Pradeep Bhatu Patil, Scientist D, NIN, Hyderabad; Dr. M.V. Surekha, Scientist E, NIN, Hyderabad; Mr. Krishna Kalyan, PhD scholar, NIN, Hyderabad

Effect of bamboo rice (*Bambusa arundinacea* Willd) on RA induced animal model The seeds of edible wild bamboo grass (*Bambusa arundinacea* Willd.), commonly known as bamboo rice, forms an integral part of the diet of tribal communities residing in the Western Ghats of South India. Based on the observations of a primary study conducted among the tribals familiar with bamboo rice, it was inferred that this grain, high in various essential nutrients and bioactive compounds, was used as an ingredient in the treatment of Rheumatoid Arthritis (RA). Hence, this study was intended to address the lacunae in available literature on the effect of bamboo rice on rheumatoid arthritis Effect of bamboo rice on RA was studied by feeding experimental diets to adult female Wistar-NIN (WNIN) rats that belonged to normal control, disease control, and treatment groups (low, medium, high dose and standard drug). RA was induced to animals in the disease control and treatment groups and fed with the normal and test diets respectively. One subset of animals was studied for the preventive effect and the second subset for the curative effect of bamboo rice against RA by assessing the paw volume, spleen index, serum levels of rheumatoid factor, TNF- $\alpha$ , IL-4 and IL-10, histopathology, DEXA and radiography analysis. Results of the walking track analysis, paw volume, spleen index and serum RF level indicated an increment in beneficial effect as the proportion of bamboo rice increased in the diet. However, observations made from the histopathology, radiology and serum levels of inflammatory cytokines indicated that animals in the medium dose group showed better results than the high dose group. Better results were observed among the groups that received preventive treatment when compared to curative treatment. Dietary intervention was carried out in this study to get a better understanding of the effect of bamboo rice on RA. Though the effect against RA was not dose dependent, it was inferred that optimum intake had a beneficial effect. Preventive treatment was found to be more effective than the curative treatment indicating that early intervention is necessary in RA. Rheumatoid arthritis, bamboo rice, inflammation.

**OP-2023-0131**

**Abstract Title: Effect of paternal calorie restriction of diet induced obese Wistar rats on metabolism of their offspring**

**Ms. Rachakatla Anuradha**, Ph.D. scholar, ICMR-NIN, Malkajgiri, Telangana, [rachakatlaanuradha3389@gmail.com](mailto:rachakatlaanuradha3389@gmail.com); Dr. M. Sathyavani, Technical Officer; Mr. M. Srinivas, Technical Officer; Dr. K. Rajender Rao, Scientist-F, ICMR-NIN, Malkajgiri, Hyderabad, Telangana.

**Background:** Calorie restriction (CR) is a nutritional strategy implemented as a weight loss regimen. Pre or periconception parental CR is proven to have many detrimental effects on health and development of their offspring. The studies on maternal CR are well established but paternal CR studies are not progressing in the same direction. In the present study on male Wistar rats (WNIN), the effects of the CR in their offspring concerning metabolic syndrome are addressed. **Methods:** In present study in (WNIN) male Wistar rats obesity was induced by giving high fat diet (60%) for 12 weeks. Later they were divided into two groups and calorie restricted for 50% and 40% respectively for next 8 weeks then they were mated with females fed with control diet to obtain the offspring. In the offspring the bodyweights were taken weekly, DEXA and lipid profiles were also performed. The differential gene expression of the genes involved in lipid metabolism and its related pathways was performed by qPCR. **Result:** The offspring (both male and female) born to calorie restricted males (both 50% and 40%) have shown the increased Body weights, Total Body fat%, Fat Mass and reduced Lean Body Mass. The genes involved in the lipid metabolism pathway were altered. The lipid biosynthesis was enhanced and lipid  $\beta$ -oxidation reduced with the increased circulatory lipid profiles. **Conclusion:** The preconceptional paternal calorie restriction (CR) has revealed metabolic alterations leading to obesogenic potencies at an early age in their offspring. The severe CR regime for weight loss has many deleterious effects on their offspring's health leading to the early progression of metabolic disorders. Thus, fathers also share the equal responsibility as mothers for children's health by contributing sperm-specific epigenetic imprints that alter the embryonic developmental trajectory and the health of adult offspring.

**Keywords:** Calorie Restriction, Lipid Metabolism, obesity

**OP-2023-0141**

**Abstract Title: Maternal Omega-3 Fatty Acid Supplementation Improves Brain Neurotrophins and Angiogenic Markers in the offspring Born to Gestational Diabetes Mellitus Mothers**

**Dr. Nisha. G. Kemse**, ICMR-DHR-Women scientist, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, [kemse.nisha@gmail.com](mailto:kemse.nisha@gmail.com); Dr. Kamini Dangat, Assistant Professor; Prof. Sadhana. R. Joshi, Prof and Head, Interactive Research School for Health Affairs (IRSHA), Pune, Maharashtra

**Background:** Children born to gestational diabetes mellitus (GDM) mothers are suggested to be at increased risk for impaired cognitive development in later life. Neurotrophins play a vital role in influencing learning and memory. The present study reports the effect of prenatal omega-3 fatty acid supplementation on brain neurotrophins, and angiogenic markers which influence cognitive performance in the offspring born to GDM dams. **Methods:** Pregnant Wistar rats were assigned to three groups; control, GDM and GDM+O (GDM + omega-3 fatty acid supplementation). Streptozotocin (STZ; 40mg/kg, d7 of gestation) was used to induce GDM in the pregnant rat. The dams were allowed to deliver normally on day 22 of gestation. The offspring were followed till 3 mo of age and were sacrificed to collect brain tissue. The neurotrophins as Brain Derived Neurotrophic Factor (BDNF), Nerve Growth Factor (NGF), Tropomyosin receptor kinase A (TrkA), TrkB, and the angiogenic markers as vascular endothelial growth factor (VEGF), VEGFR-1 were analyzed using ELISA. Values were expressed as mean  $\pm$  SEM. Statistical analyses were performed using one-way analysis of variance. **Result:** The total weight gain during pregnancy, litter size, litter weight and pup weight were comparable between groups. The offspring born to GDM dams showed lower levels of BDNF at birth ( $p=0.056$ ) and at adult age ( $p=0.066$ ). The levels of NGF, TrkA, TrkB ( $p<0.05$ ) and VEGF ( $p<0.05$ ) were lower as compared to control. However, there was no change in the levels of VEGFR-1. The offspring from GDM group took more time to reach the platform in Morris Water Maze test ( $p<0.01$ ). In Eight Arm Radial Maze test, they made less % correct choices and more errors ( $p<0.05$  for both) as compared to control. Omega-3 fatty acid supplementation improved the levels of neurotrophins, angiogenic marker and cognitive performance of the offspring at adult age. **Conclusion:** Maternal omega-3 fatty acid supplementation improved brain neurotrophins, angiogenic markers and thereby cognition in offspring born to GDM mothers. Our findings provide clues for omega 3 fatty acid supplementation to ameliorate long term consequences of gestational diabetes mellitus.

**Keywords:** Cognition, GDM, Omega-3 fatty acid

YS-2023-0015

**Abstract Title: Leveraging Machine Learning Techniques to Analyze Nutritional Content in Processed Foods**

**Ms. Doli Saikia**, Research fellow, UPES, Dehradun, Uttarakhand, [saikiadoli201@gmail.com](mailto:saikiadoli201@gmail.com); Dr. Muthukumar K A; Dr. Soumya Gupta, Assistant professor, UPES, Dehradun, Uttarakhand

**Background:** The global shift towards plant-based foods, evident in the Indian food industry, is driven by environmental and ethical reasons. While plant foods promise sustainability, concerns arise about protein quality, especially post-processing. With data indicating protein deficiencies among Indians, the relationship between food processing and nutrient retention is vital. Machine learning, integrating food science, can predict nutrient changes in plant proteins during processing, offering potential solutions. Thus, the aim of this research is to provide an extensive framework for creating an AI model that can forecast the protein content of various plant-based sources following processing through traditional as well as non- conventional approaches. **Methods:** A comprehensive database was developed using Web of Science, Scopus, PubMed, and Google Scholar, that included various plant-based sources along with their protein content both as raw materials and after processing. After the data was collected it was fed for preprocessing. The pre-processed data was then used in the “Model Development” stage, which used primarily two machine learning algorithms: Support Vector Regression (SVR) and a Random Forest (RF) model built in Scikit-learn. The SVR model tried to find the best-fitting hyperplane in a place with many dimensions. The Random Forest model on the other hand, used GridSearchCV to fine-tune its hyperparameters. At the same time, the Random Forest model is used to do a “Feature Importance Analysis” to find the most important factors that have a significant impact on the result. Finally, the model was evaluated by using Mean Squared Error (MSE) as an evaluation metric. **Result:** The test results showed that the RF model had an MSE of about 205.50, which is a measure of the average squared difference between the predicted and real values. The SVR model, on the other hand, did much better than the RF model, with an MSE of about 3.87 on the test data. Cross-validation on the SVR model showed an average MSE of about 31.58 and a standard deviation of about 41.93, which suggests that the model performed the same way on different sets of training data. **Conclusion:** This research utilized machine learning to fill a gap in understanding nutrient retention in plants during food processing and observed that SVR accurately predicts nutrient retention, beating the RF model. The study presents a novel way to optimize nutrient retention in plant-based food products after food processing. Increased scientific understanding and practical ramifications might significantly improve public health and food quality.

**Keywords:** Plant Protein, Machine learning, SVR/RF

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 3: COMMITTEE HALL, GOLDEN JUBILEE BLOCK

25<sup>th</sup> November 2023

2:00pm – 3:30pm

#### SESSION-1: FOOD SCIENCE AND NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0049	Dr.Nataraj Durgannavar	Karnataka State Akkamahadevi Women University	vijayapura	natrajdurgannavar@gmail.com	Development and Evaluation of Energy Bar using Foxtail Millet
2.	OP-2023-0074	Dr.Vasudha Pant	Green Hills Trust	Almora	vasudha.pant@gmail.com	Reviving Traditional Wisdom: Stinging Nettle's Resurgence as a Nutrient-Enriching Food Ingredient
3.	OP-2023-0084	Ms.Priya Rani	Punjab Agriculture University	Ludhiana	chaudhary.priya.food@gmail.com	Nutrient Analysis of Germinated Quinoa Varieties: A Path Towards Superior, Nutrient-Dense, Gluten-Free Products
4.	OP-2023-0101	Dr.Koushik Das	Belda College	Belda	koushikphysiology@yahoo.com	Antidiabetic efficacy of volavetki seafish protein hydrolysate via DPP-IV inhibitory with GLP-1 agonistic pathway
5.	OP-2023-0103	Ms.Paramita Dhara	Haldia Institute of Health Sciences	Tamluk	paramita2307@gmail.com	Development of Diabetic Ice cream and cone with multi millet powder .
6.	OP-2023-0129	Ms.Vanessa Fernandes	NUCSER, Nitte (Deemed to be University)	Mangaluru	vanessafernandes220@gmail.com	Development of a ready to eat snack bar for pregnant women to fulfill 1/3rd daily dietary requirements.
7.	OP-2023-0139	Dr.Kamini Dangat	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune	kamini.dangat@bharativedyapeeth.edu	Maternal fatty acids status influences fetal biometry: The REVAMP cohort

OP-2023-0049

**Abstract Title: Development and Evaluation of Energy Bar using Foxtail Millet**

**Dr. Nataraj A Durgannavar**, Assistant Professor, Karnataka State Akkamahadevi Women University, Vijayapura, [natrajdurgannavar@gmail.com](mailto:natrajdurgannavar@gmail.com); Ms. Shilpa, Ph.D scholar, Karnataka State Akkamahadevi Women University, Vijayapura; Mr. Mohammed Faizen meer, Student of MSc Food Science and Technology, Karnataka State Rural Development and Panchayat Raj University, Gadag

**Background:** Nutri bar, sometimes referred to as an energy bar, is a finger snack that combines nutrient-dense ingredients to deliver nutrients to a variety of people (including sports athletes) in a quantity that helps to improve their overall nutrition. Athletes consume energy bars more frequently; thus, our goal is to create tasty, nutritious energy bars for all age groups by including natural sugar agents. **Methods:** Ingredients used were foxtail millet, oats, peanut butter, dates, pumpkin seed, sesame and jaggery and preparation of bar involves preprocessing steps like soaking of millets, roasting of millet and others ingredient to remove anti nutritional factor and to increase flavor. About 4 variations were made and the components in each variation were changed. The ingredients in all the variations were taken to 100g. In Variation 1, jaggery was not added and there was no baking. All ingredients were grounded in variation 2 to achieve proper setting, jaggery was added in variation 3 (11g) to achieve proper binding, and jaggery was added in variation 4 (11g) and baked at 175° C to achieve proper setting, flavour, and bar texture and conducted sensory evaluation by using 9 point hedonic scale to check the overall acceptability of bar. The best accepted variation was taken for the analysis of nutrients composition per 100gm of bar and computed by using Indian Food Composition Table. **Result:** Result of sensory evaluation showed that variation 4 was much liked with scores of 8 whereas for variation 1, 2 and 3 the scores were 6. The nutrient composition of bar showed 488 Kcal of energy, 56.98 gms of carbohydrates, 15.26 gms of protein, 23.9gms of fat, 6.32gms of fibre, 135.83 mg of calcium and 6 mg of iron. **Conclusion:** The developed bar using millets was one of the best alternative to introduce the millets in the daily diet. This can able to meet the 1/3rd requirement of energy, protein and fat for children aged 6-15 years.

**Keywords:** Energy bar, nutrition, ingredients

OP-2023-0074

**Abstract Title: Reviving Traditional Wisdom: Stinging Nettle's Resurgence as a Nutrient-Enriching Food Ingredient**

**Dr. Vasudha Pant**, Secretary, Green Hills Trust, Almora, [vasudha.pant@gmail.com](mailto:vasudha.pant@gmail.com); Dr. Vasudha Pant, Secretary, Green Hills Trust, Almora

**Background:** In the relentless battle against micronutrient deficiencies noteworthy trend on the rise is food-to-food fortification. In our quest for innovative solutions, we must turn to our age-old culinary traditions. In India, stinging nettle leaves, known as “Bichu Booti (*Urtica dioica*)” **Methods:** have long been esteemed for their exceptional nutritional and medicinal attributes. These have been cherished in various culinary forms, including saag, soups, and fritters. However, there was a time when these rich traditional practices faded into obscurity. Recent times have witnessed a revival of interest in such time-honored practices. This study represents an earnest endeavor to reintroduce nettle into modern diets, capitalizing on its abundant nutrient profile and potential health advantages. **Result:** Over a span of three years, we meticulously analyzed more than 100 sun-dried leaf samples from the Kumaun region of Uttarakhand for their mineral and protein content. Encouraged by the nutritional bounty of stinging nettle, we embarked on the development of several food products, integrating stinging nettle with millets and other ingredients to amplify their nutritional value. **Conclusion:** Stinging nettle emerged as a substantial source of nutrition. Additionally, it boasts an array of essential trace minerals, along with vitamins A and C. Furthermore, it exhibits robust antioxidant properties and is rich in polyphenols. Rigorous nutritional analysis of the developed food formulations revealed significant enhancements. For instance, a comparative study of crepe mix with and without stinging nettle, while maintaining other ingredients constant, showcased a remarkable increase in calcium content, surging from 902.8 to 7064.1 mg/kg, magnesium from 1442.2 to 2335.5 mg/kg, potassium from 4640.5 to 6178.7 mg/kg, and iron from 34.3 to 98.6 mg/kg. Similar augmentations in nutritional content were observed across all other products. Realizing the potential of nettle more than 50 products have been developed. This study

unequivocally demonstrates that the inclusion of stinging nettle in food formulations substantially elevates their nutritional content. These findings beckon for innovative research, meticulous product development, and robust consumer awareness initiatives to rekindle traditional dietary practices and harness the bountiful local resources. As traditional wisdom aligns with contemporary nutritional consciousness, stinging nettle continues to assume a pivotal role in promoting health and vitality throughout India.

**OP-2023-0084**

**Abstract Title: Nutrient Analysis of Germinated Quinoa Varieties: A Path Towards Superior, Nutrient-Dense, Gluten-Free Products**

**Ms. Priya Rani**, Ph.D. Scholar, Punjab Agriculture University, Ludhiana, Punjab, [chaudhary.priya.food@gmail.com](mailto:chaudhary.priya.food@gmail.com); Prof. Sonika Sharma, Professor, Dept. of Food and Nutrition; Prof. Kiran Grover, Principal Extension Scientist Cum Head, Dept. of Food and Nutrition; Prof. Ranjeet Gill, Principal Plant Breeder, Dept. of Plant Breeding and Genetics, Punjab Agriculture University, Punjab, Ludhiana

**Background:** Quinoa with high nutritional value is traditionally important and environmental stress-tolerant pseudocereal. Moreover, quinoa is gluten-free and it is generally safe for people with celiac disease. Germination can improve nutritional content of seeds by bringing desirable modification in the availability of nutrients, texture and sensory properties. Quinoa possesses vast morphological variation. In white as well as red varieties germination of quinoa seeds depicted a significant impact on the crude fiber, protein, ash, starch, as well as carbohydrate contents. But Nutritional enhancement in germinated quinoa varieties have not been studied. Keeping this view, an experimental study was conducted.

**Methods:** The sample of ten quinoa varieties were obtained from Department of Plant Breeding and Genetics, Punjab Agricultural University, Ludhiana and analysis was conducted at the Department of Food and Nutrition, College of Community Science, PAU in Ludhiana with nutritional, antinutritional, Fatty acid profile, In vitro protein, and starch digestibility & antioxidant potential parameters. **Result:** The Range of Crude Protein, Crude fat, Dietary fiber, Magnesium, Phosphorous, Potassium, Calcium, Zinc, and Iron in quinoa varieties were found to be 11.77-15.83%, 2.76-4.39 %, 13.83-16.58%, 211.57-339.48 mg/100 g, 337.83-657.94 mg/100 g, 373.22-801.66 mg/100, 66.68-94.14 mg/100 g, 8.13-12.11 mg/100 g, and 6.8-13.44 mg/100g respectively. Quinoa varieties were found good to very good source of Lysine, methionine, tryptophan, Oleic and Linoleic acid. Saponin is major antinutritional factor and responsible for bitterness in quinoa range from 0.04-0.07% that was reduced during germination. Nutrient Quality score (NQS 11.1) was calculated based on 11 desirable nutrients and one antinutritional factor and selected three highly nutritional dense varieties (EC 507741, EC 507743, EC 507744) of quinoa. **Conclusion:** This study helped in selection of superior varieties of quinoa for the development of various highly nutritious gluten free products with improved physicochemical and functional properties. Therefore, tackle the problem regarding low nutritional profile of gluten-free products presently available in the market.

**Keywords:** Germination, NQS, Gluten-free Products

**OP-2023-0101**

**Abstract Title: Antidiabetic efficacy of volavetki seafish protein hydrolysate via DPP-IV inhibitory with GLP-1 agonistic pathway**

**Dr. Koushik Das**, Assistant Professor, Belda College, West Bengal, [koushikphysiology@yahoo.com](mailto:koushikphysiology@yahoo.com); Dr. Shrabanti Pyne, State Aided College Teacher; Ms. Supriya Bhowmick, Ph.D. Research Scholar; Raja Narendralal Khan Women's College (Autonomous), West Bengal, Midnapore

**Background:** Type 2 diabetes mellitus (T2DM) is a complex chronic metabolic disease associated with high blood glucose, low level of insulin with  $\beta$ -cell dysfunction, or developing insulin resistance to its receptors in skeletal muscle cells. Now a day, management of T2DM by food supplementation is a



challenge because of high side effect and high cost of diabetic medicines. Objective: The main objective of this present study was the efficacy of seafish protein hydrolysate (SPH) to lower hyperglycemia of T2DM in rat model. **Methods:** At first, we prepared the SPH from volavetki (Panna microdon, Bleeker, 1849) sea fish and fed to high lipid diet (HLD) and streptozotocin (STZ, 40 mg/ b.w) induced T2DM rats for 28 days. There were four groups of each group (n=5) rats were subjected to induce T2DM except control and vehicle control group. After 28 days, we assessed the following parameters such as glucose (FBG), glycosylated haemoglobin (HbA1c), glucagon like peptide-1 (GLP-1), dipeptidyl-peptidase 4 (DPP-4), insulin, C-peptide, and antioxidant enzymes activity. **Result:** Results: HLD and STZ induced T2DM was confirmed by C-peptide and insulin concentration in plasma of T2DM group. Hypoglycemic activity of SPH was proved by significantly lowered FBG, HbA1c, DPP-4, in SPH supplementation rats only T2DM rats. Further, hypoglycemic activity of SPH was again proved by significantly higher GLP 1, insulin, and FFAR1 in SPH supplementation rats. **Conclusion:** It has been revealed that SPH supplementation was confirmed as anti-hyperglycemic supplementation.

**Keywords:** T2DM, Protein-hydrolysate, GLP-1, DPP-IV

**OP-2023-0103**

**Abstract Title: Development of Diabetic Ice cream and cone with multi millet powder.**

**Ms. Paramita Dhara**, assistant professor, Ph.D. Research Scholar, Tamluk, West Bengal, [paramita2307@gmail.com](mailto:paramita2307@gmail.com); Ms. Paramita Dhara, Assistant Professor, Haldia Institute of Health Sciences, West Bengal, Tamluk

**Background:** Ice cream is a very popular dessert item in the whole world. In the ancient era there was a tradition of taking milk, fruits, sugar and ice together and it was very popular at that time. From this concept the ice cream was made. As its act as pleasuring food so whenever we consume it, the happy hormone dopamine is secreted in our brain. So it act as anti-depressional food. But there are some disease like Diabetes mellitus where the people cannot consume it without any hesitation. Sugar based product are restricted for diabetic patients. Diabetes mellitus is a disease of inadequate control of blood glucose level. So for those people an ice cream is prepared without sugar and here we use the diabetic friendly fruits, millet powder and milk and for the ice cone we use millet. Millet is rich in high fibre and lower GI, so its helps to lower cholesterol as well as blood glucose level. So its helpful for both e the diabetic patient and obese patients. Ice cream is a complex food colloid that consists of an unfrozen serum phase, ice crystals, fat globules, and air bubbles. The main ingredients of ice cream are fat, milk solid-not-fat, sucrose, stabilizer, and emulsifier. Various steps in the manufacturing process, including mixing, pasteurization, homogenization, aging, freezing, and hardening, contribute to the development of this structure. Though in this project we use no commercial stabilizer and emulsifier Aim and objectives: The study aims to develop an ice cream and a cone, which will be completely diabetic friendly. objective was to analysis the nutritive value by biochemical test, microbial test and sensory characteristics by hedonic scale. The acceptance of the product is checked by a survey. In this survey we compare the newly developed ice-cream with a commercial one then collect the data from survey report and compared it through the statistical analysis. **Methods:** Materials: Milk, black current, vanilla, At first the ice-cream is made with jaggery powder, sugar substitute, multi-millet powder, cardamom powder, homemade peanut butter, sugar free dark chocolate, jaggery powder, multi millet powder and for the cone we use millet flower, topica starch, baking powder, salt, sugar substitute, sunflower oil, vanilla extract, milk. Method: At first the ice-cream and the millet cone was made by following the instruction of a simple ice cream making recipe and a cone making recipe, then evaluated it's nutritive value by some bio-chemical test and microbial test in lab (HIHS, Haldia) and all the sensory characteristic by the hedonic scale. A survey was also held in Haldia where feedback was taken, after testing the newly developed ice-cream and a regular market ice-cream. It was held on two type of age group one was the college students (19-23years old) and other was middle aged group (40-55 years, all of them were diabetic patient). From each team 50 people was participated. They tested the sample and rate the ice-cram and the cone by 9 point hedonic scale. **Result:** In the result we found our ice-cream have the desirable taste and flavor and also it have the good texture quality. We also check the Overrun (%) and stand up time (min) and melt down (ml/10min). Not only in the sensory characteristic

but also in the nutritive value it shows a significant result. As per serving size (60 grams) its calorie value is 115, carbohydrate 5 grams, protein 3 grams, fat 6 grams, which is lower than the market's commercial ice-cream. The cone was tested separately. From the sensory evaluation report it is so crunchy enough and its color and overall appearance was slightly lower than the commercial one but it also contains 417 calorie, carbohydrate 6 gm, protein 8 gm, fat 7 gm, fibre 3 gm, and minerals sodium 256 mg, potassium 112 mg, calcium 2%, iron 19%, magnesium 6% per 100gm. However after getting the survey report we have done the statistical analysis by t-test and got no significance difference in sensory characteristics and but got the significance difference in nutritive value, which was highly expected. In the microbial test we found that all the ice cream sample and the cone are totally micro-organism free. **Conclusion:** We attempted to make a ice-cream for the diabetic patient. From this study we finally claimed that newly developed sugar-free ice-cream and millet cone are safe for diabetic patient and it's gladly accepted to the young and aged people. Its also contain so many health benefit as it contain so many minerals. We compared this ice-cream with the commercial one where we found our ice-cream have the low carb-diet friendly nutritive value and its all sensory characteristics are almost same as the commercial ice-cream. So it is easily accepted to the consumers. So now diabetic patients and all other consumer who are in diet or not, everyone can enjoy the ice-cream in a very healthy way from now.

**Keywords:** sensory evaluation, biochemical test, survey

**OP-2023-0129**

**Abstract Title: Development of a ready to eat snack bar for pregnant women to fulfill 1/3rd daily dietary requirements.**

**Ms. Vanessa Fernandes**, PhD research scholar, NUCSER, Nitte (Deemed to be University), Mangaluru, [vanessafernandes220@gmail.com](mailto:vanessafernandes220@gmail.com); Ms. K Shreeja, Student; Dr. Mamatha BS, Assistant Professor, NUCSER, Nitte (Deemed to be University), Paneer Campus, Kotekar-Beeru, Mangaluru 575 018, Karnataka, Mangaluru

**Background:** Nutrition is a fundamental factor in human health and development. Pregnancy is an important phase where the mother requires sufficient nutrients to support her health and her developing fetus. Maternal undernutrition increases the risk of gestational anemia, hypertension, miscarriages and fetal deaths during pregnancy, pre-term delivery and maternal mortality. For newborn, it can cause low birth weight, fetal intrauterine growth retardation that may have lifelong consequences on the newborn development, quality of life and healthcare costs. Pregnant women require an additional 350 kCal, 0.5 g of protein during first trimester and 6.9 g during second and 22.7 g during the third trimester of pregnancy. Low maternal dietary protein intake can cause lifelong consequences for the neonate due to fetal programming. This study aimed to develop a diet that promotes health and sustainability while meeting one third of the recommended dietary allowance (RDA) to address eradication of maternal and neonatal malnutrition. **Methods:** The snack bar was prepared by using puffed rice, quick oats, flax seeds, peanuts supplemented with protein rich ingredients including whey protein, protein hydrolysates and mineral mix. The mixture was moulded into desired shapes using jaggery syrup. Proximate analysis and sensory evaluation of the snack bar was performed **Result:** Upon conducting proximate analysis, moisture content of the product was observed to be 4.050%, ash content - 3.825%, protein content - 18.474%, fat content - 2.060% crude fibre - 1.042%, and carbohydrate - 70.548%. The snack bar was evaluated for its sensory components like colour, appearance, texture, taste, aroma and overall quality. The bar was ranked 'liked very much' by 9 of the 15 panelists, followed by 'liked much'. **Conclusion:** The developed product serves as a ready to eat (RTE) healthy snack bar for pregnant women, as the bar provides one third of the total nutrients required by expectant mothers. As the bar is rich in protein, carbohydrate and low in fat, it can be consumed any time of the day and would serve as a good instant source of energy while not promoting any co-occurring conditions.

**Keywords:** snack bar, pregnancy, nutrition, protein

**Abstract Title: Maternal fatty acids status influences fetal biometry: The REVAMP cohort**

**Dr. Kamini Dangat**, Assistant Professor, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, [kamini.dangat@bharativedyapeeth.edu](mailto:kamini.dangat@bharativedyapeeth.edu); Prof. Arun Kinare; Prof. Priscilla Joshi, Prof and head, Department of Radiodiagnosis, Bharati Medical College and Hospital, Bharati Vidyapeeth (Deemed), Maharashtra, Pune; Ms. Hemlata Pisal, Research Assistant, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University); Dr. Sanjay Gupte, Gupte Hospital and Research Centre; Prof. Sadhana Joshi, Prof and head, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Maharashtra, Pune

**Background:** The intrauterine nutritional environment affects fetal growth and the risk of disease later in life. Fatty acids are critical nutrients necessary for fetal growth and development. This study for the first time reports the relationships between maternal fatty acid status and fetal biometry across pregnancy. **Methods:** The women enrolled in the current prospective study are part of the REVAMP study where 1096 singleton pregnant women were recruited at 11-14th weeks of gestation and followed till delivery. This study, includes 324 women (108 women with preeclampsia (PE) and 216 women without PE). Fetal biometric measurements were assessed by ultrasound scans at 3 time points (11–14, 18–22, 32-35 weeks of gestation). Measurements included CRL (crown-rump length), femur length (FL), abdominal circumference (AC), and biparietal diameter (BPD), head circumference (HC) and fetal weight (FW). Maternal fatty acids were analysed at 11–14, 18–22, and 26–28 weeks using gas chromatograph. Associations of maternal fatty acids with fetal growth were examined using Pearson correlation, after adjusting for major confounders. **Result:** In the REVAMP cohort BPD, FW, AC ( $p < 0.05$  for all) and HC ( $p < 0.01$ ) were lower while total saturated fatty acids (SFA) and omega 6 to omega 3 ratio ( $p < 0.05$  for both) was higher in women with PE. This study reports a positive association of polyunsaturated fatty acids (PUFA) ( $p < 0.05$ ) in early pregnancy (11-14 weeks), while stearic acid ( $p < 0.05$ ) and total saturated fatty acids (SFA) showed a negative association with CRL. At 18-22 weeks, myristic acid was positively associated with HC ( $p < 0.01$ ), linoleic acid (LA) was positively associated with AC ( $p < 0.05$ ) and FW ( $p < 0.01$ ) while total monounsaturated fatty acids (MUFA) were positively associated with FL ( $p < 0.05$ ). There was a positive association of omega 6 to omega 3 ratio with AC ( $p < 0.05$ ). At 26-28 weeks, docosahexaenoic acid (DHA) and total omega 3 fatty acids were negatively associated with AC ( $p < 0.05$  for both). **Conclusion:** Our findings indicate that maternal fatty acids (PUFA, MUFA and SFA) are differentially associated with fetal biometry across pregnancy. This data suggests that optimising fatty acids levels during pregnancy will benefit fetal growth.

**Keywords:** fatty acids, fetal biometry, pregnancy

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 4: ANIMAL HOUSE CLASSROOM

25<sup>th</sup> November 2023

2:00pm – 3:30pm

#### SESSION-1: CLINICAL NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0106	Dr.Panchali Moitra	Sir Vithaldas Thackersey College Of Home Science, SNDT Women's University, Mumbai	Mumbai	panchali.moitra@svt.edu.in	Association of Physical Activity and Sleep Quality with Glycemic Variability and Glycemic Control in Indian Adults with Type 2 Diabetes: A Case Series Study
2.	OP-2023-0138	Ms.Chandni Halcyon Peris	St. John's Research Institute, St. John's National Academy of Health Sciences	Bengaluru	chandni.hp@sjri.res.in	Association of dietary intake of Calcium and Phosphorus and their association with bone biomarkers in Vitamin D Deficient Women
3.	OP-2023-0140	Dr.Juhi Nema	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune	juhiparikhnema88@gmail.com	Role Of Maternal Nutrition On Angiogenesis In Preeclampsia
4.	OP-2023-0144	Ms.Mariyam Shaikh	MGM Institute of Health Sciences		mmariyam2016@gmail.com	Effect of Ramadan fasting on Glycemic control in Diabetic patient

OP-2023-0106

**Abstract Title: Association of Physical Activity and Sleep Quality with Glycemic Variability and Glycemic Control in Indian Adults with Type 2 Diabetes: A Case Series Study**

**Dr. Panchali Moitra**, Sir Vithaldas Thackersey College Of Home Science, SNDT Women's University, Mumbai, Maharashtra, [panchali.moitra@svt.edu.in](mailto:panchali.moitra@svt.edu.in); Ms. Araina Trehon, Academic Dean (Postgraduate Programs & Research); Dr. Jagmeet Madan, Sir Vithaldas Thackersey College Of Home Science, SNDT Women's University, Mumbai, Maharashtra

**Background:** High glycemic variability increases the risk of short and long-term complications in people with diabetes, even though they have achieved mean glucose within the euglycemic range. Physical activity and sleep quality are important determinants of cardiometabolic health, however, the impact of these factors on glucose fluctuations is less documented. The objective was to assess the influence of physical activity and sleep quality on glycemic control and glycemic variability measured using a Continuous Glucose Monitoring System among adults with type 2 diabetes in India **Methods:** Adults with type 2 diabetes (n=8) received sensor-based FreeStyle Libre Pro glucose monitors to continuously measure interstitial glucose concentrations over a three consecutive day tracking period. A questionnaire was used to gather information on the socio-demographic characteristics and on the components of nutritional assessment. Hourly physical activities were self-recorded on a validated physical activity logbook and the sleep quality was estimated using the Pittsburg Sleep Quality Index (PSQI). Glycemic Variability was assessed by Standard Deviation (SD), Mean Amplitude of Glycemic Excursions (MAGE), Time in Range (TIR), Time Above Range (TAR) and Time Below Range; and glycemic control was determined by HbA1C values. **Result:** The mean age was 55.2 (14.9) years. Indulging in any physical activity for at least 1 hour/d at 2.5 - 8 metabolic equivalent (MET) range was significantly associated with greater TIR (mean: 81.2 vs 15.9%), lower TAR (10.1 vs 83.5%), lower glycemic variability (mean SD: 38.3 vs. 56.71; mean MAGE: 100.13 vs 138) and better glycemic control (mean glucose: 130.62 vs 213.6 mg/dL; mean HbA1C: 7.5 vs 9.6%) as compared to only indulging in activities between 1 - 2.3 MET range. Participants with better sleep quality (PSQI ≤ 5) (4 (1.15)) showed greater TIR (mean: 63.6 vs 49.8%), lower TAR (mean: 28.8 vs 46.4%), lower glycemic variability (mean SD: 40 vs 50.4; mean MAGE: 100.17 vs 128) and lower 24-hour-mean glucose values (mean: 145.5 vs 177.3 mg/dL) as compared to those with poor sleep quality (10.75 (4.11)). **Conclusion:** Lower physical activity levels and poor sleep quality were associated with larger glycemic variability, thus presenting potential behavioral change targets for better glycemic control and personalized diabetes management.

**Keywords:** diabetes, physical activity, sleep pattern

OP-2023-0138

**Abstract Title: Association of dietary intake of Calcium and Phosphorus and their association with bone biomarkers in Vitamin D Deficient Women**

**Ms. Chandni Halcyon Peris**, Research Associate, Division of Nutrition and PhD, St. John's Research Institute, St. John's National Academy of Health Sciences, Bengaluru, Karnataka, [chandni.hp@sjri.res.in](mailto:chandni.hp@sjri.res.in); Ms. Sumithra Selvam, Senior Statistician, Division of Epidemiology, Biostatistics and Population Health, St. John's Research Institute, St. John's National Academy of Health Sciences, Karnataka, Bengaluru; Dr. Tony D.S. Raj, Dean; Dr. Prashanth Thankachan, Associate Professor, Division of Nutrition, St. John's Research Institute, St. John's National Academy of Health Sciences, Karnataka, Bengaluru

**Background:** Vitamin D deficiency (VDD) is major health issue in India, where ~490 million have inadequate levels. VDD combined with inadequate dietary calcium intake compromises bone health, potentially leading to long term osteoporosis. Our aim was to assess dietary intakes, specifically calcium and phosphorus in women with insufficient/deficient VD levels and investigate their association with bone markers. **Methods:** The baseline data from a randomized control trial examining dose response to vitamin D supplementation on healthy non-pregnant non-lactating women (18-35years; n=108) with plasma 25-Hydroxy-Vitamin D(25OHD) <20ng/mL (IOM) was used for analysis. The study was

approved by the Institutional Ethics Committee, St. John's National Academy of Health Sciences and registered at Clinical Trials Registry of India. At baseline, data on anthropometry, 3-day-24-hour dietary recalls were recorded and blood samples to estimate bone markers (25OHD3, parathyroid hormone (PTH), osteocalcin (OC) & bone specific alkaline phosphatase (BSAP,) were collected. Bone mineral content and density was assessed using Dual-Energy-X-Ray-Absorptiometry. A sun exposure questionnaire quantified daily sun exposure of the participants. **Result:** At baseline, participants' mean daily intakes of energy was 1609±356.2kcal and of protein 54.8±13.7g. The mean intake of calcium, phosphorous and the calcium phosphorous ratio was 501.4±148.7mg, 1104.2±248.7mg and 0.5:1 per day, respectively. The risk of inadequate intake of calcium was 97% and phosphorous was 11%. The correlations between intakes of calcium, phosphorous and Ca: P ratio were significant for osteocalcin (Ca: r = 0.204; p = 0.036; P: r = 0.180; p = 0.065 and Ca: P ratio: r = 0.208, p = 0.032) but not for 25OHD3, PTH, and BSAP. Daily sun exposure was about below 30 minutes for 92.6% of these vitamin D deficient women. **Conclusion:** In vitamin D deficient women, dietary calcium intakes were very low. Adequate calcium, phosphorous and vitamin D status will ensure bone health. There is a need for tailored public health strategies to diversify the diet and counseling on benefits of increased sun exposure to prevent osteoporosis later in life.

**Keywords:** vitamin-D, calcium, phosphorous, bone Biomarkers

**OP-2023-0140**

**Abstract Title: ROLE OF MATERNAL NUTRITION ON ANGIOGENESIS IN PREECLAMPSIA**

**Dr. Juhi Nema**, Assistant Professor, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, [juhiparikhnema88@gmail.com](mailto:juhiparikhnema88@gmail.com); Dr. Deepali Sundrani; Dr. Kamini Dangat, Assistant Professor; Ms. Hemlata Pisal; Dr. Sadhana Joshi, Professor and Head, Interactive Research School for Health Affairs, Maharashtra, Pune; Dr. Sanjay Gupte, Gupte Hospital and Research Centre, Maharashtra, Pune

**Background:** Preeclampsia is a pregnancy disorder characterized by abnormal angiogenesis. It is a major cause of maternal morbidity and mortality affecting 8-10% of pregnancies in India. Maternal nutrients such as calcium, magnesium and vitamin D play an important role in vascular smooth muscle function. They also have a synergist effect on immunomodulation, inflammation and oxidative stress which are impaired in preeclampsia. This study reports the association of these nutrients with angiogenic markers (vascular endothelial growth factor (VEGF), placental growth factor (PIGF) and its receptor soluble form of fms-like tyrosine kinase (sFlt-1)) in preeclampsia. **Methods:** This study is a part of ICMR-Centre for Advanced Research project. Blood samples were collected at four time points across gestation: V1=11-14 weeks, V2=18-22 weeks, V3=26-28 weeks and V4=at delivery. This study includes 108 women with preeclampsia (PE) and 216 women without preeclampsia (Non-PE). Independent t-tests were used to compare the levels between the groups. Multiple linear and logistic regression was used to examine the association of calcium, magnesium and vitamin D with the risk of preeclampsia and angiogenic markers. **Result:** Lower serum magnesium and vitamin D levels in PE group compared to the Non-PE group at V2 (p < 0.05 for both) while comparable levels of calcium between the groups. There was a negative association between magnesium and vitamin D status (p < 0.01) and a positive association of calcium with the risk of preeclampsia (p < 0.05) at V2. Lower VEGF levels at V1 (p < 0.05), lower PIGF levels at all the timepoints (p < 0.01 for V1, V2 and V3; p < 0.05 for V4), higher levels of sFlt-1 (p < 0.01 for V3; p < 0.05 for V4) and higher sFlt-1/PIGF ratio at V3 and V4 (p < 0.01 for both) in the PE group compared to the Non-PE group. There was a positive association of vitamin D and magnesium with VEGF at V1 and V2 (p < 0.01 for both) and calcium with sFlt-1/PIGF ratio at V1 (p < 0.01). **Conclusion:** Maternal calcium, magnesium and vitamin D influence angiogenesis and thereby risk of preeclampsia.

**Keywords:** Preeclampsia, Vitamin D, Calcium, Magnesium

OP-2023-0144

**Abstract Title: Effect of Ramadan fasting on Glycemic control in Diabetic patient**

**Ms. Mariyam Shaikh**, MGM Institute of Health Sciences, [mmariyam2016@gmail.com](mailto:mmariyam2016@gmail.com); Dr. Santosh Gawali; Dr. Priyanka Pareek

**Background:** Ramadan fasting stands as a fundamental practice within Islam, observed by Muslims across the globe. While extensive research has delved into the physiological alterations during fasting in individuals with good health, it remains imperative to grasp its implications for those with Type 2 Diabetes Mellitus. Ramadan fasting, marked by shifts in meal timing, holds the capacity to impact daily routines, sleep patterns, and dietary habits. This study endeavours to elucidate the effect of Ramadan fasting on glycemic control in diabetic patients. **Methods:** This was a prospective study carried out in Navi Mumbai and Mumbai during the Ramadan month of March 2023. The study involved a total of 128 participants between age group 18 and 50 years, which were divided in two groups. Group one consisted of 64 individuals with diabetes (study group) and Group 2 comprised of 64 individuals without diabetes (control group), all observed Ramadan fasting. Blood samples were collected from each participant twice, before the commencement of Ramadan and after completion of the Ramadan month. These blood samples were estimated for HbA1c levels, Fasting Blood Sugar (FBS), and Post Prandial Blood Sugar (PPBS). Dietary content and dietary pattern were assessed using 24-hour dietary recalls and food frequency questionnaires. Statistical analysis of the collected data was carried out using SPSS software. The results were presented as means and standard deviations, with statistical significance set at  $p < 0.05$ . **Result:** Statistically significant reduction in HbA1c levels was observed in the study group ( $p = 0.009$ ) post Ramadan as compared to pre-Ramadan. Similarly in the control group, statistically significant reduction was observed in HbA1c levels post Ramadan as compared to pre-Ramadan ( $p < 0.005$ ). We also observed decrease in FBS and PPBS in both study and control group post Ramadan in comparison to pre-Ramadan. **Conclusion:** Fasting exerts significant effect on metabolism in both healthy conditions and diabetic state. Potential benefits are observed in glycosylated haemoglobin levels and central obesity reduction, reducing metabolic syndrome risk, particularly among individuals with diabetes. Lifestyle adjustments and pre-fasting assessments, accompanied by scientific education and nutritional counselling, are essential for diabetic patients to ensure that they observe a scientifically sound and safe Ramadan fast.

**Keywords:** Ramadan-fasting, Glycemic control, Diabetes Mellitus

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 1: ASSEMBLY HALL, MAIN BUILDING

26<sup>th</sup> November 2023

9:30 am – 11:00 am

### SESSION-2: COMMUNITY NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
7.	OP-2023-0187	Ms.Ankita Mondal	St John's Research Institute	Bangalore	ankitamondal754@gmail.com	A diet optimization tool for meeting nutrient and budgetary provisions in the Supplementary Nutrition Programme for women and children under the Integrated Child Development Scheme
8.	OP-2023-0198	Ms.Afreen Sultana	ITC Limited	Bengaluru	afreensultana821@gmail.com	Impact of Double Fortified Salt and Nutrition Education interventions to improve anemia amongst Adolescent Girls
9.	OP-2023-0226	Dr.Mahesh Kumar Mummadi	ICMR-National Institute of Nutrition	Hyderabad	mahidoc@yahoo.com	Maternal Body Composition and associated factors on Nutritional Status of Under 5 Children from CNNHS (Comprehensive National Nutritional and Health Survey)
10.	YS-2023-0025	Ms.Narshima Arya	-	Hyderabad	aryasatya5720@gmail.com	Trends in Millets Cultivation and Availability for Consumption in India from 1966/67 to 2019/20: A Joinpoint Regression Analysis
11.	YS-2023-0035	Ms.Neelam Rathod	The Maharaja Sayajirao University of Baroda	Vadodara	neelam_rathod92@yahoo.com	Development, Validation And Reliability Of Diet Quality Index For Indian Athletes
12.	YS-2023-0013	Ms. Asma Sajid	Avinashilingam Institute for Home Science & Higher Education for Women	Hyderabad	asmasajid22@gmail.com	Development of a Indian Dietary risk score tool (DRST) for early diagnosis of gestational diabetes mellitus -A Cross sectional study



OP-2023-0187

**Abstract Title: A diet optimization tool for meeting nutrient and budgetary provisions in the Supplementary Nutrition Programme for women and children under the Integrated Child Development Scheme**

**Ms. Ankita Monda**, Program Manager, St John's Research Institute, Bangalore, Karnataka, [ankitamondal754@gmail.com](mailto:ankitamondal754@gmail.com); Mr. Jawahar Manivannan, Senior Research Analyst; Dr. Anura V, Professor & Former Head Dept. St John's Research Institute, Karnataka, Bangalore; Dr. H.P.S. Sachdev, Senior Consultant, Sitaram Bhartia Institute of Science and Research, New Delhi

**Background:** To tackle the problem of malnutrition, the GOI provides hot-cooked meals (HCM) and take-home-ration (THR) to women (pregnant and lactating) and children (6-72months), depending on age-group, through the Supplementary Nutrition Program (SNP) under the Integrated Child Development Scheme, running since 1975. The SNP, provided through Anganwadis, aims to meet the energy and protein requirements, with a recent addition of essential micronutrients. However, the SNP is lacking in essential nutrients and acceptability among the beneficiaries. The current study is a way-forward to empower government committees and officials in designing context-specific SNP food recommendations through a user-friendly web-based portal utilizing mathematical modelling, meeting the nutritional requirements while adhering to the budgetary constraints. **Methods:** A cross-sectional survey was conducted in 4 Anganwadis, each, in 29 States of India. Data collection included information on the type of supplementary nutrition provided to each beneficiary, details of the foods and cyclic menu, budget allocations, additional foods and micronutrient supplementation. Additional information was collected from mothers of young children on the locally prepared recipes. Data was obtained electronically with pre-tested questionnaires. The collected recipes from each State were standardised and used in mathematical modelling. Relevant constraints on portion sizes, nutrient and budget requirements were added as necessary. **Result:** A web-based interface was developed to enable users to design HCM and THR that meet the nutrient provisions of the beneficiaries at the lowest possible cost using locally available ingredients. The portal provides State-specific recommendations based on users' selected ingredients, enabling formulation of recommendations based on the availability and accessibility of ingredients. The portal also provides visualization of the percentage nutrients met, food group distribution, cost contribution of each food, fostering informed decision-making in designing supplementary nutrition. The tool also allows for inclusion of additional ingredients, recipes, modification of ingredients costs and nutrient requirements. **Conclusion:** The web-based interface developed in this study will enable Govt officials and individuals to design context-specific dietary recommendations that could meet nutrient requirements while conforming to the budgetary constraints provided by GOI. The context-specific dietary recommendations will also allow for increased acceptability among women and children. The study presents a way-forward for addressing malnutrition in the country.

**Keywords:** WHO ICDS-SNP Optimization Tool, ICDS-SNP

OP-2023-0198

**Abstract Title: Impact of Double Fortified Salt and Nutrition Education interventions to improve anemia amongst Adolescent Girls**

**Ms. Afreen Sultana**, Research Associate, ITC Limited, Bengaluru, Karnataka, [afreensultana821@gmail.com](mailto:afreensultana821@gmail.com); Dr. Bhavna Sharma, Head, Nutrition Sciences, ITC Limited, Karnataka, Bengaluru; Dr. Shantanu Sharma, Deputy Director; Ms. Priyanshu Rastogi, Senior Program Manager, MAMTA Health Institute for Mother and Child, Delhi; Ms. Jane Karkada, Executive Director, Confederation of Indian Industry, Delhi

**Background:** Anemia is a significant public health problem in India particularly among vulnerable populations which include women of reproductive age and adolescent girls who are at more risk due to various factors. An intervention with Double Fortified Salt (DFS) is a convenient and cost-effective method to increase iron intake among the vulnerable population and help them meet daily iron needs manage or prevent anemia. Iron in DFS is typically in the form of ferrous fumarate, which is more easily

absorbed by the body compared to other forms of iron. Salt is a commonly consumed ingredient in Indian households, and its regular use makes DFS a viable intervention for reaching a large population. The effectiveness of DFS along with nutrition education to improve hemoglobin and serum iron was assessed among adolescent girls (15-49 years) through a randomized double-blinded controlled trial. **Methods:** The study was conducted in 26 villages of Chandauli district, Uttar Pradesh, India. Around 600 girls were divided in two groups by random sampling. Both Group 1 (Iodized salt & Nutrition education) and Group 2 (DFS and Nutrition Education) were provided with approx. 2kg salt for six months. Six structured nutrition education sessions on Anemia identification, prevention and management were conducted using flipbook and posters. Data on anthropometric measurements, hemoglobin and iron markers were collected using standardized tools at baseline and endline. The data were analyzed using STATA. **Result:** There was an increase of 1.6 gm% in the median hemoglobin concentration between baseline and endline amongst the girls who consumed Double fortified salt. The consumption of double fortified salt was also found to improve serum iron levels better than the iodized salt ( $p < 0.05$ ), even after the adjustment of covariates and confounders. There was an increase in knowledge and practices about anemia both the groups. More than 80% of girls regularly consumed the salt under study. **Conclusion:** Consumption of DFS has the potential to improve anemia among adolescent girls and can be evaluated further in parameters of longer study periods and study populations who are vulnerable to anemia. It can be a cost-effective intervention to mitigate the risk of anemia amongst mass populations.

**Keywords:** DFS, Anemia, Education, Adolescent girls.

**OP-2023-0226**

**Abstract Title: Maternal Body Composition and associated factors on Nutritional Status of Under 5 Children from CNNHS (Comprehensive National Nutritional and Health Survey)**

**Dr. Mahesh Kumar Mummadi**, Scientist-D, Clinical Epidemiology Division, ICMR-National Institute of Nutrition, Hyderabad, [mahidoc@yahoo.com](mailto:mahidoc@yahoo.com); **Dr. JJ Babu Geddam**, Scientist-G & HoD, Clinical Epidemiology, ICMR-National Institute of Nutrition, Hyderabad; **Dr. Laxmaiah Avula**, Retd Scientist-G & HoD, Public Health Nutrition, ICMR-National Institute of Nutrition, Hyderabad; **Ms. Sridevi**, Consultant, ICMR-National Institute of Nutrition, Hyderabad; **Dr. Sreenu Pagidoju**, Technical Officer, ICMR-National Institute of Nutrition, Hyderabad; **Mr. Raji Reddy**, Sr Technician, ICMR-National Institute of Nutrition, Hyderabad

**Background:** Undernutrition in children is caused due to lack of insufficient food intake, leading to delayed growth, low weight, low cognitive ability leading to decreased potential and functional capacity. these effects are mostly irreversible. A Cross sectional study has been conducted in Southern India, to access the maternal body composition, Socioeconomic Factors, Dietary Diversity Score of mothers and its implications on their child's nutritional status. The study also tried to assess the dietary and nutrients intake in women and children to examine their nutrient adequacy and dietary diversity and examine the prevalence of nutritional status in children of low dietary diversity intake group. **Methods:** To assess the risk of stunting, wasting and underweight in children with maternal indicators and socioeconomic characteristics of the households Chi square tests, logistic regression and adjusted odds ratios were used. **Result:** The prevalence of stunting, wasting and underweight were 35.95%, 17.69%, and 31.7% respectively in under 5 children. Underweight prevalence in children is associated with Maternal body composition like maternal height, weight, waist circumference, hip circumference, Body mass Index, Body Fat percentage. In under 5 children except for calcium and protein intake, all other micronutrients were less than one-third the recommended intake. Low nutritional status is observed in under 5 children with low dietary diversity score, emphasizing the importance of adequate food and nutrients intake for improving the nutritional status in children. **Conclusion:** The Nutrients Adequacy Ratio (NAR) of 10 food groups and 11 micronutrients intake by women of reproductive age is 4.68 and 6.71 respectively, while Mean adequacy ratio (MAR) for the above food groups and micronutrients is 0.47, and 0.61, respectively, which indicates the need for interventions emphasizing in availability of more food groups to women of reproductive age.

**Keywords:** Undernutrition, Maternal, Bodycomposition, Socioeconomic, CNNHS

YS-2023-0025

**Abstract Title: Trends in Millets Cultivation and Availability for Consumption in India from 1966/67 to 2019/20: A Joinpoint Regression Analysis**

**Ms. Narshima Arya**, Hyderabad, Telangana, [aryasatya5720@gmail.com](mailto:aryasatya5720@gmail.com); Mr. Syed Mahfuz Al Hasa, Prof. kavitha Menon, Hyderabad, Telangana

**Background:** Millets are popularly known as “Nutricereals” because of their abundant nutritional content. Millets have been an integral part of the Indian diet for centuries. Hence, we aimed to analyze the trends and significant changes in millets farming and per capita millets availability in India from 1966/67 to 2019/20. **Methods:** Millets database developed by the Indian Institute of Millets Research and FAO’s food balance sheets were used to analyze millets availability in India from 1966/67 to 2019/20. We used joinpoint regression analysis and computed annual percentage change (APC) for each segment of the trends in millets availability in India. **Result:** Millets harvested area reduced noticeably by 62.5% from 1966/67 (3.7 million Ha) to 2019/20 (1.4 million Ha) in India which resulted in only a 2.7% increase in millets production (from 16.8 million tons to 17.3 million tons). Sorghum millet was harvested mostly during 1966/67; however, the harvested area reduced drastically (APC=2.4). Across the millets, only the production of pearl millet increased significantly by 1.4% per year from 1966/67 (4.5 million tons) to 2019/20 (10.4 million tons) though its harvested area decreased by 1.1% per year. The yield of pearl millet increased the highest across the millets by 2.4% per year. Reduction in harvested area reduced the production of finger millet since late-1970s (APC=1.3) and sorghum millet since late-1980s (APC=3.2). Only the production of pearl millet increased significantly by 1.9% per year during 1985/86 (3.7 million tons) and 2019/20 (10.4 million tons). Per capita millets availability decreased by 65% in India from 1966/67 (89.4g/day) to 2019/20 (31.5g/day) with an average reduction of 2.1% per year. Per capita millets availability decreased constantly in India since 1966/67. The decreasing trend got its momentum in 1977/78 when the per capita availability reduced by 2.4% per year. Per capita carbohydrate supply reduced from 259kcal/day in 1977/78 to 99kcal/day in 2019/20 and protein supply reduced from 7.5g/day in 1977/78 to 2.9g/day in 2019/20. **Conclusion:** Millets availability and its nutrient supply decreased significantly in India. Noticeable reduction in harvested area caused only a 2.7% increase in production though the yield increased by 174% from 1966/67 to 2019/20.

**Keywords:** Millets, Indian Institute of Millets

YS-2023-0035

**Abstract Title: DEVELOPMENT, VALIDATION AND RELIABILITY OF DIET QUALITY INDEX FOR INDIAN ATHLETES**

**Ms. Neelam Rathod**, UGC SRF and Ph.D. scholar (Foods and Nutrition), The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, [neelam\\_rathod92@yahoo.com](mailto:neelam_rathod92@yahoo.com); Dr. Suneeta Chandorkar, Assistant Professor, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat

**Background:** Well-chosen sports nutrition strategies are important for success in sports and can affect performance, valid and reliable dietary assessment methods are required to get a complete picture of food intake, dietary habits and sports-specific nutrition strategies. The dietary intake of Indian athletes is reported inadequate in many studies. Most of the studies related to the dietary intake of athletes have focused on achieving the recommended macronutrients and micronutrients. However, quantitative data on nutrients may provide limited information regarding diet quality i.e. assessment of nutritional adequacy of the diet which resembles closely to the real world. There is a need to shift the approach from assessing single nutrients to overall diet quality because various foods are consumed in combination. There are limited research studies on assessing the overall dietary patterns of athletes. This is due to the unavailability of diet quality index specifically for athletes. Evaluation of diet quality of athletes using population-based indices would overlook various diet components of athletes such as pre-, during and post-training nutrition and hydration strategies and specific dietary requirements such as higher energy and nutrient requirements of athletes compared to the general population. **Methods:**

A hundred elite athletes were selected for the study. The total scores were based on 3-day–24-h dietary recalls. The total score was 100 and was based on adherence to the nutrition recommendation for Indian athletes. The component types adequacy, moderation and optimal range were scored based on the cut-off value and threshold values of the component after adjusting to energy per 1000 Kcal and were linearly scored using the energy density approach. The content was validated using the content validity ratio. The construct was validated using PCA, Quintile analysis, P for trend using linear models, and Pearson's correlation while criterion validity was assessed using Pearson's correlation. The sample size for reliability was calculated using Bonnet's formula and was assessed using Cronbach's alpha. EI/BMR estd ratio >1.23 was classified as "adequate energy reporters". **Result:** The mean age of athletes is 20.9±2.9 years. The mean scores for boxers, kabaddi players, archers, air rifle shooters and long-distance runners were 89.9±2.8, 85.6, 78.3, 84.5 and 85.4, respectively. PCA showed at least five dimensions representing 72.03% of the total variance in the index. KMO analysis showed that the sample was adequate for PCA. Higher diet quality index scores (across quintiles) were associated with higher intakes of grains, green leafy and other vegetables, fruits, milk and milk products and total protein foods. Higher diet quality index scores were also associated with lower intakes of refined grains, processed fruit products, processed meat, solid fats, cooking oil, added sugar and alcoholic drinks. The total scores of diet quality were independent of energy intake (p<0.001). Optimal energy availability had a significantly greater total score than athletes with LEA. Cronbach's alpha was greater than 7 which is acceptable. **Conclusion:** The novel diet quality index for Indian athletes showed validity as well as internal reliability.

**Keywords:** Diet quality index, validity, reliability

**YS-2023-0013**

**Abstract Title: Development of a Indian Dietary risk score tool (DRST) for early diagnosis of gestational diabetes mellitus -A Cross sectional study**

**Ms. Asma Sajid**, Ph.D. scholar and Nutritionist, Avinashilingam Institute for Home Science & Higher Education for Women, Hyderabad, Telangana, [asmasajid22@gmail.com](mailto:asmasajid22@gmail.com); Dr. V Premala Priyadharshini, Head, Dept .of Food service management & Dietetics, Avinashilingam Institute for Home science & Higher Education for Women, Tamil Nadu, Coimbatore; Dr. Latha Sashi, Head of the Department, Department of Clinical Nutrition and Dietetics, Fernandez Hospital, Telangana, Hyderabad

**Background:** To develop a dietary risk score tool for early identification of Gestational Diabetes Mellitus (GDM). **Methods:** A Cross sectional study was carried out at tertiary care facility of Hyderabad. Women registered at facility with gestational age of ≤ 12 weeks and without known history of diabetes were included in study. Structured scoring tool with 13-variable was developed. Individual score values were assigned to each variable, and the total score was calculated. The participants were directly interviewed, and scores were provided. In the second trimester, they were followed up with Oral Glucose Tolerance Test results and divided into two groups, GDM and non-GDM. Appropriate regression methods were carried out to test the association of variables with outcomes. Diagnostic validity was tested using ROC curve analysis. **Result:** There were 530 women in study, with 174 (32.8%) GDM and 356 (67.2%) non-GDM. Mean age and BMI were found to be 28 years and 26 kg/m<sup>2</sup> in GDM group and 27 years and 24 kg/m<sup>2</sup> in non-GDM, respectively. The risk factors that were statistically linked to GDM in univariate analysis were -a) dietary factors like increased intake of refined carbohydrates, oil, processed /junk foods, and sugary beverages and low intake of whole grains, vegetables, and fruits b) pre-pregnancy BMI, c) low physical activity (i.e., walking), d) history of LGA, and e) excessive weight gain in pregnancy. The dietary factors were in accordance with ICMR recommendations. Variables with statistical significance were included in multivariable binary logistic regression modeling. This model was tested for multicollinearity; variables with higher variance inflation factor (VIF) were removed in order to avoid multicollinearity, and the adjusted probability ratio with 95% CI was provided. ROC analysis reported an Area Under Curve (AUC) of 0.99 at a cutoff score of ≥49.36%. Sensitivity, specificity, and diagnostic accuracy were found to be 94.25%, 97% and 96.23% respectively. **Conclusion:** The developed Indian dietary risk score tool is effective in identifying women at risk of

GDM. We recommend the application of this tool in routine care practice to further validate it at various study sites.

**Keywords:** Gestational Diabetes Mellitus, Scoring Tool

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 2: CONFERENCE HALL, GOLDEN JUBILEE BLOCK

26<sup>th</sup> November 2023

9:30 am – 11:00 am

### NUTRITION EDUCATION & COMMUNICATION, SPORTS NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0003	Dr.Mallicka	Mayo Institute of Medical Sciences, Barabanki, Uttar Pradesh	lucknow	drmалlicka09@gmail.com	Self-Care Behaviour of Pregnant Women with Gestational Diabetes Mellitus attending a Tertiary Care Hospital in Lucknow - A Quasi-Experimental Study
2.	OP-2023-0068	Ms.Bhagyasri goud	Mfine Health Care	Bangalore	bhagyasrigouda kki@gmail.com	Diabetes and Prediabetes Individuals on Low-carb diet How digital application contributed improved glycemic levels in the developing country
3.	OP-2023-0095	Ms.Paromita Banerjee	ICMR-National Institute of Nutrition	Hyderabad	paromitabanerjee0806@gmail.com	Development and Pilot Testing of a Multi-Component Nutrition based Workplace Wellness Programme (WWP) Model to Promote Healthy Diets and Lifestyles among IT Employees of Hyderabad, India
4.	OP-2023-0072	Dr.Abdul Jaleel CP	ICMR-NIN	Hyderabad	cpjaleel@gmail.com	What factors contribute to certain children living in poverty being free from all forms of anthropometric malnutrition?
5.	OP-2023-0113	Dr.Teena Dasi	ICMR NIN, HYDERABAD	Hyderabad	teenarajeev@rediffmail.com	'Good but not good enough': Unpacking the perceptions on Take Home Rations for Under-3 children in Telangana state
6.	OP-2023-0194	Mr.Hrusikesh Panda	ICMR - National Institute of Nutrition	Hyderabad	hrusinin@gmail.com	Assessing the Impact of COVID-19 on Food Environment, Dietary Diversity and Food Security: A Comprehensive Mixed-Methods Study in Telangana
7.	OP-2023-0205	Dr.Koushik Biswas	All India Institute of Medical Sciences (AIIMS), Raebareli	Raebareli	koushik2907@gmail.com	Burden of vitamin D and vitamin B12 insufficiency among elderly (> 60 y) patients in North India: a single-centre study

OP-2023-0003

**Abstract Title: Self-Care Behaviour of Pregnant Women with Gestational Diabetes Mellitus attending a Tertiary Care Hospital in Lucknow - A Quasi- Experimental Study**

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**Background:** Introduction: India is now the diabetes capital of the world. The rising burden of the Gestational Diabetes Mellitus (GDM) adds to the existing burden of diabetes. The euglycemia is achieved once the baby is delivered. The first line of management of GDM is mainly through life style modification with diet and physical activity. There is not much information from this part of the world about how well pregnant women with GDM stick to dietary changes and exercise recommendations or how counselling helps them deal with their GDM. With the above background this quasi-experimental study was planned with the objective to impart counselling on dietary and physical activity recommendations and self-monitoring of blood glucose and to determine its effect on self-care behaviour of pregnant women with GDM with respect to recommended diet, physical activity and self-monitoring of blood glucose **Methods:** 188 pregnant women diagnosed with gestational diabetes mellitus was selected for this Quasi- experimental study. The study participants were recruited from antenatal OPD at the Department of Obstetrics and Gynecology of Queen's Mary hospital, KGMU, Lucknow. The total study duration was from November 2019 to November 2022. Those pregnant women who were diagnosed with GDM according to DIPSI criteria, up to 28 weeks of gestation, who gave their written consent to participate in the study and living within a 15-kilometer radius of the KGMU, Lucknow were included in the study. One group of the study participants received one to one counselling, individualized diet plan along with usual GDM care and other group received usual GDM care during their antenatal visits. The Summary of Diabetes Self Care was adapted to assess adherence to the recommended dietary, physical activity modifications and self-monitoring of blood glucose. Data was analyzed using R software version 4.1.1. (R Core Team, 2021). P-value was considered significant at 5% level of significance for all comparisons. **Result:** The pregnant women with GDM in two groups were not significantly different in terms of sociodemographic variables like, age, religion, education, socioeconomic status, occupation, type of family and family history of diabetes mellitus. A significant difference was observed in the dietary and physical activity scores in between the two groups of the pregnant women with GDM. However, no difference was observed in case of Self-Monitoring of The Blood Glucose Scores of the two groups. **Conclusion:** The study concluded that counselling plays an important role in helping pregnant women with GDM to adhere with the recommended dietary modification and physical activity.

**Keywords:** Diabetes, Diet, Exercise, Pregnancy

OP-2023-0068

**Abstract Title: Diabetes and Prediabetes Individuals on Low-carb diet How digital application contributed improved glycemic levels in the developing country**

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**Background:** Digital nutrition therapy that monitors or provide recommendations on diet have been found to be effective in managing Diabetes. However, there is less evidence on how integration of personalized nutrition recommendations impacts Glycemic control among diabetes and prediabetes individuals. **Methods:** We included adults with Type II Diabetes and prediabetes who enrolled and completed 3 months paid Diabetes care program through MFine platform, between November 2021 to December 2022. The sample was retrospectively analysed user characteristics and their associations with diabetes management. We collected participants age, gender, height, weight, comorbidities or

history of illness and usual dietary intake. Participants followed the program were compared to their own baseline measures taken before the intervention, to assess any improvement or decline in the lab values (HbA1c, FBS, ABG) and diabetic medication, post program completion. The before-after lab test design was used to evaluate changes in outcomes over time. **Result:** 172 participants with 112 males and 60 females (mean age 48.1±12.3) were assessed. The mean BMI of the study group was 28.6±2.9kg/m<sup>2</sup>. Of them 138 patients were diabetic with (mean initial HbA1c 8.96±1.93, FBS 179.7±67.3, & ABG 186.1±61.0) and 34 patients were prediabetic individuals with (mean initial HbA1, 6.27±0.13, FBS 154.1±54.1, & ABG 172.5±49.9) at initial consultation. After following program for 3 months with four pillars consideration (Diet, physical activity, sleep and stress management) there was a significant difference ( $p<0.000$ ) among the participants with final blood glucose levels of diabetic (mean final HbA1c 6.48±0.72, FBS 122.2±30.1, & ABG 130.4±32.0) and prediabetic individuals (mean final HbA1, 5.25±0.24, FBS 102.7±14.5, & ABG 116.2±20.3). Also, there was a change in medication dosage among these population (62 % individuals dosage reduced and 28% individuals' medication have been stopped) after following the program. **Conclusion:** Digital nutrition counselling and monitoring interventions with Mfine application targeting Prediabetes and type II diabetes are effective for improving glycemic levels. As demonstrated from the meal image monitoring provided the information about the food consumption which helped to deliver timely suggestions and tailored nutrition therapy that improved the patient outcomes.

**Keywords:** Diabetes, Prediabetes, Mfine application, Digital-nutrition

**OP-2023-0095**

**Abstract Title: Development and Pilot Testing of a Multi-Component Nutrition based Workplace Wellness Programme (WWP) Model to Promote Healthy Diets and Lifestyles among IT Employees of Hyderabad, India**

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**Background:** Workplace Wellness Programs (WWPs) are globally recognized tools to prevent and control metabolic syndrome (MetS) and non-communicable diseases (NCDs) among employees, who spend one-third of a productive day in sedentary position at work. However, in India WWPs are not widespread, and even among them WWPs orientated towards nutrition and lifestyle are rare. Hence, this study aimed to develop and implement a multi-component nutrition-based WWP tailored to Indian IT sector that employs a significant portion of India's workforce. **Methods:** A systematic exploratory design was used to develop the conceptual framework of WWP. Phase I (Development) involved extensive review of literature, selection of theoretical framework and designing the intervention prototype. In Phase II (Feasibility Testing) challenges were identified and interventions were contextualised. In phase III (Implementation and Evaluation) the model was pilot tested on (n=183) employees, from three IT organizations of different operational sizes. The programme utility was assessed in terms of employee participation, retention, and feedback. Changes in lifestyle and eating behaviour (KAP questionnaire), metabolic risk score (anthropometry, biochemical markers) and organisation policy were assessed to evaluate programme efficacy. **Result:** A complex nutrition-based intervention model prototype based on socio-ecological theory was developed and intervention components were delivered using Communication for Behavioral Impact (COMBI) approach at individual, interpersonal and organisation levels. The interventions targeted at reducing the risk factors of MetS were implemented over 6 months through health screening, one-to-one and telephonic consultations at individual level. At interpersonal level, 12 group awareness sessions, demonstrations and events were conducted. At organisation level, enabling environment was created through modification of workplace food and physical activity environment (FPAE). Post-intervention data revealed high employee engagement, positive changes in employee health behaviour and workplace FPAE. A mild but significant reduction occurred in body weight ( $z=-3.59$ ,  $p<0.01$ ), LDL-cholesterol ( $z=-4.75$ ,  $p<0.01$ ), triglyceride ( $z=-4.63$ ,  $p<0.01$ ). **Conclusion:** This comprehensive nutrition-based WWP model showed efficacy in improving employees' nutrition knowledge, health behavior and FPAE and can be adapted to contexts and sectors where sedentary work continues to increase MetS.

**Keywords:** Employee, Workplace Wellness, Metabolic Syndrome



**OP-2023-0072**

**Abstract Title: What factors contribute to certain children living in poverty being free from all forms of anthropometric malnutrition?**

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**Background:** Along with poverty alleviation measures, understanding the factors fostering nutritional well-being within financially disadvantaged communities assume significance. This paper aims to decipher the determinants of “absence of all forms of anthropometric malnutrition” among children residing in India’s most impoverished households. Our primary research question in this study probes: How do certain children maintain a state of freedom from all forms of anthropometric malnutrition even in the face of severe economic adversity? **Methods:** The unit level data from fifth round of National Family Health Survey (NFHS 5) was used for this analysis. This analysis included only those children from the lowest (poorest) wealth quintile. We have constructed a Composite Index of Anthropometric Malnutrition, encompassing nine potential malnutrition conditions. We utilized binary logistic regression analysis to identify predictors associated with the absence of anthropometric malnutrition among children aged 0-59 months in the poorest households in India. This analysis generated unadjusted and adjusted odds ratios, along with their corresponding p-values and 95% confidence intervals. **Result:** The strongest predictor of no anthropometric malnutrition among children of the poorest households in India are maternal height and maternal education. This analysis highlights the significance of programmatic factors such as improved sanitation facilities, maternal education, reduced family size, institutional childbirth, and maintaining healthy birth weight as key predictors for preventing all forms of anthropometric malnutrition among children in India’s poorest households. Addressing factors such as maternal education, sanitation, maternal nutrition, and access to healthcare can significantly reduce the burden of anthropometric malnutrition among children in India’s poorest households. **Conclusion:** These identified factors can be leveraged to combat malnutrition among the most disadvantaged, complementing the ongoing programs in place. Given the adverse effects that early childhood poverty can exert on the health and development of children, the results of this study underscore the need for increased governmental assistance to support mothers of newborns. This need is especially relevant for mothers from poor economic and social backgrounds.

**Keywords:** Malnutrition, Poverty, NFHS-5, India

**OP-2023-0113**

**Abstract Title: ‘Good but not good enough’: Unpacking the perceptions on Take Home Rations for Under-3 children in Telangana state**

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**Background:** Take Home Rations (THR) are aimed at meeting the nutritional requirements and reducing undernutrition among under-3 children in India. While the efforts are focused on improving the service delivery of THR programs, the beneficiaries’ perceptions on the quality, uptake and consumption of THR, needs exploration. Objective: This study aimed to understand the perceptions and challenges associated with feeding and consumption of THR among under-3 children in the state of Telangana where THR service delivery has been successful. **Methods:** This cross-sectional study was conducted among primary care-givers (N=372) of under-3-year-old children from 14 villages of Medchal-Malkajgiri district, Telangana State in January 2023 after obtaining the written informed consent from the participants. Information on supply, consumption and perceptions on improving the current THR were elicited using a semi-structured interview schedule. **Result:** Out of the 355 registered children, 93% received THR regularly. Even though 77% were fed Balamrutham in the previous month, majority of children (72%) were fed Balamrutham for <15 days. Only 31% children were fed 16 eggs. Majority of

the households perceived THR to be of good quality. Intra-household sharing appeared to be the major challenge for effectiveness of THR as about 70% and 71% of mothers reported intra-household sharing for eggs and balamrutham respectively. The Balamrutham was used to prepare dishes such as dosa, payasam and sweets for other household members. Eggs were also used to prepare curry for the household. Caregivers perceived that the child disliked the smell and taste of egg and regular feeding of eggs causes indigestion. Monotony of Balamrutham was a reason for its irregular consumption. Some of the caregivers feared that regular consumption of Balamrutham may lead to diarrhea or cold due to its sweetness. Additional food items such as fruits, milk, dry fruits, chikki, snacks & savouries were preferred as THR. Non-sweet versions, finely powdered forms, smaller packets and improvement of taste were the suggested improvements for balamrutham. **Conclusion:** Enhancing the variety and taste of THR and behaviour change communication on the importance of THR for under-3 children should be emphasized for improving the effectiveness of THR among under-3-year-old children in Telangana state.

**Keywords:** Take home rations, under-3 children

**OP-2023-0194**

**Abstract Title: Assessing the Impact of COVID-19 on Food Environment, Dietary Diversity and Food Security: A Comprehensive Mixed-Methods Study in Telangana**

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**Background:** COVID-19 pandemic decimated livelihoods, food supply chain, escalated food prices and food scares. The complex and multifaceted impact on food environment (FE) had influenced the food choices and diet diversity of rural population, further exacerbating the nutritional issues. It is crucial to cognize this complex interplay for building resilient food systems for future. This study aimed to assess the impact of COVID-19 on FE, dietary diversity score (DDS) and food insecurity experience scale (FIES). **Methods:** In 2021-22, after the end of the third wave of COVID-19 pandemic, a cross-sectional, mixed-methods study was conducted in (i) Middle-income-households having 6-10y children (n=254), and (ii) food store vendors (n=17) in six selected villages of Medchal-District, Telangana. The 5A's approach covering availability, accessibility, affordability, acceptability and accommodation (Konapur et al., 2022) was followed to assess the contextual FE pre/post and during pandemic. A validated quantitative questionnaire was administered to assess DDS (a score of  $\geq 10$  out of 13 food groups is considered adequate diversity for micronutrients) and FIES. Focus group discussion (FDGs) with mothers and in-depth interviews with vendors were conducted. **Result:** Availability of fruits, vegetables and milk products significantly reduced during the first lockdown ( $p < 0.000$ ). Consequently, there was a significant increase in prices of all food items pre/post and during pandemic ( $p < 0.000$ ). However, there was no difference in accessibility of foods. Almost 60% had restricted consumption of carbonated drinks and packed foods; while increased consumption of spices, fruits and meat was reported. The vendors accommodated all the foods but the store opening hours were severely affected during lockdown ( $p < 0.000$ ). Majority (98%) of the children had poor DDS ( $\leq 9$ ). Whereas, 52% households reported to have experienced food insecurity even after the pandemic. The qualitative interviews revealed challenges in all the 5As due to limited availability (food stock), limited accessibility (movement restrictions), non-affordability (hiked prices), poor accommodation (restricted time for store operation), and poor acceptability (scare due to contamination by food handlers). **Conclusion:** Limited food availability, high prices, poor diet diversity and food insecurity persisted during COVID-19 pandemic. This study highlights the need for resilient food environments to promote dietary diversity for a sustainable future.

**Keywords:** COVID-19; Food environment; DDS; FIES;

**Abstract Title: Burden of vitamin D and vitamin B12 insufficiency among elderly (> 60 y) patients in North India: a single-centre study**

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**Background:** Vitamin D deficiency in the elderly is associated with osteoporosis, sarcopenia, muscle weakness, reduced ability to perform daily activities, increased body sway, risk of fall and hip fracture. Vitamin B12 deficiency in the elderly is associated with fatigue, cognitive impairment, dementia and depression. The objective of this study is to estimate the prevalence of vitamin D and B12 insufficiency among elderly patients of different age groups and observe any seasonal deficiency trend. **Methods:** This is a retrospective hospital record-based study. All patients undergoing vitamin D and/or B12 estimation from October 2022 to September 2023 in AIIMS Raebareli were included. Serum vitamin D and B12 assay were performed using chemiluminescence immunoassays on VITROS ECiQ Immunodiagnostic Systems. For vitamin D,  $\geq 30$  ng/ml was considered normal, 20-30 ng/ml as insufficient and  $< 20$  ng/ml as deficiency. For vitamin B12,  $\geq 300$  pg/ml was considered normal, 200-300 pg/ml as borderline and  $< 200$  pg/ml as deficiency. **Result:** Vitamin D and B12 estimation was done on 1647 and 2298 patients respectively. Mean vitamin D and B12 levels were  $30.05 \pm 16.85$  ng/ml and  $589.16 \pm 361.74$  pg/ml respectively. Prevalence of low vitamin D (20-30 ng/ml), vitamin D deficiency ( $< 20$  ng/ml), borderline B12 (200-300 pg/ml) and B12 deficiency ( $< 200$  pg/ml) was seen in 31.9%, 28.9%, 17.1% and 17.1% of elderly patients. Women had significantly lower vitamin D compared to men in the 60-69 y, 70-79 y,  $\geq 80$  y age groups and overall. Men had significantly lower B12 compared to women in 60-69 y, 70-79 y and overall but not in the  $\geq 80$  y age group. A significant seasonal difference was observed in vitamin D and B12 levels, with lowest levels detected in March ( $F=2.51$ ,  $p=0.004$ ) and August ( $F=2.51$ ,  $p=0.04$ ) respectively. **Conclusion:** Elderly patients have high a prevalence of vitamin D and B12 insufficiency in North India. Incorporating free micronutrient supplementation for the elderly under the national programme will be beneficial. Liberalisation of non-vegetarian food sales during July-August (Shravan) may provide more food choices thereby improving B12 levels.

**Keywords:** Elderly, vitamin D, vitamin B12, deficiency, seasonal trend

## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 3: COMMITTEE HALL, GOLDEN JUBILEE BLOCK

26<sup>th</sup> November 2023

9:30 am – 11:00 am

### SESSION-2: FOOD SCIENCE AND NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
8.	OP-2023-0153	Dr.N. Kapaini Basena		Senapati	kapainibasete@mail.com	Evaluation of in-vitro antioxidant activity and in-vivo anti-inflammatory effect of Ficus semicordata
9.	OP-2023-0161	Ms.KOMATHY N	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	20phfdf001@avinuity.ac.in	Determination of Carbon and Nutritional Footprint of Millets
10.	OP-2023-0176	Ms.B.R. Nikhita	ICMR National Institute of Nutrition	Hyderabad	nikhita.b.r@gmail.com	Role of Nutri-ragi in MAM: Development and Acceptability of Gluten-free Sprouted Ragi Supplementary mix among preschoolers
11.	OP-2023-0200	Ms.Devaprasanna	Amrita Vishwa Vidyapeetham	Coimbatore	devaprasanna.patrick@gmail.com	Standardization and quality evaluation of nutritional natural taste maker
12.	OP-2023-0207	Mr.JWNGSAR BARO	ASSAM AGRICULTURAL UNIVERSITY	Jorhat	jwngsarbaro3418@gmail.com	Evaluation of anti-obesity potential of bark extract of Alstonia scholaris in high fat diet induced obese rats: In vitro and In vivo studies
13.	YS-2023-0024	Mr.Nishithkumar Jogi	Nitte University Centre for Science Education and Research	Mangaluru	nishithk777@gmail.com	Modified process to enhance nutraceutical property of soybean protein hydrolysates

**OP-2023-0153**

**Abstract Title: Evaluation of in-vitro antioxidant activity and in-vivo anti-inflammatory effect of Ficus semicordata**

**Dr. N. Kapaini Basena**, Ph. D Scholar, Senapati, Manipur, [kapainibasete@mail.com](mailto:kapainibasete@mail.com); Dr. Mamoni Das, Professor, Assam Agricultural University, Assam, Jorhat

**Background:** Ficus semicordata is a plant belonging to the Moraceae family. The leaf of Ficus semicordata has been used traditionally for the management of various inflammatory diseases in Manipur. This study aimed to evaluate the antioxidant potential, phytonutrient contents and study the effect of in-vivo anti-inflammatory properties of ethanolic leaves extract of Ficus semicordata against acute inflammation in rat model. **Methods:** The samples were extracted using ethanol solvent. Spectrophotometric methods were used to assess the total phenol content, total flavonoids content, total alkaloid and total carotenoid content using respective standards (catechol, quercetin, caffeine). The free radical scavenging activity and reducing power assay was investigated by using DPPH, FRAP and CUPRAC method. In-vivo anti-inflammatory property was investigated by using carrageenan-induced hind paw edema in Wistar albino rats. **Result:** The ethanolic extract from leaves of Ficus semicordata showed total phenol content (257.65±1.76 mg CE/100g), total flavonoids content (239.14±2.09 mg QE/100g), total alkaloid content (8.61±0.45 mg caffeine/100g) and total carotenoid content (3.52±0.19 mg/100g). The ethanolic extract of Ficus semicordata leaves had a high antioxidant activity with an IC<sub>50</sub> value of 7.81 µg/ml. FRAP and CUPRAC content were 429.62±2.24 µmol TE/g and 523.44±1.06 µmol TE/g respectively. The acute toxicity study did not showed any behavioural change nor any sign of toxicity upto 14 days of observation and mortality was absent within 48 hours at 2000mg/kg body weight in Albino mice. Anti-inflammatory properties of oral administration of Ficus semicordata leaf extracts at the doses of 100, 300 and 900 mg/kg body weight and standard drug (melonax) showed significant (p< 0.01) reduction and inhibition of edema induced by carrageenan at 6hour when compared with control group. However, the decreased in rat paw volume was significantly (p< 0.01) highest in Test group fed with 900 mg/kg body weight of Ficus semicordata leaf extract. **Conclusion:** From the study, we can conclude that the ethanolic leaf extract of Ficus semicordata possesses potential antioxidant and anti-inflammatory activities, supporting the traditional application of this plant in treating various diseases associated with inflammation.

**Keywords:** Ficus semicordata, antioxidant, anti-inflammatory

**OP-2023-0161**

**Abstract Title: Determination of Carbon and Nutritional Footprint of Millets**

**Ms. Komathy N**, PhD Scholar, Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore, [20phfdf001@avinuty.ac.in](mailto:20phfdf001@avinuty.ac.in); Dr. R.Radha, Assistant Professor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore

**Background:** Millets, a group of small-seeded, drought-tolerant grains, have garnered increased attention as a sustainable alternative to conventional cereals due to their unique nutritional composition and climate-resilient growth characteristics. On the nutritional properties, millets exhibit exceptional qualities. They are rich in essential nutrients such as fiber, vitamins & minerals and are particularly known for their high protein content. Additionally, millets are gluten-free, making them suitable for individuals with gluten sensitivities. Hence, this study aims to determine both the carbon and nutritional footprint of millets, offering valuable insights into their environmental and dietary benefits. **Methods:** To determine the carbon footprint, all stages of its production including cultivation, water consumption, land use and transportation are considered. Primary data is collected through surveys and secondary data from scientific literature, government reports and databases. The carbon footprint of millets was determined per year using energy in kcal and emission factor. Further the Qualifying Index (QI), Disqualifying Index (DI) and Nutrient Balance Score (NB) was determined. **Result:** Carbon footprint analysis reveals that millets, on an average, emit significantly fewer greenhouse gases during their production compared to major cereal crops like wheat and rice. This study result elucidated that the

carbon footprint of ragi (1252.01kgco 2 ekcal /yr) was higher which have high negative impact on environment whereas varagu (293.43 kgco 2 ekcal /yr) emits least carbon compared to other millet varieties and has low impact on environment. The qualifying Index and nutrient balance score of bajra was higher and the value of disqualifying index of Italian millet was higher compared to other millets.

**Conclusion:** In conclusion, the determination of the carbon and nutritional footprint of millets highlights their dual advantage as an environmentally friendly crop and a nutritionally dense food source. Embracing millets in agriculture and diets can be a sustainable solution to mitigate climate change while promoting better nutrition and food security.

**Keywords:** Millets, Carbon footprint, Nutritional Footprint, Qualifying Index (QI), Disqualifying Index (DI), Nutrient Balance Score (NB)

**OP-2023-0176**

**Abstract Title: Role of Nutri-ragi in MAM: Development and Acceptability of Gluten-free Sprouted Ragi Supplementary mix among preschoolers**

**Ms. B.R. Nikhita**, PhD research scholar, ICMR National Institute of Nutrition, Hyderabad, [nikhitar@gmail.com](mailto:nikhitar@gmail.com); Dr. Sourav Sen Gupta, Scientist, Emory university, NA; Dr. Devraj J P, Scientist D, ICMR National Institute of nutrition, Hyderabad; Dr. Santosh Kumar Banjara, Scientist D, ICMR National Institute of nutrition, Hyderabad; Dr. Karthik R, Scientist C, ICMR National Institute of nutrition, Hyderabad; Dr. Paras Sharma, Associate Professor, Mizoram university

**Background:** Undernutrition is one of the major global health challenges today, contributing to nearly half of all deaths in children under five years of age due to insufficient dietary intake and environmental factors. Nutritional intakes that should provide for maintenance of current weight and support normal growth & development fail to sustain the needs of growing child. Fingermillet (Ragi) rich in protein (well-balanced amino acids), calcium & other micronutrients; along with dates powder (a natural sweetener) proves to be beneficial in addressing the issue as it aces the child growth & averts childhood malnutrition. However, there is a sharp decline in millet acceptability owing to taste preference & food preparation. Hence to illuminate the health benefits & introduce today's generation to our traditional grains, the present study was planned to formulate and evaluate the millet-based product. **Objectives:** To evaluate the sensory attributes of newly formulated supplementary products (Finger millet plus dates (F1); and (F2) Balamrutham plus dates) and to conduct test meal feeding trial study among under 5 children at Anganwadi centers. **Methods:** Germinated finger millet (GPU 28) and dates powder replaced existing Balamrutham plus. Sensory analysis of products (premix, laddu, idly, porridge & dosa) was conducted using 5-point hedonic scale in untrained panel of mothers/teachers/caretakers at an Anganwadi center. A t-test statistical analysis was used for data analysis. The test meal feeding trial was also conducted in different AWC children. **Result:** With a mean score of 4.8, the premix F1 received superior sensory scores ( $p > 0.05$ ). In terms of flavor, texture and aroma, panelists strongly favoured recipes prepared with F1. Because of its texture, idly (F2) had the best overall acceptability ( $p < 0.05$ ). Though maximum higher scores were assigned for control, both the products were in well accordance. Children consumed  $>75\%$  of each product in the trial run study indicating a better approval. **Conclusion:** Replacing wheat, sugar with finger millet and dates powder led to change in colour and textural properties yet well-accepted by children and panelists. Thus, it would be recommended as sensorially accepted nutritious value-added product for MAM children.

**Keywords:** Germinated Fingermillet, dates powder, childhood malnutrition, balamrutham plus

**OP-2023-0200**

**Abstract Title: STANDARDIZATION AND QUALITY EVALUATION OF NUTRITIONAL NATURAL TASTE MAKER**

**Ms. Devaprasanna**, Ph. D Scholar, Amrita Vishwa Vidyapeetham, Coimbatore, Tamil Nadu, [devaprasannapatrik@gmail.com](mailto:devaprasannapatrik@gmail.com); Dr. Sasikala, Guest lecturer, Queen Mary's College, Tamil Nadu, Chennai

**Background:** Instant noodles are popular due to their availability and affordability. However, they often contain Monosodium Glutamate (MSG), and artificial stabilizers and additives which causes adverse effects on health on regular consumption. To address this, MSG free taste maker with natural stabilizers and taste enhancer was developed and standardized. This versatile mix can be used in various instant foods like noodles and pasta. The study aimed to upscale and evaluate the developed tastemakers and obtain the best formulation. **Methods:** A nutritional instant taste maker without MSG was developed with natural stabilizers (Locust bean gum) and taste enhancer (shitake mushroom) and to upscale the three different variations CTM (1:3), VTM (1:3), and ITM (1:3). Textural properties were assessed with a texture analyzer. Functional and physical properties were determined. Water activity was measured with an aw meter. A 9-point scale and SPSS software were used for product evaluation and statistical analysis, including ANOVA for significant differences. **Result:** It was clear that textural properties were found high in VTM. The nutrient profile of VTM has higher values among the others. There is no significant difference found in the sensory characteristics between each of the variations. All the three developed formulations were found to be the best products as there is not much difference in the preference score and hence, they all will surely find a place in the market. **Conclusion:** The developed tastemaker infused with natural spices, taste enhancer, and stabilizer adds significant health benefits, especially without any compromise on taste. This product holds immense potential in today's market, where there is a high demand for delicious, convenient, nutrient-rich, and low-fat options. Each carefully selected ingredient contributes to better health outcomes for individuals, families, communities, and the nation.

**Keywords:** Nutrition, Standardization, valorization, Health, Spices, taste maker, spice mix, formulation, evaluation.

OP-2023-0207

**Abstract Title: Evaluation of anti-obesity potential of bark extract of *Alstonia scholaris* in high fat diet induced obese rats: In vitro and In vivo studies**

**Mr. Jwngsar Baro**, Ph.D. scholar, Assam Agricultural University, Jorhat, [jwngsarbaro3418@gmail.com](mailto:jwngsarbaro3418@gmail.com); **Ms. Deeptimayee Mahapatra**, Ph.D. scholar, Assam Agricultural University, Jorhat

**Background:** Global epidemic levels of obesity are frequently accompanied by comorbidities that are life-threatening. The lack of long-term, safe, and effective treatments for obesity in contemporary pharmacotherapy forces the scientific community to investigate the potential of Ayurvedic traditional healers because they are regarded as effective and safe. **OBJECTIVE:** To study the anti-obesogenic potential of *Alstonia scholaris* bark extract (ASBE) in high fat diet induced obese rats. **Methods:** HFD induced obese rats were divided into six experimental groups (Group I to VI): animals fed with normal diet served as normal control (Group I) while, animals continued with HFD alone served as obese control (Group II); Rats fed with HFD + Treated with orlistat (30 mg/kg b.w) served as standard control (Group III), Group IV and V were administered ASBE at a dose of 100, 300 and 900 mg/ kg b.w. respectively along with administration of HFD. All the drugs were administered orally once a day for a period of 45 days. Various physical, biochemical and histopathological observations were done at the end of the experimental period. **Result:** In-vivo and in vitro studies revealed significant reduction in body weights, food intake, organ weights and fat pad weights when treated with ASBE plant extract. Elevated levels of glucose, insulin, AI, leptin, lipid profiles, hepatic antioxidant enzymes and inflammatory cytokines such as TNF- $\alpha$ , IL-6 were also brought back to normal. **Conclusion:** Data obtained from our study clearly suggested that ASBE plant extract has potent anti-obesity potential.

**Keywords:** IN VIVO IN VITRO anti-obesity

YS-2023-0024

**Abstract Title: Modified process to enhance nutraceutical property of soybean protein hydrolysates**

**Mr. Nishithkumar Jogi**, Senior Research Fellow, Nitte University Centre for Science Education and Research, Mangaluru, Karnataka, [nishithksk777@gmail.com](mailto:nishithksk777@gmail.com); Dr. Mamatha Bangera Sheshappa, Assistant Professor and Head, Dept. of Food Safety and Nutrition, Nitte University Centre for Science Education and Research, Mangaluru, Karnataka

**Background:** Protein hydrolysates are the broken protein molecule with specific amino acid residue well known to have various functional and bioactive properties. Soybean (*Glycine max*) is a leguminous crop, rich in protein and are widely used for oil extraction. **Methods:** In the present study, soybean protein hydrolysates (SPH) was prepared using alcalase for 4h and modification of hydrolysis (MPH) was carried by reiterating the process using supernatant obtained after 2h of hydrolysis. Enzyme concentration was divided to 50% with each successive hydrolysis. The freeze dried SPH, MPH and unhydrolyzed soybean (UNH) were analysed for bioactive properties (antioxidant and ACE-I inhibitory activity) and characterised for degree of hydrolysis (DH%), SDS-PAGE, particle size, FT-IR and RP-HPLC. The effect of modification of hydrolysis on bitterness and hardness of retrograded corn starch was studied. **Result:** The results demonstrate that, modification of soybean efficiently increased the protein content (68.86%) and decreased the fat content (10.65%) in MPH compare to SPH and UNH. MPH also showed 1.5 and 3.3-folds higher DH% than the SPH and UNH respectively. MPH showed significant higher DPPH, ABTS scavenging and ACE-I inhibitory activity. The hardness of retrograded corn starch was found to be reduced in the MPH (1.21 N) than the SPH (1.55 N) and UNH (1.81 N) compared to control (1.71 N) during 7 days storage. MPH displayed four-fold less bitterness than SPH, underscoring the significance of modification in enhancing the bioactive properties of protein hydrolysates **Conclusion:** Modifying hydrolysis process of soybean has demonstrated its importance in increasing the palatability and nutraceutical property, which can be explored as an ingredient in designing a nutraceutical product.

**Keywords:** Soybean, Alcalase, Protein hydrolysates, ACE-I



## FREE COMMUNICATIONS - ORAL PRESENTATIONS

### HALL NO. 4: ANIMAL HOUSE CLASSROOM

26<sup>th</sup> November 2023  
11:00 am

9:30 am -

#### SESSION-2: CLINICAL NUTRITION

S No.	Abstract ID	Presenter name	Affiliation	City	Email	Title of Presentation
1.	OP-2023-0173	Dr.Soni Priya Valeru	ICMR-National Institute of Nutrition	HYDERABAD,	sonychin@gmail.com	Impact of Diet and Gut Microbiota composition in Systemic lupus erythematosus (SLE)
2.	OP-2023-0180	Ms.Kamakshi Kalia	Post Graduate Institute of Medical Education and Research	Jalandhar,	kamakshi.kalia14@gmail.com	A pilot study of Oral Glutamine rich Supplementation as a Nutritional Intervention for Managing Oral Mucositis in Patients Receiving Chemotherapy/Stem Cell Transplant.
3.	YS-2023-0016	Ms.Aditi Godhamgaonkar	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune,	aditigod95@gmail.com	Fatty acid status and its association with telomere length
4.	OP-2023-0147	Ms.Gande Vennela	ICMR - National Institute of Nutrition	Hyderabad	vennelagande6@gmail.com	Urinary Sulfate levels in Autism Spectrum Disorder

OP-2023-0173

**Abstract Title: Impact of Diet and Gut Microbiota composition in Systemic lupus erythematosus (SLE)**

**Dr. Soni Priya Valeru**, ICMR-Research Associate, ICMR-National Institute of Nutrition, HYDERABAD, [sonychin@gmail.com](mailto:sonychin@gmail.com); Dr. Devraj J Parasannanavar, Scientist D, ICMR-National Institute of Nutrition, Dr. Sarath Chandramouli Veeravalli, Rheumatologist, Krishna Institute of Medical Sciences, TELANGANA, HYDERABAD; Dr. Sourav Sen Gupta, Research Scientist, Emory University, Atlanta, Emory; Dr. Jagjeevan Babu Geddam, Scientist G, ICMR-National Institute of Nutrition, TELANGANA, HYDERABAD

**Background:** Changes in lifestyle and dietary habits influence the course of SLE. Although studies have explored the connection between SLE and inflammation, there is limited research on dietary intake, its association with inflammation and resulting gut microbiota alterations. The primary aim of this study was to evaluate dietary habits and nutrient intake among SLE patients, examine the influence of the dietary inflammatory index, and analyze the diversity and composition of gut microbiota in correlation with disease severity. **Methods:** We conducted a case-control study involving 200 women with SLE and 200 healthy controls, who were family members (siblings/relatives). All participants were recruited at KIMS hospital in Hyderabad, Telangana, over a two-year period. Inclusion criteria were as follows: female, age 14-45 years, SLE diagnosis based on AC/SLICC criteria. Dietary intake was assessed using a food frequency questionnaire and 24-hour dietary recall. We compared nutritional status, physical activity, nutrient intake, and food-group consumption between cases and controls. The taxonomic composition of gut microbiota was determined from faecal samples by 16S ribosomal RNA gene sequencing targeting the V3-V4 region. Differences in the relative abundance of bacterial groups, alpha diversity and beta diversity were compared. **Result:** Mean age for cases was  $30.14 \pm 9.20$  years and controls were  $31.59 \pm 10.74$  years. Mean BMI for cases was  $26.7 \pm 4.58$  and controls was  $27.48 \pm 3.48$ . SLE patients reported significantly lower levels of physical activity ( $p < 0.001$ ). When categorized by BMI groups (underweight, normal weight, and obese), SLE patients showed higher mean dietary intake of macronutrients such as protein, fats, and carbohydrates compared to controls. The gut microbiota in SLE patients exhibited lower alpha diversity and higher heterogeneity than the control group. At the genus level, SLE patients had increased abundance of *Butiricimonas*, *Parabacteroids*, *Enterococcus*, *Staphylococcus*, and *Escherichia/Shigella*. A higher abundance of *Lachnospiraceae* was observed in normal weight and obese SLE cases which was correlated with their higher consumption of fiber and Vitamin C. **Conclusion:** The gut microbiota of SLE patients remained distinct from that of healthy controls. Diet can play a pivotal role in shaping the gut microbiota which in turn can impact disease progression and activity

**Keywords:** Gut microbiota, SLE, Diet, *Lachnospiraceae*

OP-2023-0180

**Abstract Title: A pilot study of Oral Glutamine rich Supplementation as a Nutritional Intervention for Managing Oral Mucositis in Patients Receiving Chemotherapy/Stem Cell Transplant.**

**Ms. Kamakshi Kalia**, Dietetics Trainee, Graduate Institute of Medical Education and Research, Jalandhar, Punjab, [kamakshi.kalia14@gmail.com](mailto:kamakshi.kalia14@gmail.com); Dr. Nancy Sahni; Dr. Pankaj Malhotra, Professor and Head; Dr. Alka Khadwal, Professor, Post Graduate Institute of Medical Education and Research, Chandigarh

**Background:** Oral mucositis (OM) commonly occurs as a side effect of treatments such as Radiation Therapy, Chemotherapy, Chemoradiotherapy, and Hematopoietic Stem Cell Transplantation. It causes painful mouth ulcers and poses significant nutritional difficulties for the affected patients. Limited data exists on managing nutritional aspects of OM with L-Glutamine, Eicosapentaenoic acid (EPA) and high protein diet. L-Glutamine promotes immune cell division and mucosal lining synthesis that is vital for gastrointestinal health. During times of high metabolic demand and stress, cancer cells rapidly deplete intracellular glutamine stores. EPA, on the other hand, hampers cancer cell proliferation and reduces

chemotherapy-related toxicity while preserving muscle mass in cancer patients. Proteins, usually not stored in the body, are essential for preventing cachexia and supporting growth and repair. This pilot study aimed to investigate the impact of L-Glutamine, EPA, and high protein supplementation on preventing or alleviating OM and enhancing the nutritional status of patients undergoing Chemotherapy and Stem Cell Transplant (SCT). **Methods:** We conducted a study involving patients diagnosed with malignant hematological disorders who were undergoing chemotherapy treatment while hospitalized in the hematology ward. This nutritional intervention spanned from the first day of chemotherapy and continued for 14 days. During this period, the patients received daily oral supplements consisting of 5000mg of glutamine, 3g of EPA, and 42g of protein in the form of liquid, cream, or popsicles. An experienced dietitian assessed the severity of oral mucositis (OM) using the Common Terminology Criteria for Adverse Events (CTCAE) grading system and monitored the patient's oral motor function using the Oral Mucositis Assessment Scale (OMAS). Nutritional intake was determined through 24-hour dietary recalls, and the patients' Body Mass Index (BMI) was calculated at both the beginning and end of the study. We also evaluated the patients' overall well-being using the World Health Organization (WHO) Quality of Life (QOL) questionnaire. **Result:** This study involved seven inpatients from the Hemato-oncology unit at Nehru Hospital affiliated with PGIMER. The age of participants ranged from 35 to 75 years, and the ratio of male to female patients was 4:3. Among the patients, four were receiving high-dose chemotherapy, while three were receiving chemotherapy as part of the conditioning process for Stem Cell Transplantation (SCT). Our daily assessments demonstrated that, throughout the study period, the study group did not experience oral mucositis beyond grade 2. Their BMI remained stable from the study's initiation to its conclusion. Additionally, the patients reported a positive impact on their quality of life. **Conclusion:** In this initial study, the combination of glutamine and EPA, along with high protein supplementation, appeared to decrease the likelihood and severity of oral mucositis in patients undergoing chemotherapy and SCT. Larger-scale studies are needed to further investigate the effectiveness of glutamine supplementation and establish the optimal dosage for preventing or alleviating oral mucositis.

**Keywords:** Mucositis, Glutamine, EPA.

## YS-2023-0016

**Abstract Title:** Fatty acid status and its association with telomere length

**Ms. Aditi Godhamgaonkar** PhD Student, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, [aditigod95@gmail.com](mailto:aditigod95@gmail.com); Dr. Deepali Sundrani, Assistant Professor; Dr. Sadhana Joshi, Professor and Head, Interactive Research School for Health Affairs (IRSHA), Bharati Vidyapeeth (Deemed to be University), Maharashtra, Pune; Dr. Girija Wagh, Professor and Head, Bharati Vidyapeeth Medical College, Pune; Dr. Sanjay Gupte, Gupte Hospital, Maharashtra, Pune;

**Background:** Pregnancy complications such as preeclampsia (PE) is associated with abnormal placentation and premature placental ageing. Telomeres are terminal DNA sequences that play a crucial role in placental development and ageing. Telomere length is suggested to be influenced by nutrients such as fatty acids. The current study reports the association of fatty acid levels (maternal, placental and cord) and placental dimensions with placental telomere length. **Methods:** The present study was a part of the Indian Council of Medical Research, Centre for Advanced Research (ICMR-CAR) project – “Investigating Mechanisms leading to Preeclampsia”. A total of 324 pregnant women (216 non-PE and 108 PE women) were longitudinally followed during pregnancy. Maternal blood was collected at 4 time points during pregnancy (i.e., 11–14 weeks, 18–22 weeks, 26–28 weeks, and at delivery). Placental samples were collected immediately after delivery. Placental telomere length (TL) was estimated using Absolute Human TL Quantification qPCR assay Kit (ScienCell Research Laboratories, USA). Maternal, placental and cord fatty acid levels were estimated using Gas Chromatography. **Result:** Early pregnancy (11-14 weeks of gestation) maternal erythrocyte eicosapentaenoic acid (EPA) was positively associated with placental TL ( $p < 0.05$ ). Placental dimensions were positively associated with TL ( $p < 0.01$ ). Placental  $\Delta 6$  desaturase index was negatively associated with placental TL ( $p < 0.05$ ). Placental TL was negatively associated with cord polyunsaturated fatty acids (PUFA) ( $p < 0.05$ ) and

positively associated with saturated fatty acid (SFA) ( $p < 0.01$ ). **Conclusion:** Our findings indicate that fatty acid status in pregnancy can influence placental TL highlighting the role of fatty acids in placental ageing. The present study also reports positive association of placental TL with placental dimensions suggesting role of telomeres in placental growth and development.

**Keywords:** Pre-eclampsia; Oxidative stress; Telomere length

**OP-2023-0147**

**Abstract Title: Urinary Sulfate levels in Autism Spectrum Disorder**

**Ms. Gande Vennela**, Ph.D. Scholar, [vennelagande6@gmail.com](mailto:vennelagande6@gmail.com); Ms. Mallika Marimuthu, Tamil Nadu, Coimbatore; Ms. Jovis Jacob, Ph. D. Scholar; Dr. K. Venkatesh, Scientist - E - National Institute of Nutrition, Telangana, Hyderabad

**Background:** Autism is a heterogeneous spectrum of disorder associated with different degrees of impaired social communication and restricted repetitive behavior. At the systemic level, chronic stress and anxiety are inherent features of ASD (Autism Spectrum Disorder). Other manifestations like impaired digestion, and altered gut microbiome point to the dysregulated gut-brain axis. At the cellular level, mitochondrial dysfunction and oxidative stress are widely implicated. Glutathione is a key intracellular antioxidant derived from SAA (sulfur-containing amino acid). The levels of glutathione are found to be reduced by 40-50% in autistic children. Glutathione and inorganic sulfate are end products of SAA metabolism. As glutathione levels are low, we hypothesize that the urinary inorganic sulfate levels might be high in ASD children. **Methods:** Study design is a Case-control study. The study was carried out on 17 Children aged 5 to 12 diagnosed with autism. They were selected from the Child Guidance Centre in Uppal and Total Solutions in Himayath Nagar, Hyderabad. For the control group, 17 age and gender-matched children who are apparently healthy, typically developing children were selected from Pallavi model school, Boaduppall, Hyderabad. The parents of the children were administered autism and food intake related questionnaires and urine samples of the children were collected. Urinary sulfate estimation was done using the method Per Lundquist et al described. Urinary indoxyl Sulfate levels are estimated using DMACA method. **Result:** The ASD group had lower levels of urinary sulfate ( $p$ -value  $< 0.01$ ) and higher levels of indoxyl sulfate compared to the control group ( $p$ -value  $< 0.05$ ). We found no difference in dietary intake of protein and sulfur-containing amino acids among the 2 groups. **Conclusion:** Low levels of inorganic sulfate in urine may be due to high levels of polar toxins derived from the colonic microflora (gut dysbiosis). Sulfation reaction is a method to detoxify and eliminate these toxins through urine. high levels of Indoxyl sulfate, a toxic metabolite in urine correlates with our conclusion. Further, studies have shown that plasma levels of Sulfate are low in ASD. Low levels of sulfate may affect the detoxification of catecholamines in brain leading to cognitive and behavioral issues observed in ASD.

**Keywords:** Autism, sulfation, protein putrefaction, dysbiosis

# FREE COMMUNICATIONS - POSTER PRESENTATIONS

## SESSION: 1

25<sup>th</sup> November 2023

11:00am – 1:15pm

- NUTRITION EDUCATION & COMMUNICATION AND SPORTS NUTRITION
- HEALTH POLICY RESEARCH
- CLINICAL NUTRITION
- EXPERIMENTAL NUTRITION

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
<b>NUTRITION EDUCATION AND COMMUNICATION AND SPORTS NUTRITION</b>						
1.	PP-2023-0028	Ms.Sivapriya K.C.	SCHOOL OF FOOD SCIENCE AND TECHNOLOGY	Kottayam	sivapriyakc@gmail.com	ASSESSING MILLET AWARENESS AND CONSUMPTION PATTERNS AMONG YOUNG ATHLETES: A PILOT STUDY
2.	PP-2023-0030	Ms.Vidya Sudamrao Ghule	Bharati Vidyapeeth's Bharti hospital And research	Pune	ghulevidya1993@gmail.com	Impact of Nutrition Education Intervention on Knowledge , Attitude And practices of adolescent Girls
3.	PP-2023-0039	Ms.Sejal Malik	Symbiosis Institute of Health Science SIU Pune Maharashtra	Pune	sejalmalik9@gmail.com	The Impact of the One Health Approach on Household Food Insecurity in the Indian Population: A Bibliometric Analysis
4.	PP-2023-0040	Ms.Pragati Yadav	MPUAT	Udaipur	PRAGATIFE B11@GMAIL.COM	Enhancing Nutritional Status in Rural Adolescent Girls through Targeted Nutrition Education: A Critical Imperative
5.	PP-2023-0044	Ms.Rajimol K.C	St.Teresa's college, Eranakulam.	Eranakulam	kc.rajimol@gmail.com	NUTRITIONAL KNOWLEDGE, ATTITUDE AND PRACTICE OF SELECTED VOLLEY BALL PLAYERS (18-23 YRS) OF COLLEGES AFFILIATED TO MAHATMA GANDHI UNIVERSITY KOTTAYAM, KERALA, INDIA
6.	PP-2023-0053	Ms.Ritika Rasaily	Sister Nivedita University	Kolkata	rasailyritika26@gmail.com	A thematic analysis of systematic reviews on evidence and gaps on breastfeeding globally
7.	PP-2023-0074	Ms.Rupsa Pandit	Midnapore City College	Kolkata	rupsa07pandit@gmail.com	Improving Male Participation in ANC and PNC through Participatory Learning and Action: A Literature Survey
8.	PP-2023-0075	Ms.Jayee Das	University of Calcutta, Department of Home Science	Kolkata	dasjayee43@gmail.com	Strategies to Promote Healthy Eating by using Food Labels through COM-B Model: A Literature Survey
9.	PP-2023-0094	Ms.Namratha Pramod	Sports Authority Of India	Bengaluru	namrathapramod@gmail.com	KNOWLEDGE, ATTITUDE, AND PRACTICE ON NUTRIENT TIMINGS AMONGST ATHLETES

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
10.	PP-2023-0100	Dr.SAPAVAT SHANKAR	ICMR-NIN	Nalgonda	naikshankar0@gmail.com	Prevalence of Relative Energy Deficiency in Sports (REDs) among Indian female adolescent athletes.
11.	PP-2023-0124	Mr.kethavath vijay	university of hyderabad	hyderabad	kethavathvijay9573@gmail.com	A formative study on Capacity Building of Schools and Colleges in Mitigating Obesity and Obesogenic Environment Using Information Technology Solutions
12.	PP-2023-0130	Ms.Niranjani Mahadevan	Sri Ramachandra Institute of Higher Education and Research(DU)	Chennai	niranjanimahadevan05@gmail.com	Sports Nutrition Knowledge and Practice regarding hydration among athletes – A Pilot Study
13.	PP-2023-0131	Dr.Diana Paulette Evans	Georgetown University	D.C.	dpe8@georgetown.edu	Assessment of factors in school environments that increase the risk of Obesity among students in private schools in Hyderabad. A qualitative study surveying the perspectives of principals and teachers
14.	PP-2023-0135	Ms.Debanjana Majumdar	Symbiosis Institute of Health Sciences (SIHS), Symbiosis International (Deemed University)	Pune	debanjanamajumdar.nd2224@sihs.edu.in	Knowledge, attitudes, practices, and perception about the nutrition labels and Front of Package food labels affecting the purchase behaviour of consumers – A Systematic Review
15.	OP-2023-0025	Ms.Shraddha Vyas	Appediet( Private Diet consultation firm)	Hyderabad	shraddha.nanotech@gmail.com	Exploring The Interplay: A Survey on Sleep Quality, Screen Time and Their Impact on Obesity
16.	OP-2023-0029	Ms.syedanees	Bishop Cotton Women's Christian College	bengaluru	aneessyeda1200@gmail.com	RELATIONSHIP BETWEEN PERCEIVED STRESS, EMOTIONAL EATING AND FOOD CHOICE AMONG STUDENTS PREPARING FOR NEET

### HEALTH POLICY RESEARCH

17.	OP-2023-0056	Ms.JAGRITI KUMARI	Banaras Hindu University	Karnataka	jagritiext@bhu.ac.in	Assessing Extent of Agricultural Diversification for Informed Nutritional Interventions
18.	OP-2023-0066	Ms.Nalini Khatwani	Symbiosis Skills and Professional University	Pune	nalinikhatwani8@gmail.com	A Comprehensive Survey of Consumer Attitudes and Purchasing Habits Regarding Edible Oil Claims"
19.	OP-2023-0067	Ms.malsawm kimi hauhnar	Avinashillingam Institute of Home Science and Higher Education for Women	coimbatore	kimkim16162@gmail.com	A Study on the Acceptance of Diabetes Self-management Education mHealth among type 2 Diabetes in Aizawl, Mizoram
20.	OP-2023-0091	Dr.Radhika Hedao	Symbiosis Institute of Health Sciences, Symbiosis	Pune	radhikaphedao@gmail.com	Healthy Eating and Living Among Adolescents: A Mixed-Methods Exploratory Study Combining Participatory Learning Action and Integrative Review

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
21.	OP-2023-0092	Ms.Kanishka Upadhyay	QUA NUTRITION, DELHI	Delhi	kanishkaupadhyay.98@gmail.com	A Study on Identifying the Determinants of Food Nudges among Urban Adolescents
22.	OP-2023-0099	Dr.Hemant Mahajan	ICMR NIN, Hyderabad	Hyderabad	hemant.mahajan.84@gmail.com	Recalibration of the Framingham risk score for predicting 10-year risk of cardiovascular diseases: Analysis for the APCAPS cohort
23.	OP-2023-0109	Ms.DEVANS HI KUMARI	MRIIRS	Haryana	kumaridevan shi34@gmail.com	Nutritional knowledge or nutrition literacy and its impact on dietary intake among Indian students-A review
24.	OP-2023-0152	Ms.LEELAVA THI.V	-	-	mailleelavathi95@gmail.com	EXPISCATORY OF THE CRYPTIC OF DRAVIDIAN CUISINE (TAMIL CUISINE) IN DIABETES
25.	OP-2023-0229	Ms.Bhakti Trivedi	Gujarat University	Ahmedabad	bhaktitrivedi1323@gmail.com	Effectiveness of School-Led Nutrition Training Program on the Knowledge, Attitude, and Practices of Rural Adolescent Population in Gujarat.
26.	OP-2023-0231	Ms.SHAHEEN FATIMA	Khawaja Moinuddin Chisti Language University Lucknow	LUCKNOW	shaheenfatima949@gmail.com	Nutritional Status Assessment and Awareness of Millets in Complementary Feeding Practices among Caregivers of Malnourished Children in Urban Slums of District Lucknow
27.	OP-2023-0121	Ms.Nita Ann Johnson	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	nita.ann.johnson@gmail.com	MILLET CONSUMPTION AND PURCHASING BEHAVIOUR AMONG SELECTED OBESE YOUNG WOMEN OF COIMBATORE
28.	OP-2023-0130	Ms.Diksha Rani	International Institute for Population Studies, Mumbai	Mumbai	dkra7170560@gmail.com	Reversing the Rising Trend of Stunting in Meghalaya: A Public Health Priority
29.	OP-2023-0148	Ms.SHURUTHI S J	CENTRAL UNIVERSITY OF TAMIL NADU	-	shuruthisj@gmail.com	A SYSTEMATIC REVIEW ON DIET HISTORY OF OEDEMATOUS MALNUTRITION IN CHILDREN BETWEEN 0-5YRS GLOBALLY
30.	OP-2023-0204	Ms.Sneha Jha	-	Ranchi	sneha1397.saha@gmail.com	Relationship of orthorexia nervosa with personality and perfectionism among nutrition students and gym goers
31.	OP-2023-0210	Dr.Mayura Tonpe	Tata Institute of Social Sciences, Mumbai		mayuratonpe@gmail.com	Changing pattern of Severe Acute Malnutrition among children in Maharashtra
32.	OP-2023-0227	Ms.RASHI NANDWANI	Catalyst Management Services	Bengaluru	rashinandwani@gmail.com	Social Media Usage and Advertising Food-Related Content: Influence on Dietary Choices of Young Adults
<b>CLINICAL NUTRITION</b>						
33.	PP-2023-0008	Ms.PIYALI SENGUPTA	Curelink	New Delhi	piyali.sengupta906@gmail.com	A Study of Nutritional Status, Frailty, and Oral Health among Geriatrics

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
34.	PP-2023-0010	Ms.Anjana R	Avinashilingham Institute for Home Science.	Coimbatore	anjana6248@gmail.com	The Effect of a Whole Food Plant-Based Diet on the Biochemical Parameters of Chronically ill Patients
35.	PP-2023-0020	Dr.Sushma Gumma	9 months Fertility, Ferticare and Crane Hospitals	Vijayawada	sushma.gumma01@gmail.com	Holistic Nutrition to Improve Fertility markers in women
36.	PP-2023-0031	Ms.Roshni Marlin Pasanna	St. John's Research institute	Bangalore	roshni.mp@sjri.res.in	Urinary metabolomic biomarkers of lysine supplementation in stunted children
37.	PP-2023-0073	Ms.Vasvee Bajpai	Amway India Enterprises Pvt Ltd	Varanasi	tanvi.bajpai17@gmail.com	To evaluate the effect of Pre and Probiotic Capsules in Irritable Bowel Syndrome patients
38.	PP-2023-0080	Ms.Shanthini Devi M	Ganga College of Nursing and Allied Health Science	Coimbatore	devidoss2000@gmail.com	EFFECTIVENESS OF NUTRI SHOTS ON WEIGHT GAIN PATTERN AMONG CHILDREN AGED 4-5 YEARS AT SELECTED SCHOOLS IN THIRUVARUR DISTRICT
39.	PP-2023-0086	Ms.Shivani Unecha	SNDT College of Home Science	Pune	shivaniunecha1999@gmail.com	MENSTRUAL PROBLEMS AND DIETARY PATTERN AMONG ADOLESCENT GIRLS
40.	PP-2023-0106	Ms.Sneha Dominic Xavier		Hyderabad	snehaxavier172@gmail.com	ESTIMATION OF GUT INFLAMMATORY MARKERS CALPROTECTIN, MYELOPEROXIDASE AND NEOPTERIN IN SEVERE ACUTE MALNUTRITION.
41.	PP-2023-0108	Ms.Tanvi Milind Mestry	Mgm- School Of Biomedical Sciences	Mumbai	tanvimestry14@gmail.com	Assessment of the health (hormonal parameters, dietary pattern and lifestyle) of women undergoing in vitro fertilization (IVF) treatment.
42.	PP-2023-0127	Ms.Monika Kumari	CSIR-IHBT	Palampur	monikasubms@gmail.com	Nutritional intervention of Flaxseed extract for the management of inflammation associated Rheumatoid arthritis.
43.	PP-2023-0137	Ms.Amulya A	DOS OF FOOD SCIENCE AND NUTRITION	Mysore	amulyaa26507@gmail.com	NUTRIENT ADEQUACY IN PREGNANT WOMEN AND IT'S ASSOCIATION WITH HEMOGLOBIN LEVELS
44.	PP-2023-0143	Ms.Samiyah Irfan Khan	MGM School of Biomedical Sciences, Navi Mumbai	Navi Mumbai	samiyahkk@gmail.com	Assessment of Nutritional Knowledge Among Children with Cerebral Palsy
45.	OP-2023-0019	Ms.Keerthan a. G	Dr. MGR educational and research institute faculty	Chennai	keerthanababu220802@gmail.com	Effect of calorie deficit diet in weight loss:A randomised controlled trial
46.	OP-2023-0021	Ms.Anuja Amit Mohile	Symbiosis Skills and Professional University	Pune	mohileanuja20@gmail.com	Comparison of the Age of onset of Menarche between 10-45 years old Indian females and its association with the pre menarcheal dietary and lifestyle patterns.
47.	OP-2023-0024	Dr.Summaiya Alam Lari	ICMR-National Institute of Nutrition	Hyderabad	summaiyalari@gmail.com	Minimization of pesticide residue levels in the exposed dermal regions of farm workers by use of personal protective equipment



S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
48.	OP-2023-0034	Ms.SONIA VELARSAN	University of Trans-Disciplinary Health Sciences and Technology	BENGALURU	sonia.v@tdu.edu.in	Integrating Ayurvedic and Modern Dietetic Principles for Personalized Cancer Diet: Preliminary Observations
49.	OP-2023-0036	Dr.PALLAVI MISHRA	Government PG College Magaraha Mirzapur	Mirzapur	pallavi.phd@gmail.com	NUTRITIONAL AND HEALTH STATUS OF OVERWEIGHT WOMEN SUFFERING FROM HYPOTHYROIDISM
50.	OP-2023-0040	Ms.MINA KUMARI GURUNG	Bishop Cotton Women's Christian College	Bangalore	ashmitagurung12@gmail.com	Comparison of Hemoglobin Level and Nutritional Status of Vegetarian and Non-Vegetarian Adolescent Girls in Bengaluru Rural, Karnataka
51.	OP-2023-0055	Ms.prachi bansal	Banaras Hindu University	varanasi	bansalprachi1999@gmail.com	Buckwheat and its Potential Role in Scavenging Diseases.
52.	OP-2023-0060	Dr.MANISHA SAHU	RACHANA SHARIR DEPARTMENT , FACULTY OF AYURVEDA, IMS, BHU	VARANASI	sahumanisha762@gmail.com	An Overview on Role of Amala Powder as a Dietary Supplements for the Management of Hypertension.
53.	OP-2023-0063	Ms.ANU KAUSHIK	Institute of Home Economics, University of Delhi	Delhi	kaushikanu10@gmail.com	Dietary compliance and profiling of patient with Type 1 Diabetics attending an outpatient clinic in Delhi, India
54.	OP-2023-0070	Dr.Mohammad Nawab	National Research Institute of Unani Medicine for Skin Disorders	hyderabad	ccrumnawab@gmail.com	Understanding Unani Dietary Practices: A Therapeutic Approach to the Management of Metabolic Disorders
55.	OP-2023-0075	Dr.Hafsa Abdul Rehman Patel	National Research Institute of Unani Medicine for Skin Disorders	Hyderabad	patelhafsa123@gmail.com	Nutraceuticals for dyslipidaemia in Unani perspectives- A comprehensive review
56.	OP-2023-0083	Ms.Karnika	Department of Food and Nutrition, Punjab Agricultural University, Ludhiana	Hisar	chaudhary.karnika12@gmail.com	The Genetic Culinary Connection: A Nutrigenomic Approach in Pathogenesis of Obesity and Cardiovascular disease
57.	Op-2023-0086	Ms.Sowmiya J	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	sowmiyaj998@gmail.com	ASSOCIATION OF MALNUTRITION AND NUTRITION IMPACT SYMPTOMS AMONG GASTROINTESTINAL TRACT CANCER PATIENTS
58.	OP-2023-0105	Dr.Panchali Moitra	Sir Vithaldas Thackersey College Of Home Science, SNDT Women's University, Mumbai	Mumbai	panchalim2511@gmail.com	Mediating effects of eating behaviors, dietary diversity and perceived stress on measures of gastrointestinal health in adults

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59.	OP-2023-0117	Mr.KASHINATH KARFE	KARNATAKA INSTITUTE OF MEDICAL SCIENCES AND HOSPITAL	DHARWAD	kashinathkarfe@gmail.com	Assessment the Nutritional Status of Shift Work Nursing Officers at KIMS Hospital, Hubballi Taluk, Dharwad District, Karnataka, India
60.	OP-2023-0125	Ms.Shalini Goswami	Sister Nivedita University	Kolkata	goswamishalini53@gmail.com	A holistic study on nutritional deficiency and altered health conditions due to sleep disorders.
61.	OP-2023-0135	Ms.Deepa Puttaswamy	St. John's Research Institute	Bengaluru	deepap@sjri.res.in	Nutritional status and body composition at diagnosis of South Indian children with Acute Lymphoblastic Leukaemia (ALL)
62.	OP-2023-0142	Dr.Deepali Sundrani	Mother and Child Health, Interactive Research School for Health Affairs (IRSHA), Bharati Vidyapeeth	Pune	deepali.sundrani@bharativedyapeeth.edu	Maternal fatty acids influence microRNA regulation of angiogenic factors in Assisted Reproductive Technology (ART) placentae
63.	OP-2023-0145	Ms.Sayeeda Arshiya Farheen	Division of Nutrition, St John's Research Institut	Bengaluru	sayeeda.af@sjri.res.in	Role of Cardiometabolic risk factors on the association between bone health and body composition among South Indian children aged 5 to 16 years.
64.	OP-2023-0149	Dr.Altamash Kaleem	National Research Institute of Unani Medicine for Skin Disorders	Hyderabad	altamashkaleem1@gmail.com	Unani Dietary Therapeutic Approach To Melasma
65.	OP-2023-0150	Ms.P.Lawvanaya	Be well Hospitals	Chennai	lawvselva97@gmail.com	A compare Total Fat consumption Among Women and Association Between Trunk Muscle/Fat Composition, Lumbar Disc Bulge, And Low Back Pain in Women Aged Between 20-50Years: A case series
66.	OP-2023-0156	Ms.Nandini Nanda	Maulana Azad Medical College	New Delhi	registered.dietitian05@gmail.com	Nutrition intake of children with chronic kidney disease (CKD) attending the outpatient department of a tertiary care centre
67.	OP-2023-0157	Dr.Deepti Khanna	HUL	Gurgaon	deepti.khanna2@unilever.com	Glycemic Indices of Multiple Oral Nutritional Supplements: A Randomized Cross-Over Study in Indian Adults
68.	OP-2023-0162	Ms.SUBHASREE S G	Hospital	Triuvanantapuram	subhaprasanth@gmail.com	Nutrition intervention in reversing Non-Alcoholic fatty liver disease (NAFLD) in children
69.	OP-2023-0163	Ms.Alisha Bhatia	Punjab Agricultural university	Ludhiana	alisha.bhatia2017@gmail.com	Efficacy of vitamin D2 enriched Mushroom powder on Vitamin D status and metabolic syndrome biomarkers in adults
70.	OP-2023-0177	Dr.Surekha Nagaraj	Government Home Collège, Hassan	Hassan	surekhan1980@gmail.com	Effect of Different Processing Methods on Glycemic Index(GI) of Value Added Barnyard Millet (Echinochloa frumentacea Link.) Based Products
71.	OP-2023-0182	Ms.Manisha Thakur	ICMR-NIN	Hyderabad	manisha.t1624@gmail.com	Assessment of dietary intake of Polyunsaturated Fatty Acid, and Cognition, Concentration, Memory

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						and Behaviour and their correlation among Children aged 7-13yrs
72.	OP-2023-0184	Dr.Khan Shama Rahimullah	National Research Institute of Unani Medicine for Skin Disorders	Hyderabad	khanshama41@gmail.com	Nutraceuticals for Acne Vulgaris : An Evidence Based Recommendation
73.	OP-2023-0185	Ms.Sreejita Chatterjee	Amity University Kolkata	Kolkata	sreejitachatterjee77@gmail.com	A Brief Review Study Of The Effect Of Sorghum (Sorghum Bicolor L.) As An Emerging Therapeutic Food In The Treatment Of Non Alcoholic Fatty Liver Disease
74.	OP-2023-0186	Ms.Bhawi Panwar	Mfine	Bangalore	bhawi.panwar@mfine.co	Evaluating The Impact Of Personalized Digital Weight Loss Program: A Study On Overweight Individuals With The Implementation Of Intermittent Fasting, Carbohydrate Reduction And Meal Image Monitoring
75.	OP-2023-0188	Ms.Vrushali Vilas Kadam	Interactive Research School For Health Affairs, Bharati Vidyapeeth (Deemed To Be University)	Pune	vrushali.kadam1@bharityapeeth.edu	Maternal Diet Across Pregnancy In Women With Preeclampsia
76.	OP-2023-0190	Ms.Deepa Sanglekar	Gujarat University	Ahmedabad	deepasanglekar@gmail.com	Development Of A Novel Multivariate Risk Prediction Model For Gut Dysbiosis In The General Population: A Pilot Project
77.	OP-2023-0197	Dr.Saiyed Fatema Anjum Nasehuddin	National Research Institute Of Unani Medicine For Skin Disorders	Hyderabad	sydfatema09@gmail.com	Diabetes Mellitus Type 2: Dietary Management In Unani Perspective
78.	OP-2023-0202	Ms.Kamakshi Kalia	Post Graduate Institute Of Medical Education And Research	Chandigarh	kamakshi.kalia14@gmail.com	Nutritional Management In Cerebral Palsy And Dystonia: A Case Report
79.	OP-2023-0212	Ms.Nehal Mansukhbhai Chavda	Gujarat University	Ahmedabad	nehalchavda_90@yahoo.com	Value Addition And Assessment Of Glycemic Index And Glycemic Load Of Some Traditional Gujarati Recipes.
80.	OP-2023-0213	Dr.Haris Afzal	National Research Institute Of Unani Medicine For Skin Disorders	Hyderabad	harisafzalaa_zmi@gmail.com	Dietary Management In Waja'al-Mafasil (Osteoarthritis) Through Unani System Of Medicine
81.	OP-2023-0216	Ms.Amulya A	Dos Of Food Science And Nutrition	Mysore	amulyaa26507@gmail.com	NUTRIENT ADEQUACY IN PREGNANT WOMEN AND IT'S ASSOCIATION WITH HEMOGLOBIN LEVELS

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82.	OP-2023-0218	Ms.Amita Beniwal	Dept. Of Food Science And Nutrition, College Of Community Science	Jorhat	amitabeniwal445@gmail.com	"Silkworm Pupae-Derived Protein and its Nutritional Impact on Rat Growth Patterns"
83.	OP-2023-0223	Dr.Priya Singla	Ignou Sc 2299, Nirman Campus Of Education, Research And Training	Sunam	PRIYA1988@PAU.EDU	EFFICACY OF QUALITY PROTEIN MAIZE BARS WITH SPECIAL REFERENCE TO IMPROVEMENT IN HEALTH STATUS OF SCHOOL CHILDREN
84.	OP-2023-0225	Dr.Mohammad Mubashshir Arfee	National Research Institute Of Unani Medicine For Skin Disorders	Hyderabad	abdullah.mu bashshir@outlook.com	Dietary intervention in Daght al-Dam Qawī (Hypertension) in reference to Unani Medicine
<b>EXPERIMENTAL NUTRITION</b>						
85.	PP-2023-0004	Ms.SaiGayathri.H	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	saigayathrihnair@gmail.com	Ragi Brownie -A millet based approach towards Calcium deficiency
86.	PP-2023-0015	Dr.SHIKHA MAHAJAN	PUNJAB AGRICULTURAL UNIVERSITY	LUDHIANA	shikha_bathla@pau.edu	COST EFFECTIVENESS OF DEVELOPED MUNG BEAN (VIGNA RADIATE) BASED DAIRY ANALOGUE
87.	PP-2023-0016	Mr.SOUMAM DUTTA	ICMR NIN	HYDERABAD	soumam_dutta@yahoo.com	Vitamin D3 improves classical functions more effectively than Vitamin D2 in rat model
88.	PP-2023-0024	Mr.LOKESH MURUMULLA	ICMR - National Institute of Nutrition	hyderabad	murumullalokesh25@gmail.com	Exploring the Complex Interplay: Neurotoxicity of Pb and Amyloid Peptides in Neuronal Cells and the Potential Neuroprotection by Rosmarinic Acid
89.	PP-2023-0029	Ms.Indu Bhargavi.K	St. Francis College for Women	Hyderabad	indubhargavi.95@gmail.com	Homology Model and Docking- Based Virtual Screening for Ligands of Pomelo Fruits as Inhibitor of 14-3-3 protein involved in Atherosclerosis
90.	PP-2023-0032	Ms.Anika Andrea	St. John's Research Institute	Bangalore	anika.a@sjri.res.in	A combined measurement of fat- and water-soluble vitamins in biological fluids by Liquid Chromatography and mass spectrometry.
91.	PP-2023-0033	Ms.Nandini NC	St. John's Research Institute	Bangalore	nandini.nc@sjri.res.in	Relationship of natural abundance of carbon and Nitrogen Stable Isotope Ratios with dietary intake of sugar
92.	PP-2023-0034	Ms.Neha Marie Pereira	St. John's Research Institute	Bangalore	Neha.mp@sjri.res.in	Amino acid profiles of cow milk, curd, human breastmilk and curdled human breastmilk by Liquid Chromatography and mass spectrometry.
93.	PP-2023-0047	Mr.Nikhil Nadiger	St John's Research Institute	Bengaluru	nikhil.n@sjri.res.in	Increased inflammation in diabetic women undergoing laparoscopic surgeries
94.	PP-2023-0059	Dr.JANCY RANI D	Dr.N.G.P. Arts and Science	Coimbatore	jancyranifsn@gmail.com	Characterization and Antioxidant activity of the green synthesized Silver

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
			College, Coimbatore, Tamilnadu			Nanoparticles from Finger Millet (Eleusine Coracana .L) Milk
95.	PP-2023-0063	Ms.Sushmitha K	Yuvaraj's College Autonomous Mysore	Mysore	sushmitha100701@gmail.com	FORMULATION AND QUALITY ANALYSIS OF PROBIOTIC ICE-CREAM PREPARED USING LACTOBACILLUS STRAINS
96.	PP-2023-0064	Ms.Monika DR	Yuvaraja's College Autonomous Mysore	Mysore	monikadrmonikadr28@gmail.com	STUDIES ON THE DEVELOPMENT OF RTE EAT THEPLA AND IT'S PREMIX
97.	PP-2023-0069	Dr.RADALI DUARAH	Assam down town University	Guwahati	rodalid3@gmail.com	Antimicrobial analysis of medicinal plants used in traditional rice beer starter culture of Assam against five human pathogenic bacteria
98.	PP-2023-0087	Mr.Sachin Parwani	Post Graduate Institute of Medical Education and Research Chandigarh	Chandigarh	sachinparwani2000@gmail.com	Fathers Matter Too: Exploring the Consequences of Paternal Folate Deficiency on Placental Imprinted Genes.
99.	PP-2023-0096	Ms.SASIREKHA NELAPUDI	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	sasirekha.nelapudi@gmail.com	Enhancing Nutrient content and Reducing Anti-Nutrients in Millets through Micro milling Technology: A Comprehensive Research Study
100.	PP-2023-0099	Ms.Gurralla Soumya	ICMR-NIN	Hyderabad	soumyareddygurralla1701@gmail.com	Vitamin B6 deficiency induces cardiac fibrosis through AGE-modification of extracellular matrix proteins.
101.	PP-2023-0105	Mr.VENU KONDA	ICMR-NATIONAL INSTITUTE OF NUTRITION	HYDERABAD	kondavenu94@gmail.com	Zinc biofortified rice improves growth and zinc status in zinc deficient Rats
102.	PP-2023-0109	Ms.Srijana M Shekar	DoS in FSN, University of Mysore	Mysuru	srijanamshekar@gmail.com	EFFECT OF CALORIE RESTRICTION ON INFLAMMATORY & APOPTOTIC GENES IN ALVEOLAR EPITHELIAL CELLS OF STZ INDUCED DIABETIC RATS
103.	PP-2023-0111	Ms.S. GOMATHI	ICMR-NIN	HYDERABAD	gomathi5161@gmail.com	UNRAVELLING THE ESSENCE OF MATERNAL RIBOFLAVIN DEFICIENCY ON OFFSPRINGS GROWTH AND DEVELOPMENT
104.	PP-2023-0114	Ms.Sakshi Rai	ICMR- National Institute of Nutrition	Faridabad	raisakshi722@gmail.com	Antimicrobial potential of Lactobacillus: the gut commensal
105.	PP-2023-0128	Ms.Avisha Sharma	CSIR-IHBT	Palampur	avishasharma01@gmail.com	Exploring the Anti-Inflammatory Potential of Alpha-Linolenic Acid (ALA) and Secoisolariciresinol Diglucoside (SDG): Individual and Synergistic Effects in LPS-Stimulated RAW 264.7 Macrophages
106.	PP-2023-0138	Ms.DIVYA.M.S	JAMAL MOHAMED COLLEGE	TRICHY	divyasivakumar2001@gmail.com	DEVELOPMENT OF THE BOWEL MOVEMENTS ENHANCING HERBAL AND MILLET BASED LIQUID DIETS FOR CONSTIPATION

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
107.	PP-2023-0139	Ms.DIVYA B	JAMAL MOHAMED COLLEGE	TRICHY	divyabacktha2001@gmail.com	FORMULATION OF LEUCAS ASPERA (fl.) AND MILLET SUPPLEMENTARY TONIC MIX FOR COUGH
108.	OP-2023-0009	Ms.TITLI PANCHALI	Midnapore City College	MIDNAPORE	titlipanchali19@gmail.com	Potentiality of Setipinna phasa Oil in Balb/c Mice Reduces High-Fat Diet Induced Obesity and Related Inflammation
109.	OP-2023-0010	Ms.Ananya Dutta	Midnapore City College	Paschim Medinipur	ananyadutta457@gmail.com	ANTI-CANCER EFFICACY OF TAPRA FISH (Opisthopterus tardoore) OIL-DERIVED LINOELAIDIC ACID ON HUMAN BREAST CANCER CELL LINE
110.	OP-2023-0027	Ms.PRITHA GHOSH		HYDERABAD	PRITHA.RATANPUR@GMAIL.COM	ISOLATION OF SALMONELLA PHAGES FROM CHICKEN FECES AND ITS EFFECT ON EXPERIMENTALLY CONTAMINATED CARROT SALAD
111.	OP-2023-0038	Ms.Somali Ghosh	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	somalighosh05@gmail.com	Lipid modulating effect of sun-dried seed and peel powder of Vitis vinifera L derived polyphenols: In-vivo study on healthy adult wistar rats
112.	OP-2023-0050	Ms.Parinam Poojitha Sri Sai	Symbiosis Institute of Health Sciences	Pune	poojithaparinam@gmail.com	"Exploring The Medicinal Potential of Cissus quadrangularis (Asthisamharaka): A Comprehensive Review on Osteoporosis Management and Anti-Arthritic Effect"
113.	OP-2023-0065	Ms.Akankshya Satapathy	Research Assistant	Hyderabad	akankshya.satapathy98@gmail.com	Selected zinc co-factor requiring gene expression regulation by long non-coding RNAs (lncRNAs): A comparative study
114.	OP-2023-0097	Ms.Shravya Umesh Karkera	MGM School of Biomedical Sciences, MGMIHS	Navi Mumbai	karkerashravya@gmail.com	Comparative Study on Blood Glucose Levels and Lipid Profile of Lactating Women Consuming Galactagogues
115.	OP-2023-0195	Mr.SAIKANTH VARMA	ICMR-National Institute of Nutrition	Hyderabad	saikanthvarma50@gmail.com	In-utero exposure to estrogen mimicking compound bisphenol alters bone mineralization in the offspring
116.	OP-2023-0233	Ms.K.Lalankimi	Department of Allied Hospitality Studies (DAHS), MAHE	Manipal	makimikhiangte03@gmail.com	Effect of nitrates on endurance athletes- a case control study
117.	YS-2023-0014	Ms.SHANTHI NI DEVI M	Ganga College of Nursing and Allied Health Science	Coimbatore	devidoss2000@gmail.com	"EFFECTIVENESS OF NUTRI SHOTS ON WEIGHT GAIN PATTERN AMONG CHILDREN AGED 4-5 YEARS AT SELECTED SCHOOLS IN THIRUVARUR DISTRICT"
118.	YS-2023-0020	Dr.Shrabanti Pyne	Raja Narendralal Khan Women's College (Autonomous)	Medinipur	pyneshrabanti@gmail.com	Antidiabetic activity of volavetki seafish oil via the FFAR1 agonistic insulin-mimetics pathway.

## NUTRITION EDUCATION & COMMUNICATION AND SPORTS NUTRITION

PP-2023-0028

**Abstract Title: Assessing Millet Awareness and Consumption Patterns Among Young Athletes: A Pilot Study**

**Ms. Sivapriya K.C.**, Ph.D. Scholar, School of Food Science and Technology, Kottayam, [sivapriyakc@gmail.com](mailto:sivapriyakc@gmail.com); Dr. JISHA M.S., Hon. DIRECTOR, Professor, School of Food Science and Technology, Mahatma Gandhi University, Kottayam; Dr. Anooja Thomas K, Course Coordinator, Adjunct Faculty, School of Food Science and Technology, Mahatma Gandhi University, Kottayam.

**Background:** Dietary choices and consumption patterns have a major impact on nutritional status. Among dietary choices, Millets, a group of small-seeded grains, have emerged as a sustainable nutrition and food security solution. Millets are not only a source of essential nutrients but possess several qualities that make them suitable for combating Relative Energy Deficit in Sports (RED-S). There is an increasing prevalence of Relative Energy Deficit in Sports (RED-S) among young athletes because the nutritional requirements of young athletes are high. In this scenario, millet consumption can effectively address these nutrition problems. Despite the potential advantages of millet consumption in young athletes, it can only be increased by Awareness and consumption practice. **Methods:** The area selected for the pilot study was Mahatma Gandhi University, Kottayam, Kerala, due to the availability of enough samples. 50 participants which contain both equal proportion of male and female athletes was selected for the study using random sampling. Prepared a well-structured questionnaire which included demographic information, their awareness of millet consumption patterns, and reasons for or against consumption. An informational PowerPoint presentation about what is Millets, significance of Millet consumption, potential health benefits in including diet was prepared to improve awareness of Millet among young athletes, which encourages them in future consumption. Conducted interviews to gather in-depth knowledge about Millets among participants. The data collected were analyzed, interpreted and presented the results. For statistical analysis, SPSS software was used. **Result:** The study found that there is low consumption of Millets among young athletes. The level of awareness of Millet consumption and nutritional knowledge was low among young athletes. A significant gap exists between the awareness and consumption patterns of Millets among young athletes which is the reason for their low consumption. **Conclusion:** The level of Awareness and the rate of Millet consumption is low among young athletes. Thus, targeted nutritional counselling and interventions are required to promote Millet consumption among young athletes.

**Keywords:** Millets, Consumption pattern, Dietary choices, Awareness of Millets, Nutrition security

PP-2023-0030

**Abstract Title: Impact of Nutrition Education Intervention on Knowledge, Attitude And practices of adolescent Girls**

**Ms. Vidya Sudamrao Ghule**, Dietician (Bharati Hospital Pune), Bharati Vidyapeeth's Bharti hospital And Research, Pune, [ghulevidya1993@gmail.com](mailto:ghulevidya1993@gmail.com); Dr. Rupali Sinde, Msc., Ph.D. Food Science and Nutrition (UGC NET JRF), Assistant Professor, Modern College of Arts Commerce and Science Ganeshkhind Pune. Dept of B Voc. Food Processing Techno, Pune; Ms. Trupti Sandip Rasal, Head of Department (Nutrition and Dietetics), Bharati Vidyapeeth's Bharti hospital and research center Pune

**Background:** Adolescent age group is between 10 to 19 years of age and is a transition period. Food habits and eating patterns change during this period. If the choices at this age involve balance and healthy diet then it will have positive response on the health during adulthood. Nutrition Education can assist in developing healthy food habits in adolescents. During adolescent period using random sampling. Prepared a well-structured questionnaire which included demographic information, their awareness of millet consumption patterns, and reasons for or against consumption. An informational PowerPoint presentation about what is Millets, significance of Millet consumption, potential health benefits in including diet was prepared to improve awareness of Millet among young athletes, which encourages them in future consumption. Conducted interviews to gather in-depth knowledge about Millets among participants. The data collected were analyzed, interpreted and presented the results. For statistical analysis, SPSS software was used. **Result:** The study found that there is low consumption of Millets among young athletes. The level of awareness of Millet consumption and

nutritional knowledge was low among young athletes. A significant gap exists between the awareness and consumption patterns of Millets among young athletes which is the reason for their low consumption. **Conclusion:** The level of Awareness and the rate of Millet consumption is low among young athletes. Thus, targeted nutritional counselling and interventions are required to promote Millet consumption among young athletes.

**Keywords:** Millets, Consumption pattern, Dietary choices, Awareness of Millets, Nutrition security

**PP-2023-0039**

**Abstract Title: The Impact of the One Health Approach on Household Food Insecurity in the Indian Population: A Bibliometric Analysis**

**Ms. Sejal Malik**, Student, Symbiosis Institute of Health Science SIU Pune Mah, Mulshi lavale, Pune Maharashtra, [sejalmalik9@gmail.com](mailto:sejalmalik9@gmail.com); Ms. Pooja Panchal, Teacher associates, Symbiosis Institute of Health Science SIU Pune, Maharashtra.

**Background:** By enhancing coordination, collaboration, and communication at the interface between humans, animals, and the environment, the One Health strategy improves global health security by addressing common health issues such as zoonotic infections, antibiotic resistance, food safety, and others. The difficulty of producing and distributing the food required to feed a growing population, as well as the capacity of contemporary societies to effectively address these and other food-related issues, will necessitate a workforce that is educated and skilled in areas other than traditional food safety, security, and public health, such as food production, sustainable practices, and ecosystem health. **Method:** A comprehensive search was conducted using PubMed and Science Direct databases focusing on the impact of one health on food insecurity in Indian population. The search was conducted between (2017to2023) using PRISMA guidelines. Keywords were analyzed and visualized using VOS viewer software. **Result:** In total, 298 publications were considered. The yearly count of publications, demonstrated steady rise from 2017 through 2023. Primary five clusters directly centered on animals, food safety, females, humans, comprising 84 items in total. These clusters were connected by 1,173 links with cumulative link strength of 2,773. In dataset, total 84 keywords met established threshold. The primary research focuses on zoonotic diseases encompass viral, bacterial, and parasitic zoonotic diseases, with limited emphasis on antimicrobial resistance research. In realm of food safety research, major interests revolve around topics like food insecurity, food contamination, food supply chain, food microbiology. **Conclusion:** To facilitate informed policy choices and resource allocation, proponents and practitioners of the One Health concept must collect and provide national-level data to inform government decision-makers about the impact of One Health initiatives. This approach provides a pragmatic and fair method for attaining sustainable development objectives and promoting the worldwide health security agenda.

**Keywords:** One health, food insecurity

**PP- 2023-0040**

**Abstract Title: Enhancing Nutritional Status in Rural Adolescent Girls through Targeted Nutrition Education: A Critical Imperative**

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**Background:** Rural adolescent girls represent the backbone of thriving communities, yet they often grapple with suboptimal nutritional status, with far-reaching consequences for their health, development, and well-being. In the pursuit of sustainable development goals, addressing this pressing issue assumes paramount significance. This abstract underscore the compelling urgency of targeted nutrition education interventions tailored to the specific needs of rural adolescent girls. Such initiatives hold the potential to empower these young women with the knowledge and skills needed to make informed dietary choices, thus transforming their health trajectories and opening doors to brighter futures. Drawing upon existing literature, empirical evidence, and successful case studies, this research advocates for the integration of nutrition education into rural development and public health strategies. By shedding light on the multifaceted benefits and transformative potential of such interventions, this



abstract underscore the path to improved health, enhanced opportunities, and empowered lives for rural adolescent girls. **Method:** The study was conducted in Deoria district, Uttar Pradesh, chosen for its specific nutritional status and demographic features. Three government girls' schools were carefully selected as the study's sample base, comprising 420 adolescent girls (140 from each school). Detailed questionnaires were developed for data collection, covering background information, nutritional assessment, and nutritional knowledge. Dietary patterns were evaluated using food frequency questionnaires and 24-hour dietary recall methods. The data collection instruments were rigorously validated, achieving high internal consistency ( $\alpha = 1.01$ ) and suitability through a pilot study. The variables were systematically categorized into background information, dietary assessment, and nutritional knowledge, facilitating a structured analysis. The data collection involved pre and post-nutrition education intervention assessments, including anthropometric measurements, dietary practices, and nutritional knowledge, providing a holistic view of the participants' nutritional status. The intervention comprised a 10-day nutrition education program with various instructional materials. Post-intervention data collection enabled the evaluation of the intervention's impact on nutritional knowledge, dietary practices, and nutrient intake. Robust data analysis techniques were employed, including percentage calculations, descriptive analysis, paired t-tests, and cross-tabulation. The significance level was set at  $p < 0.05$ . Operational definitions were provided for key terms, ensuring clarity and validity. This meticulously designed methodology offers valuable insights into the impact of nutrition education on adolescent health, adhering to high standards of reliability and validity, contributing significantly to the field of nutrition education. **Result:** In conclusion, the analysis of BMI changes before and after the nutrition education intervention among adolescent girls highlights a positive impact on BMI levels. Although the significance of these changes varied among age groups, the findings underscore the potential of nutrition education to positively influence BMI outcomes. It is worth noting that BMI levels still remained below WHO standards, emphasizing the ongoing need for comprehensive nutrition education interventions to address this issue effectively. In this study, we explored the impact of nutrition education on food frequency patterns among adolescent girls, shedding light on transformative shifts in dietary habits. The analysis of consumption behaviors across various food categories revealed valuable insights into the potential influence of the intervention. The findings showcased those cereals, specifically wheat and rice, were dietary staples, with significant consumption rates. Following the intervention, minor fluctuations were observed in rice consumption, while wheat consumption remained stable. Notably, other cereals like maize, ragi, and jowar witnessed substantial increases in monthly consumption post-intervention. Furthermore, the study demonstrated a positive shift in pulse consumption, encouraging a healthier dietary choice. Consumption of nuts, dry fruits, and oilseeds exhibited a significant increase, emphasizing the intervention's role in promoting nutritious snack options. Improvements were also observed in fruit, vegetable, milk, and dairy product consumption, highlighting a notable transformation in dairy consumption habits. The intervention positively influenced non-vegetarian product consumption frequencies, indicating a shift towards incorporating diverse protein sources into the diet. Additionally, changes in cooking ingredient consumption patterns suggested potential healthier cooking choices among the participants. Overall, these findings underscore the crucial role of nutrition education in fostering balanced and nutritious diets among adolescent girls, promoting a foundation for lifelong healthy eating habits. **Conclusion:** The study underscores the paramount significance of nutrition education interventions in augmenting nutrient intake, enhancing dietary knowledge, and fostering healthier dietary habits among adolescent girls. These interventions are pivotal in addressing nutritional deficiencies, promoting balanced nutrition, and empowering young individuals to make informed choices about their well-being. The findings highlight the lasting impact of such interventions and advocate for their continued implementation as a key strategy in improving adolescent nutrition and overall health.

**Keywords:** Nutrition education, Sustainable development goals

PP-2023-0044

**Abstract Title: Nutritional Knowledge, Attitude and Practice Of Selected Volley Ball Players (18-23 years) of colleges affiliated to Mahatma Gandhi University Kottayam, Kerala, India.**

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**Background:** Nutrition is an essential contributor to the sports performance. Nutritional knowledge, attitudes and practice of a sports person determines the selection and quality of food consumed, which eventually reflect in his or her performance. Good knowledge, attitude and practice in nutrition is needed for a sports person to avoid chronic energy deficit, injury and disordered eating behaviors. Aim of the study was to assess the nutritional knowledge, attitude and practice among selected female volley ball players of 18- 23 years age group from colleges affiliated to Mahatma Gandhi University, Kottayam, Kerala **Methods:** 45 Female volley ball players from 2 private colleges affiliated to Mahatma Gandhi University were selected for the study. The tool used for the study was a pre structured nutritional KAP checklist contains 15 questions each for knowledge, attitude and practice. For each question, the possible answers were strongly agree, agree, neither agree nor disagree, disagree and strongly disagree and the scores assigned for each were 2,1, 0, -1 and -2. For evaluation a total score between -30 to 30 was used. The different categories used to grade the total score obtained by each person were (score 19 to 30: very good, score 7 to18 : good, score -6 to 6 : average, score -18 to 7: poor, score -30 to -19 : very poor ).**Result:** Mean scores for nutritional knowledge, attitude and practice were  $4.89\pm 4.83$ ,  $3.22\pm 3.74$  and  $4.38\pm 6.49$ . Majority of the studied group scored average for nutritional knowledge, attitude and practice (68.9, 75.9 and 62.2 per cent respectively) **Conclusion:** Study pointed out to the need of nutrition education of the studied group by coaches and nutritionists, to make them very good at nutritional knowledge, attitude and practices.

**Keywords:** Nutritional knowledge, attitude and practice, Female volley ball players, 18-23 years, Mahatma Gandhi university.

PP-2023-0053

**Abstract Title: A thematic analysis of systematic reviews on evidence and gaps on breastfeeding globally**

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**Background:** Breastmilk is well- known source of food for the infants. Breastfeeding has ample benefits both to the mother and child physically as well as mentally. Despite the many benefits, rates of breastfeeding continue to be low. From round 5 of National Family Health Survey (NFHS 5), Early Initiation of Breastfeeding (EIBF) remained stagnant at 41.8 % and Exclusive Breastfeeding (EBF) at 63.7%. There is a need for current evidence-based recommendations and gaps if any, to strengthen program implementation. **Methods:** We searched PubMed database using the search term breastfeeding and related words of all Systematic Reviews (SRs) for the year 2022 and 2023 [till July] across the globe. All abstracts were reviewed by two authors independently and later categorized them into various themes and subthemes. Similar themes were further clubbed under broad themes. The themes were given various codes for analysis and interpretation. Descriptive statistics were used to compute results for various themes. Key findings of the abstract were summarized for each of the themes. **Result:** A total of 290 systematic reviews were identified from both developed and developing countries. We found 15 SRs that were not related to breastfeeding and were excluded from the analysis. We categorized all the 290 articles into 9 broad themes. The highest number of articles were in theme "Problems in breastfeeding and management" and accounted for 25% of all SRs and lowest was for the theme "maternal and parental role in breastfeeding" (0.8%). The commonest reasons for low EBF was working parents and Human Milk Insufficiency (HMIS). Most SRs found counselling to have a positive impact on EIBF & EBF using both technology (smart phones or tele counselling) or personal counselling. A key gap that SRs pointed was limited studies on drug pharmacokinetics during lactation

as well as studies among working mothers. **Conclusion:** The thematic analysis on SRs has shown a positive role of counselling in improving EIBF and EBF rates globally. While HMIS can be resolved through lactation support, working parents provide a considerable challenge in improving breastfeeding indicators. There is a need for more studies in working mothers and pharmacokinetics.

**Keywords:** breastfeeding

**PP-2023-0074**

**Abstract Title: Improving Male Participation in ANC and PNC through Participatory Learning and Action: A Literature Survey**

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**Background:** Male participation in antenatal and postnatal care (ANC and PNC) offers emotional and psychological support to the mother, enhances knowledge and education regarding pregnancy, improves maternal health, and facilitates early detection of health issues. Shared responsibilities, breastfeeding support, and enhanced child well-being are additional benefits. However, the prevalence of male engagement in ANC and PNC are suboptimal. Participatory Learning and Action (PLA) enables community members to share, analyze and enhance their knowledge regarding life and conditions and actively participate in decision making processes. In this literature survey, we aim to identify PLA techniques which can improve male participation in ANC and PNC. **Methods:** A literature survey was conducted using PubMed and Google Scholar databases. Search items like “male participation”, “male engagement”, “antenatal care”, “postnatal care”, “participatory learning and action” were used. Barriers and promoters of male participation were identified. Possible solutions were conceptualized. **Results:** Lack of knowledge, cultural norms, stereotypical gender roles, lack of time and institutional obstacles were found to be the major factors behind lack of male participation. PLA techniques like regular community meetings with the male family members, community mobilization, awareness-raising, action planning, monitoring, and advocacy might be effective. Certain audio-visual tools, games and events can be designed to highlight the importance of male participation. Traditional art forms can be utilized. Hypothetical situations can be given to the male participants to observe their responses. Moreover, sharing success stories and lessons learned within communities will foster a collaborative approach for a sustained positive change. **Conclusion:** Male participation improves ANC and PNC outcomes. Organizing regular community meetings with male family members where they can share their experiences and gain knowledge will help them to change their cultural perceptions and motivate them to participate actively in maternal care.

**Keywords:** Male Participation, Male Engagement, Antenatal Care, Postnatal Care, Anticipatory Learning

**PP-2023-0075**

**Abstract Title: Strategies to Promote Healthy Eating by using Food Labels through COM-B Model: A Literature Survey**

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**Background:** With India’s rapid shift in dietary patterns, the sales of ultra-processed packaged food products has increased dramatically in the past few decades. This undoubtedly contributes to the growing concern of non-communicable diseases. Existing evidences show that reading the food labels can enable consumers to make informed food choices. However, a lack of awareness about decoding food labels can be observed among a significant proportion of Indian population. Hence, this literature survey aims to identify the globally used effective strategies to promote healthy food choices by using food labels. **Methods:** A literature survey was conducted using PubMed and Google Scholar databases. Search items like “Food label”, “Nutrition label”, “Nutrition information”, “Nutrition education” and “Nutrition knowledge” were used. The barriers and facilitators of food label use were scrutinized. Possible strategies to improve food choices through food label reading were conceptualized based on the Capability, Opportunity, Motivation for Behaviour change (COM-B) model. **Result:** The following

strategies were conceptualized, Capability: Capability building to decode nutrition label information through education on semiotics, nutrition terminologies, shelf life, product claims, daily nutrient requirements, unhealthy ingredients (like sodium, sugar, trans fat, chemical additives) and healthy ingredients (like dietary fibre, protein, vitamins, minerals). Opportunity: Providing opportunities to read nutrition labels through easy availability and accessibility of labels on food items, visible and attractive labelling, highlighting important ingredients, FoPNL, audio labels, availability of information sheets at the shops, detailed information availability through bar codes, QR codes, mobile apps, information sharing on social media, use of specific hashtags to encourage discussions, workshops and demonstration of healthy cooking using food labels. Motivation: Motivating people to use food labels through persuasive messaging, personal testimonials, success stories and social support systems. Behaviour: Reading food labels efficiently will improve nutritional knowledge which in turn will improve food choices. **Conclusion:** Food labels, if used properly, can help the consumers to make better decisions. Capability building, providing opportunities and motivating people to read food labels will improve their food choices and eating behaviour.

**Keywords:** Food Label, Nutrition Information, Nutrition Education, Health Promotion

**PP-2023-0094**

**Abstract Title: Knowledge, Attitude, And Practice on Nutrient Timings Amongst Athletes**

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**Background:** Eating at the right times of day is crucial since food controls your body's cycles, increases metabolism, and aids in detoxifying. Delivering the right macronutrients at the right moment to maximize their utilization by the body is known as "nutrient timing. The energy phase, the anabolic phase, and the adaptation phase are the three stages of nutrient timing in relation to exercise. **Methods:** The study aims at the studying the Knowledge, Attitude and Practises based on nutrient timing amongst the athletes. The study was done using a well-planned questionnaire, through the filling of google forms. 59 individuals participated in the study. Also, google Forms has provided a better reach of the participants. **Result:** Among 59 participants, 41 were men and 18 were the female majority of them being between the age group above 25 years who are practising sports actively. About 54.2% (32) participants knew of nutrient timing diets either through other players or through recent internet searches or social media content. Major misconception was that 73.6 % (43) of them believed only protein is required for recovery. 100 % (59) showed keen attitude on following nutrient based diet if it increases performance. When a question was asked to understand the attitude of participants with regard to carbohydrate consumption during weight loss 42.4% (25) of the participants did not show positive attitude. 42.8% (28) participants were not following nutrient based diets. 84.7% (50) of the participants had healthy practice of not consuming tea and coffee immediately after the major meal. **Conclusion:** The study revealed that the participants were well informed about nutrient-based timing and had positive attitude to follow it specially to improve their performance. The practise of meticulous planning, the consumption of whole foods, fortified foods, and dietary supplements are all included in nutrient timing-based diets. Following high-volume or severe exercise, timing of energy intake and the ratio of specific ingested macronutrients may help with recovery and tissue repair, boost MPS, and elevate mood states.

**Keywords:** Nutrient timing, Diets, Athletes, Performance.

**PP-2023-0100**

**Abstract Title: Prevalence of Relative Energy Deficiency in Sports (REDs) among Indian female adolescent athletes.**

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**Background:** Energy availability is the dietary energy left over and available for optimum function of body systems after accounting for the energy expended from exercise. Energy availability is expressed as kcal/kg FFM/day, and is defined in the scientific literature in the form of a mathematical formula:  $EA [Energy\ Availability] = \{EI [Dietary\ energy\ Intake\ (kcal)] - EEE [Exercise\ Energy\ Expenditure\ (kcal)]\} / FFM [Fat-Free\ Mass\ (kg) / day]$  Low energy availability (LEA) is any mismatch between dietary energy intake and energy expended in exercise that leaves the body's total energy needs unmet, that is, there is inadequate energy to support the functions required by the body to maintain optimal health and performance. LEA occurs as a continuum between scenarios in which effects are benign (adaptable LEA) and others in which there are substantial and potentially long-term impairments of health and performance (problematic LEA). Relative Energy Deficiency in Sport (REDs) A syndrome of impaired physiological and/or psychological functioning experienced by female and male athletes that is caused by exposure to problematic (prolonged and/or severe) LEA. The detrimental outcomes include, but are not limited to, decreases in energy metabolism, reproductive function, musculoskeletal health, immunity, glycogen synthesis and cardiovascular and hematological health, which can all individually and synergistically lead to impaired well-being, increased injury risk and decreased sports performance. 30- 45 kcal / kg FFM /day is said to be a optimal energy availability for an individual, less than 30kcal /kg FFM / day is defined as low energy availability. This cross sectional study is done on the female adolescents athletes to estimate the prevalence of relative energy deficiency in sports (REDs) from the Telangana State Sports School (TSSS), Hyderabad. **Method:** 1. Screening of the athletes for low energy availability using validated questionnaires: low energy availability in female's questionnaire (LEAF-Q) and for eating disorder Questionnaire (EAT- 26) was done for 73 athletes among which half of the sample was Chosen for further assessments. 2. Energy availability (EA) was estimated by monitoring seven day food intake (EI) and Exercise energy expenditure (EEE) was calculated using the time allocation pattern (TAP) for seven days. 3. Resting metabolic rate (RMR) was estimated using the indirect calorimetry (IC). 4. Measurement of body composition and bone mineral density was done using the bioelectric impedance (BIA) and dual energy x-ray absorptiometry (DEXA) were done. 5. Blood pressure (BP) and Heart Rate were evaluated using BP-BIO and polar heart rate monitor respectively. 6. The data was analysed using appropriate statistical tools to draw inferences. **Results:** After screening using the questionnaire it was found that 19.4% of the athletes were in the category of low energy availability, 2.7% had menstrual dysfunction, 11.1% had Injuries, 13.8% had gastrointestinal dysfunctions and 8.33% had poor eating habits. • It was found that 27.8% athletes had low resting metabolic rate (RMR), Respiratory quotient (RQ) showed 12.9% were using fat, 64.5% were using mixed fuels whereas 22.5% were using carbohydrate as the fuel in resting phase. **Conclusion :** Although the low energy availability was found among 19.4% of the athletes, the prevalence of REDs was relatively low in the Indian adolescent's athletes at the Telangana State Sports School supported by the Khelo India programme by Government of India .

**Keywords:** Lea, Reds, Leaf-Q, Eee, Rmr, Bia, Dexa.

PP-2023-0124

**Abstract Title: A formative study on Capacity Building of Schools and Colleges in Mitigating Obesity and Obesogenic Environment Using Information Technology Solutions**

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**Background:** The prevalence of Overweight Obesity is on the rise. Urban young in the 10-24 years age showing upward trends. Diet, physical activity, and personal habits are modifiable risk factors amenable to intervention, provided they are identified early and intervened. Individuals are already using IT tools available for diet and lifestyle modification. A non-commercial, well-validated tool for individual and community (schools/colleges) management of obesity with scientific and ethical inputs from apex bodies like NIN, based on inputs from inbuilt secure dynamic analytics, is a need of the hour. Objective: The research aims to develop a mHealth-based school overweight and obesity surveillance system. The study also aims to pilot test the application in schools and colleges for its acceptability, usability,



and utility in effectively assessing the overweight and obesity risk factors and making decisions. **Methods:** The methodology used is a quasi-experimental study planned in four phases: need assessment, software development, intervention, and software evaluation. **Result:** The first phase of the needs assessment has been completed, which involved collecting data on college students' demographic details, anthropometric details, dietary habits, physical activity details, and college environment. The data was collected from various educational institutions all over Hyderabad, which include colleges such as Pharmacy College, Nursing College, Hotel Management College, and universities. **Conclusion:** A maximum number of college students don't have physical training classes in their college and don't have the resources to conduct physical activities. Thus, leads to an increase in low physical activity, leading to the risk factor for overweight and obesity. In the study, it is noticed that students have increased consumption of calorie-dense food.

**Keywords:** Obesity, risk factor Surveillance, Decision-support, AI.

### PP-2023-0130

**Abstract Title: Sports Nutrition Knowledge and Practice regarding hydration among athletes – A Pilot Study.**

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**Background:** Hydration is a crucial, but often neglected aspect of nutrition. It is important for athletes' performance and recovery. Water loss 2% of total body weight impairs athletic performance and recovery. This study is designed to ascertain the knowledge and practices of hydration among athletes. **Methods:** 40 district-level athletes from three different sports (Judo n=18, Football n=12, and Volleyball n=10) were recruited from ages 13 to 25. A self-developed & validated questionnaire was administered to assess the knowledge and practices regarding hydration among athletes. The question assessed overall knowledge about hydration and specific knowledge regarding sports drinks, energy drinks, etc. Hydration practice questions assessed timing, type, and amount of fluid preferred. **Result:** Among 40 athletes, 7.5% had above-average, and 47.5% had below-average overall knowledge scores. 62.5% of athletes have no specific knowledge of sports and energy drinks. 25% preferred to drink fluids during their practice, while 80% preferred plain water when thirsty. The preference for beverages varied amongst athletes like water, fruit juice without milk, fruit juice with milk, and sports drinks. 25% of the athletes consume fluid to their requirement. **Conclusion:** Indian district-level athletes' knowledge was less than adequate and practice was not in line with the fluid requirements. Low knowledge level influences the athlete's hydration practice. Nutrition education sessions focusing on the importance of hydration strategies should be provided to athletes to enhance their recovery and improve their performance in future competitions.

**Keywords:** Hydration, Knowledge, Practice, Athletes, Performance.

### PP-2023-0131

**Abstract Title: Assessment of factors in school environments that increase the risk of Obesity among students in private schools in Hyderabad. A qualitative study surveying the perspectives of principals and teachers**

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**Background:** Overweight and Obesity in children and adolescents increase their risk of developing nutrition-related non-communicable diseases. India's obesity rates are growing exponentially. It is predicted that by 2030, over 27 million children in India will be obese, representing one in ten of all obese children globally. School programs are vital in promoting healthy diets and physical activity. This study aims to survey the perspectives of school principals and teachers to understand the gaps and challenges in the current school programs to address this epidemic. **Methods:** In this ongoing study, we selected four international schools in Hyderabad based on snowballing techniques. The data collection included four key informative interviews among principals and seven focus group discussions among teachers in groups of 5-8 participants. The number of interviews was based on the saturation principle. We used a grounded theory methodology approach, starting with a deductive process and moving to an inductive analysis. The data obtained from the participants was coded and analyzed, focusing on the associations among the themes to develop a theory. **Result:** This study found eight main themes: 1) Poor parent compliance with school junk food regulations, 2) Poor parent engagement in promoting healthy eating habits and physical activity, 3) Early introduction of unhealthy diets, 4) Physical activity periods in some schools are below the CBSE and WHO recommendations, 5) Junk food advertisements, 6) Increase of physical inactivity and sedentary habits due to the Covid-19 lockdowns, 7) Insufficient school activities as part of the curriculum to promote behavioral change for healthy eating in students 8) Scarce outdoor spaces and playgrounds available in the city. **Conclusion:** Although there are existing guidelines and programs in India to prevent Obesity in school students, private schools face challenges in implementing these guidelines, such as poor collaboration among parents, deficient school programs to address behavioral change, and unhealthy environments outside the school. Strengthening the current programs to address such problems, including the parents' collaboration, is critical to improving children's and adolescents' dietary and physical activity habits. Additionally, the need for more monitoring of the current programs decreases school compliance and continues to be a threat.

**Keywords:** Obesogenic Environments, Nutrition, Physical Activity

PP-2023-0135

**Abstract Title: Knowledge, attitudes, practices, and perception about the nutrition labels and Front of Package food labels affecting the purchase behaviour of consumers – A Systematic Review**

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**Background:** Nutrition labels and Front of Package food labels (FoP) helps consumers to make healthier food choices and reduce the incidence rate of diet related diseases. as they provide detailed information about the nutrients available in the packaged food items. The objective of the study is to assess the knowledge, attitude, practices, and perceptions on nutrition labels and FoP that effect the purchase behaviour of the consumers. **Methods:** A detailed literature search for research articles published in the English language between January 2013 to March 2023 was conducted in four databases viz. PubMed, Science Direct, Web of Science and Scopus using robust MeSH terms and keywords. PRISMA guidelines were followed to prepare the review. The searched articles were uploaded in COVIDENCE Software. Initially the articles were screened by two independent reviewers for title and abstract followed by full text screening. A third reviewer was consulted in case of any query. Data from the selected studies was extracted in the MS Excel spreadsheet and results were synthesised. **Result:** Total 30 articles were included in the review of which 22 articles focused on the impact of nutrition labels on consumer knowledge, attitude, and practices followed by the consumers and 8 articles focused on the perceptions on front of pack labelling. The studies highlighted that nutrition labels helps to improve the knowledge, attitude and practices followed by of the consumers in making healthier purchase choices that will have positive impact on their good health and reduce diet related diseases. Ten papers clearly indicated that FoP could generate awareness and motivate consumers to make healthy choices. **Conclusion:** This systematic review suggests the formulation of new laws and policies regarding the nutrition labels or FoP that would help people to make healthy food choices and reduce incidence of diet related diseases.

**Keywords:** FoPL, purchase behaviour, Consumers Perception, Policy

**Abstract Title: “Exploring the Interplay: A Survey on Sleep Quality, Screen Time and Their Impact on Obesity”**

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**Background:** 1. To study the correlation between Screen time, Sleep quality and its impact on obesity across all ages, and Gender. 2. To establish simple methods and lifestyle modifications to curb negative impact of screen time and poor sleep on health. Hypothesis: Effective monitoring and reducing screen time along with implementing simple lifestyle modifications to improve sleep quality, can be powerful tool for enhancing overall health and well-being and preventing obesity. Obesity is one of the fastest growing health concerns worldwide in current times. As per NFHS-5 data, 23% of Men and 22.1% of women are obese in India. It also reveals 40% of women and 12% of men are abdominally obese in India. As per NFHS data, 3.4% of childhood obesity is seen in India. Obesity is always linked with increased risk of various other comorbidities like Diabetes Type -2, Hypertension and Cardiovascular diseases. Excessive screen time has a significant impact on rising rate of obesity as it can contribute to both a sedentary lifestyle and sleep deprivation creating a two-way relationship. Proposed mechanisms of impact of screen time on sleep quality of a person include -displacement of proper sleeping/ resting time with screen viewing, psychological stimulation and light exposure, and increased physiological alertness. Devices produce blue light which suppresses production of melatonin in our brain, which leads to difficulty in falling asleep. Delayed sleep is often linked with continuous sitting, night time munching, binge eating, drinking, smoking, indigestion and constipation. Often poor sleep results in waking up late and has a definite effect on skipping exercises/ gym/ yoga sessions or even skipping breakfast in mornings thereby disrupting the entire healthy daily routine of a person. Sleep deprivation along with increased exposure to screens results in negatively impacting the cognitive function, academic performances in case of students, work performances in employees and even relationship issues. The entire circadian rhythm of the person is badly affected with increased screen time especially 1-2 hours before sleep, which in turn causes insulin resistance, hormonal imbalance, increased stress levels, irritability and poor digestion issues. These all definitely result in increased obesity risk. **Methods:** Pilot Study: A detailed questionnaire was prepared (Google form) with information about age, BMI, occupation, medical conditions, sleep quality, screen time, physical activity, food habits, gap between screen time and sleep. This Google form was shared with wide spectrum of people across the country belonging to different ages and profession. (Total No. of responses- 40) . Based on the responses the participants were categorized into two groups: 1. Group1: Good Sleep Quality, Screen time < 4 hrs and BMI – Normal weight (18.5-24.9). 2. Group 2: Extremely poor sleep quality, Screen time >4hrs (10-11) and BMI-Overweight (>24.9). Methodology: Group II Participants were further contacted and interviewed in detail. Major factors shown by the people were: 1. Habit of Late-night TV, Mobile, Laptop viewing for entertainment or due to boredom. 2. Night Duties. 3. Professional projects, Academics, work from Home etc. 4. Depression and stress. 5. Inability to fall asleep leading to more screen viewing. Online counselling sessions were arranged for each of the 10 persons classified into Group -II for a period of 1month (September) every week for 45 Minutes. Counselling sessions included: 1. Detailed analysis of the sleep quality. 2. Ruling out other disturbing factors in sleep like- Noise, brightness in the bedroom, sleep apnea, thirst or cravings at night, frequent urination, stress etc. 3. Participants were given healthy tips to break the loop of screen timings especially at night by small pleasant physical activities like reading a book (not kindle or e-book), listening to music, going for a shower, walk after dinner, sunlight exposure in early hours of the day, adding aromas or fragrances in the bedroom. 4. Along with this, participants were given healthy diet plans to improve their food habits. 5. Participants were also advised to add some relaxation techniques during the day like meditation, prayers, breathing exercises etc. 6. Implementation of active lifestyle significantly helped in causing exertion at the night which significantly improved sleep quality. 7. Adolescents and students were encouraged to use apps which generate screen time reports and block the screen when overviewed, like Digital wellbeing etc. **Results:** After the counselling sessions the participants were again asked to fill up feedback forms with questionnaire related to quality of sleep, waking up in between at nights, energy levels after waking up and also were asked to check on their weight. Their progress week after week was keenly analyzed. After one month of counselling sessions about lifestyle modifications to improve sleep quality, reducing screen time, following a healthy diet and active lifestyle there was a good improvement found in the participants. Out of total 40 responses, 13 participants were categorized into Group-1, while other 27 participants were into Group -2. The result



was collected in the form of feedback forms (Google Form) with rating scores for sleep quality, screen timings and weight loss in kgs. After one month of counselling, out of 27 participants, categorized as Group -II, with high BMI and poor sleep quality, 10 participants showed improvement in sleep, reduction of screen time by 2 -3 hours especially before sleep time and also weight loss of range 1-2 kgs. **Conclusion:** The current study helped in establishing a clear correlation between screen time, quality of sleep and their impact on obesity. Effective monitoring of screen time and implementing simple strategies to reduce it can have a substantial positive impact on sleep quality which can in turn effect the overall health of a person. Effective monitoring of screen time: It is essential to make strategies which are custom made as per individual age, occupation, metabolic status etc. Children and Adolescents: • Parental monitoring is the need of the hour to put down screen time effectively as childhood obesity is directly linked with sedentary screen time of children for hours together. • Parental interactions, family time, play time and socializing will help in curbing this problem. Adults: • Implementing screen time tracking devices, apps to make one aware of screen time usage will help. Unnecessary use of social media apps needs to be controlled. • Engage in going out, sports, hobbies and socializing will have a good impact on bringing the screen time duration down. Seniors: • Interaction of family members will go a long way in cutting down of screen time in elders. • Encouraging them to socialize, pursue simple outdoor activities can also help. Developing simple strategies to improve sleep quality will a huge positive impact on the weight and overall health of persons, these include: • Following healthy food habits with balanced diet • Active lifestyle • Sleep-conducive environment at bed-time- No gadgets, dim lights, No noise, aromas etc. • Simple stress management techniques like meditation, breathing exercises etc. In summary the study highlights the multi-faceted relationship between screen time, sleep quality and their impact on weight gain. By addressing sedentary aspects of screen time and sleep related issues, individuals can better manage their weight and reduce obesity risks. The findings in the study underscore the importance of managing screen time, implementing healthy sleep practices to promote better overall well-being. Additionally, public health campaigns and policies play a role in raising awareness of consequences of excessive screen time and poor sleep quality on overall health of individuals

**Keywords:** Sleep Quality, Screen, Obesity, Hormones

**OP-2023-0029**

**Abstract Title: Relationship between perceived stress, emotional eating and food choice among students preparing for NEET.**

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**Background:** Stress and emotional eating are the two phenomena that are commonly experienced by students preparing for competitive exams. It is a major issue of concern as the student's food choice may get influenced by these factors. The study conducted on students appearing for NEET attempted to identify a relationship between perceived stress, emotional eating and food choice. **Methods:** Purposive sampling was employed to obtain the samples. Perceived stress scale, emotional eater questionnaire and food frequency questionnaire were used to assess stress, emotional eating and food habits among the students respectively. **Result:** Results showed that 39% of the students experienced high stress while 69% of the students were emotional eaters. There was a significant difference observed between male and female respondents to stress. Night time snacking and coffee were significantly associated with emotional eating. Furthermore, emotional eating correlated to perceived stress among NEET students. **Conclusion:** The study implies that there is a need to acknowledge the influence of emotions and stress levels of subjects on their eating behavior and NEET scores and measures must be taken for the student's holistic well-being.

**Keywords:** NEET, perceived stress, emotional eating

# HEALTH POLICY RESEARCH

OP-2023-0056

**Abstract Title: Assessing Extent of Agricultural Diversification for Informed Nutritional Interventions**

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**Background:** Since time immemorial, agriculture has stood as humanity's most fundamental occupation, as sustenance remains an indispensable requirement for all living organisms. Despite the substantial advancements brought about by the adoption of Green Revolution technologies in the past, the persistent challenges of hunger and malnutrition endure. In light of the inherent limitations of horizontally expanding agricultural land, the only viable recourse is to explore vertical expansion through the avenue of agricultural diversification. Furthermore, researches underscore agricultural diversification as a viable strategy for elevating nutritional status, operating through two pivotal pathways: first, by diversifying the spectrum of production that can be consumed within households, and second, by potentially augmenting household income through the diversity of marketable products

**Methods:** In the state of Uttarakhand, a study was undertaken to appraise the extent of diversification practices, discern their advantages, and elucidate the relationships among specific profile characteristics of ninety farmers. **Result:** It was revealed that most farmers practiced a medium extent of diversification with common enterprise mixes being field crops combined with vegetables & dairy or just field crops & dairy. Reduced dependence on mono-cropping was the major significant perceived benefit. There was a significant association between extent of agricultural diversification and total land holding, total annual income, economic motivation, information seeking behaviour & media ownership among farmers. Education had negative & non significant relationship with extent of agricultural diversification. **Conclusion:** In light of these findings, the study's ultimate conclusion underscores the paramount importance of appraising the degree of agricultural diversification in a given area as the cornerstone for the planning and implementation of effective nutritional interventions. Such assessments ensure that interventions are meticulously tailored to the specific regional context, harmoniously aligned with local agricultural practices, and attuned to dietary preferences, ultimately culminating in an amelioration of nutritional outcomes and enhanced food security within the community.

**Keywords:** Agricultural Diversification, Nutritional Intervention, Enterprise mix, Benefits

OP-2023-0066

**Abstract Title: A Comprehensive Survey of Consumer Attitudes and Purchasing Habits Regarding Edible Oil Claims"**

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**Background:** Fortification and enrichment methods are employed to enhance the nutritional value of oils. Consumers should be made aware of the health benefits associated with different types of vegetable oils. Detailed information about sourcing, production, and testing processes on the content label is valued by consumers. It emphasizes the importance of understanding consumer preferences to enhance product sales and offers recommendations, such as prioritizing quality, innovative packaging, and targeted advertising through claims. However, choosing the right edible oil is crucial for overall health, preventing some of the non-communicable diseases. Thereby, understanding consumer behaviour is essential for businesses, both for their existing products and new launches and also for policy makers. **Methods:** The study investigated the Impact of four factors (frequency of oil use, brand loyalty, oil knowledge, label awareness) on claims perception through a convenient sampling method which focused on gaining information from participants based on their accessibility and willingness to

participate. Secondary data in the form of images attached of edible oil labels were shown to consumers (without disclosing the brand name) in the online structured questionnaire **Result:** The data was analysed using correlation analysis on Consumer behaviour and - Brand loyalty to edible oils - Frequency of use of edible oils - Knowledge of edible oils - Influence of labels on packaging, - Perception of nutrition claims and health claims on edible oil. **Conclusion:** The concept of consumer behavior and its sub factors, which include brand loyalty, frequency of use, knowledge towards edible oil, and awareness of labels claims contribute to a common overarching factor as the “perception of nutritional claims and health benefits.” This implies that consumer’s behaviour, loyalty to brands, frequency of product use, understanding of edible oil properties, and awareness of nutritional labels; all play a role in shaping their perception of how nutritional and health-related claims are presented by different products.

**Keywords:** label claims, consumer attitude, awareness

**OP-2023-0067**

**Abstract Title: A Study on the Acceptance of Diabetes Self-management Education mHealth among type 2 Diabetes in Aizawl, Mizoram**

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**Background:** With mHealth services possessing potential benefits and their advancement in health care services. The purpose of the study is to investigate the acceptance of mHealth for diabetes self-management education. **Methods:** The Technology Acceptance Model (TAM) was used as a theoretical framework to measure the perception using perceived ease of use and perceived usefulness of the Mizo diabetic population. Data was collected from 256 diabetes patients attending a clinic in Aizawl, Mizoram. **Result:** The results shows that both perceived ease of use and perceived usefulness show positive acceptance of mhealth with the mean for all items above four exceeding the midpoint three on the scale and playing an important role in individuals’ acceptance of mHealth services. **Conclusion:** Our findings reveal that there is a positive acceptance of mHealth among diabetic patients and encourage the health care provider to develop mHealth for the self-management of diabetes.

**Keywords:** Diabetes Education, mHealth, Technology Acceptance

**OP-2023-0091**

**Abstract Title: “Healthy Eating and Living Among Adolescents: A Mixed-Methods Exploratory Study Combining Participatory Learning Action and Integrative Review”**

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**Background:** The determinants of healthy diets and lifestyles are multifaceted and dynamic, ranging from an individual’s biological and individual issues at micro level to macro elements such as the food environment, economic and sociocultural surroundings. While adolescent experiences are often overlooked, this study used a mixed method approach to examine the factors influencing their dietary choices and lifestyles. **Method:** The study used a mixed methods approach to combine evidence from an integrative review and participatory learning action (PLA) methods. The methodology was divided into two parts - firstly, thorough review of qualitative and quantitative studies was conducted from relevant databases which captured conceptual models, frameworks, indicators and determinants of healthy eating and living through an integrative review method. The findings from the studies were categorised as per themes emerging from coding of the review. The second part of the study used the

“Graffiti wall” – a qualitative participatory learning appraisal (PLA) tool wherein adolescents (n= 40) wrote their central idea of healthy eating and living on blackboards by giving catchy phrases and titles while discussing their barriers and facilitators towards healthy lifestyle and diet. Thematic analysis was used to identify the individual and collective factors contributing towards the lifestyle of adolescents. **Result:** The analysis of the findings from the literature review and graffiti wall tool led to the emergence of three categories of determinants: individual, social and societal with various overarching themes such as taste and flavours, convenience, availability and accessibility contributing to distorted portions. Peer influence, parental dynamics and influence, socioeconomic status and access to nutritious foods within the household affected their dietary behaviours and lifestyle. Nutritional knowledge emerged as critical factor, highlighting the importance of nutrition education and interventions. Stress was a significant factor leading to unhealthy food choices and increased screen time. Social media usage created dependence, reduced sleep, limited outdoor physical activities and showed a high influence of celebrities on their body image perception. **Conclusion:** The key determinants identified through this mixed methods approach -diet, physical activity sleep, stress and screen time need attention for the development and assessment of adolescent interventions.

**Keywords:** Adolescents, Lifestyle choices, Mixed methods

**OP-2023-0092**

**Abstract Title: A Study on Identifying the Determinants of Food Nudges among Urban Adolescents**

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**Background:** Adolescents are exposed to an obesogenic food environment which directly influences their food choices and contributes to the obesity epidemic. Addressing this concern, this study investigates the concept of nudging, which involves altering the choice architecture to influence food choices. Specifically, the research aims to bridge a critical gap in scientific literature by identifying key determinants of food nudges among Indian urban adolescents residing in two metro cities, Delhi and Hyderabad. **Methods:** It was a cross-sectional study that used a mix-methods approach. The quantitative phase employed a pre-tested questionnaire, and in-depth interviews were used for the qualitative phase of the study. The two cities were stratified into two geographical zones (old and new zones). From each zone, two co-educational schools were randomly selected (one government and one private). Thus, four schools from each city were chosen for the study, for a total of eight schools, and subjects (n=869) were adolescents studying in 8th and 9th grades. Qualitative in-depth interviews with adolescents, teachers, and parents (n=11) were conducted in Hyderabad. Data analysis included descriptive statistics (percentage, standard deviation, mean) for the quantitative phase and thematic analysis for the qualitative phase. **Result:** The findings underscore that for majority of adolescents, taste is always the major nudge to buy outside foods followed by peer influence and trendy foods. A significant relationship ( $p<0.05$ ) was found between parents educational status, food price and availability. Many adolescents were swayed by the visual appeal of food, celebrity endorsements, food advertisements, marketing strategies, social media, nutrition claims, and food product placement. Furthermore, family practices can act as a positive nudge for healthy food selection. **Conclusion:** In view of limited research in this domain, this study lays the groundwork for future investigations. It highlights the urgency of designing a choice architecture that encourages nutrition-friendly selections among adolescents. By comprehending the determinants of food nudges in this context, researchers and policymakers can collaborate to develop effective interventions, promoting healthier dietary choices among adolescents and addressing the pressing issue of adolescent obesity.

**Keywords:** Adolescents, food nudges, food choices

**OP-2023-0099**

**Abstract Title : Recalibration of the Framingham risk score for predicting 10-year risk of cardiovascular diseases: Analysis for the APCAPS cohort**

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**Background** :The Framingham risk score (FRS) is a commonly used cardiovascular diseases (CVD)-risk prediction score in Indian setting because it (i) Considers CVD risk-factors that are relevant for Indian setting; (ii) Considers several CVD conditions (coronary heart disease (CHD), cerebrovascular disease (stroke), heart failure, peripheral vascular diseases) with a common set of risk-factors; (iii) The information for the included risk-factors in the FRS can be obtained at primary-care provider level; and (iv) Had shown good discrimination in previous studies conducted in hospital-based setting. However, as the Framingham Heart Study (from which FRS was developed) was done on a white US-based population, its recalibration in Indian setting is necessary for its application at Indian level, to decrease the chances of over- or under-estimation of CVD risk. Therefore, we have recalibrated the FRS-CVD for the urbanizing-villages in southern India and assessed the effect of recalibration on proportion categorised as high risk (predicted CVD-risk >20%). **Methods**: The Andhra Pradesh Children and Parents Study (APCAPs) is an intergenerational cohort of ~6,500 participants (current mean age ~45 years, 47% women) from 29 villages near Hyderabad; established in 2003 to explore the determinants of premature CVD development in Indians. Between 2010-12, using standardized protocols, detailed data on CVD risk-factors (e.g. diet, activity, blood pressure, and fasting biomarkers) were collected for cohort participants. Using 2010-12 cycle data and a 10-year estimated survival (men ~0.90, women ~0.93) derived using WHO-2012 data for India, we have calculated the future 10-year absolute CVD-risk using with and without recalibrated General- (Gen-CVD-FRS) and Simplified- Framingham CVD-Risk Score (Sim-CVD-FRS) developed by D'Agostino et al. (2008). Generalized-CVD-prediction scores (Gen-CVD-FRS) considered: Age, total- and HDL-cholesterol, systolic blood pressure (SBP), anti-hypertensive medications, smoking, and diabetes status. Simplified-CVD-prediction scores (Sim-CVD-FRS) considered: Age, body mass index, SBP, anti-hypertensive medications, smoking, and diabetes status; (variables which do not require laboratory testing). For this analysis, we included participants age 30-74 years with no previous history of CVD and no missing values for the relevant covariates (n~3000). Additionally, we calculated the lifetime predicted CVD-risk using algorithm developed by Lloyd-Jones et al. Lifetime CVD-risk referred to risk of all atherosclerotic CVD (myocardial infarction, coronary insufficiency, angina, atherothrombotic stroke, intermittent claudication or CVD death). Low short term CVD-risk is defined as a 10-year absolute CVD-risk  $\leq 10.0\%$ ; High short term CVD-risk is defined as a 10-year absolute CVD risk >10.0% **Result**: Based on Gen-CVD-FRS scores, 19.80% (273) of 1382 males had a 10-year CVD risk >20% compared to 19.80% (273) with recalibrated scores. Among 1585 females, 3.9% (62) had a 10-year CVD risk of >20%, using original FRS-CVD scores and 10.0% (159) using recalibrated scores. Based on Simplified-CVD-FRS scores, 19.6% (271) males had a 10-year CVD risk >20%, compared to 19.5% (269) with recalibrated scores. Among 1585 females, 3.5% (55) had a 10-year CVD risk of >20%, using original FRS-CVD scores, and 9.6% (152) using recalibrated scores. Among low-risk participants (CVD-risk  $\leq 10.0\%$ ), ~60% males and ~30% females had high lifetime predicted CVD-risk. **Conclusion**: For males, the predicted CVD-score was nearly similar between recalibrated and original FRS scores. Whereas, the recalibrated CVD-FRS showed a greater proportion of the female population at high risk of CVDs compared to the original CVD-FRS scores.

**Keywords** :CVD, FRS, India, Risk-prediction, Recalibration

**OP-2023-0109**

**Abstract Title: Nutritional knowledge or nutrition literacy and its impact on dietary intake among Indian students-A review**

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**Background:** Nutritional knowledge and literacy is broadly defined as knowledge of the concepts and processes related to nutrition and health. Nutritional knowledge or nutrition literacy is directly affecting the behavior and attitude of people towards their choices of selecting food from all food groups to maintain good health and immunity. However, studies to date have summarized the existing nutrition knowledge among Indian students and its effect on diet pattern. **Method:** This review was conducted to evaluate the impact of nutritional knowledge or nutrition literacy on the implementation of healthy eating pattern and also suggesting expected methods to improve the behavior and attitude towards healthy eating from the existing published research of India. The data for the review sourced from electronic databases PubMed, science direct, scholarly and ICMR and a predefined search term strategy. **Result:** Previous studies conducted in different Indian regions highlighted that poor knowledge and attitude were significantly associated with insufficient dietary intake. However nutrition education intervention studies using the educational session and counseling methods showed a significant change in the level of knowledge and attitude towards healthy dietary intake among college and school students. Studies reported an overall increase in 10-20% increase in attitude and nearly 50% increase in knowledge related to healthy eating habits. **Conclusion:** More studies need to be conducted in different Indian settings (location and socio-economic groups) to assess the effect of nutrition education intervention on different aspects such as how to include cost effective sessional foods and nutritious eating at home and outside. Future studies should be conducted to assess the nutrition knowledge and attitude towards improvement in dietary intake.

**Keywords:** nutritional knowledge, knowledge assessment, dietary

**PP-2023-0152**

**Abstract Title: EXPISCATORY OF THE CRYPTIC OF DRAVIDIAN CUISINE (TAMIL CUISINE) IN DIABETES**

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**Background:** Life and growth of all organisms are based on food. Thus, searching for food has become the basic activity of all living beings. Sangam society was based on life in Kurinji and other four lands (Mullai, Marutham, Neithal and Paalai). Each land has specific source of food and livelihood. Dravidian cuisine comprises of all these five lands food culture. Dravidian cuisine, particularly Tamil cuisine, is known for its flavors and culinary traditions. This study endeavors to explore the hidden facts of Dravidian cuisine, with a specific focus on Tamil cuisine, to find out the recipes with potential anti-diabetic properties. The primary aim is to frame a cyclic menu comprising these recipes from tamil cuisine for diabetes. The menu comprises recipes made from millets, which is called as "thinai" or "siruthaaniyam" in tamil. **Method:**The methodology encompasses the analysis of traditional Dravidian recipes, emphasizing the anti-diabetic property of the ingredients. These selected recipes were used to design a cyclic menu with adequate and balanced nutrition. Nutritional analysis was being done to ensure the menu's compliance with diabetes dietary guidelines. Finally, recommending the menu for 50 young adult respondents (18-35 years) after the validation from the dietitians. **Result:** About 90 percent of the respondents were not aware of the benefits of Dravidian cuisine. After the awareness, every respondent were benefited from the prepared cyclic menu and got aware on the benefits of the Dravidian cuisine. **Conclusion:** The findings of the study is the creation of scientifically grounded anti-diabetic Dravidian menu, which creates an opportunity for individuals with diabetes to enjoy the flavors of this culinary tradition while effectively managing their condition. This research contributes to the area of diabetes care by utilising the medicinal potential of Dravidian cuisine and helps in potentially improving health outcomes for patients with diabetes.

**Keywords:** Tamil cuisine, Millets, Menu, Recipes,

**OP-2023-0229**

**Abstract Title: Effectiveness of School-Led Nutrition Training Program on the Knowledge, Attitude, and Practices of Rural Adolescent Population in Gujarat.**

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Research fellow, Gujarat University, Ahmedabad; Mr. Tarun Yogi, Research scholar, Gujarat University, Ahmedabad; Ms. Vidhi Shah, Research scholar, Gujarat University, Ahmedabad.

**Background:** With a global nutrition transition, the burden of double malnutrition among adolescents is becoming increasingly prominent. Projected to have one of the world's youngest populations through 2030 (UNFPA Report), India witnessed approximately 20% of deaths in the 10-19 age range attributed to NCDs in 2019 (UNICEF, 2021). Schools offer a vital setting for addressing nutritional concerns, providing scalable solutions to reinforce health messages and combat all forms of malnutrition. Our study thus aimed to assess changes in knowledge, attitude, and practices among adolescents after integrating nutrition education into their regular study sessions under the flagship program Nestle Healthy Kids Program (NHKP) by Nestle, INDIA. **Methods:** A nutrition training program was carried out in government schools (n=12) of Ahmedabad district, India, over a period of two years. Each student received 12 hours of nutrition education. A pre- and post-test research was conducted to evaluate the KAP (Knowledge, Attitude, and Practice) of students (n= 1,418) in grades 6, 7, 8, and 11, regarding nutrients. The test included 20 closed-ended questions on macro and micronutrients, physical activity, and hygiene. On a scale of 0-20, scores were categorized as 0-6 (poor), 7-12 (acceptable), and 13-20 (good). The sessions used a specially designed NHKP module, modified to align with regional needs and presented in the local language (Gujarati), with images of local foods. It covered six chapters: Macronutrients, Micronutrients, The Importance of a Balanced Diet, Health and Hygiene, NCDs, and a Summary. Interactive games and audio-visual aids were developed to capture students' interest and attention. KAP scores were analyzed using appropriate statistical methods. **Result:** Significant improvement in KAP levels of students was observed during both terms of study. The knowledge score of students increased from  $8.32 \pm 2.36$  to  $13.68 \pm 2.31$ , with an average knowledge increment percentage across schools improving to 84.15%. Students of 6th-8th std exhibited the most significant changes in attitude and practices while the smallest change was seen in the 11th std. **Conclusion:** Utilizing schools as a primary platform, strategically planned curricula, and activities can bring statistically significant ( $p < 0.05$ ) enhancement in nutrition awareness among adolescents, ultimately resulting in positive behavioral changes concerning the food choices of today's adolescents.

**Keywords:** Nutrition-education, Adolescent-health, Public-health, Nutrition-awareness, Nutrition-knowledge

OP-2023-0231

**Abstract Title: Nutritional Status Assessment and Awareness of Millets in Complementary Feeding Practices among Caregivers of Malnourished Children in Urban Slums of District Lucknow.**

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**Background:** Central to the sustenance of adequate nutrition and optimal growth during infancy and early childhood are the practices of complementary feeding. These practices, encompassing the introduction of solid foods alongside breastfeeding, play an influential role in laying the foundation for a child's future health and developmental outcomes. The intricacies of complementary feeding, if not approached with informed awareness, can inadvertently hinder a child's growth trajectory. **Objective:** 1. To assess the nutritional status of the children. 2. To study complementary feeding practices among caregivers of malnourished children. 3. To implement and measure the impact of intervention education regarding awareness of millets-based complementary foods among caregivers. **Methods:** Quasi-experimental design was used to collect sample for this study. A sample comprised of 400 mothers included their 400 children from different urban slum areas of Lucknow, Uttar Pradesh. Selected children aged 6–24 months, from the eight AWW situated in sectors of blocks were enlisted with the help of birth records and survey registers of Anganwadi workers (AWW) at each Anganwadi Centre (AWC). Mothers were interviewed using a structured questionnaire to assess the current complementary feeding practices and prevalent food misconceptions among mothers. For anthropometry assessment, weight and length were measured with the help of an electronic weighing machine and an infantometer. Data was analyzed using SPSS for frequency, percentage, and chi-square tests. **Result:** The nutritional status of children showed that more than half of the population (51.5%) was malnourished, and out of 400 children, only 32.3% had delayed complementary feeding

initiation. The majority of mothers had average knowledge (52% knowledge) regarding complementary feeding. The intervention was highly effective in improving the treatment group's nutritional status, reducing acute malnutrition, and increasing the percentage of 'Normal' status. The findings underscore the importance of targeted nutritional interventions in improving children's nutritional status. The present study shows the importance of targeted nutritional interventions in improving children's nutritional status. **Conclusion:** Good nutrition forms the basic foundation of health throughout life. Most mothers and health workers know little about how much food a child needs for adequate growth and development. Hence, the advice given is often inaccurate and conflicting. Also, there is a heavy influence of advertisements and the internet on day-to-day life. There is a need for parental education for sound and correct child rearing practices and, in particular, advice on how, when, and why to feed the child from what is easily available in the household. The gap between knowledge and practice should be filled with proper interaction and education.

**Keywords:** Complementary feeding, malnutrition, nutritional status.

**OP-2023-0121**

**Abstract Title: MILLET CONSUMPTION AND PURCHASING BEHAVIOUR AMONG SELECTED OBESE YOUNG WOMEN OF COIMBATORE**

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**Background:** Millets are a category of resilient, small-seeded grain that have been traditionally grown in India for millennia. They have attracted attention in recent years due to their nutritional content, resistance to poor growing circumstances, and capacity to tackle food as well as nutrition security. Apart from India, millets are becoming increasingly popular on a global scale and are currently accepted as 'smart foods' and are included in diets around the world. However, developing diets requires knowledge with regard to a population's accessibility and awareness about these smart foods, and the present study was conducted to understand consumption and purchasing behaviour of millets among the selected residents of Coimbatore. **Method:** A cross-sectional study design with snowball sampling among 328 participants aged between 25 to 40 years was implemented. A pre-tested questionnaire was utilised to collect the responses of the participants regarding the awareness of existing millet types, millet recipes, factors influencing their preferences and the reasons for inclusion of millets in their regular diets. **Result:** The majority of respondents were female (82.9%), under-graduates (67.3%), and belonged to medium to high income groups (63.21%). According to the perception of the study participants regular millet intake was determined to be substantially low. Sorghum was the most preferred variety (45.17%) followed by Pearl (21.2%) and others. Considering the factors determining the consumption frequency of millets and the criteria of being preferred, taste (34.17%), colour (26.33), and cooking method (20.17%) took precedence over price (19.30). The consumption pattern of respondents highlighted the non-regular availability of millets in local markets (30.05%). The study also revealed that most participants failed to include millets in their meals because millets were perceived to have a lower shelf life compared to other whole grains (28.70%), and were unaware of the proper cooking or preparation methods of millets (13.29%). **Conclusion:** It is necessary to allow pragmatic, viable information to be made available to individuals in the form of education modules that need to be developed and popularised in local languages so as to include millets into regular household meals, which will ensure a population that can create, cultivate and consume millets for better health.

**Keyword:** millets, consumption, education modules, health

**OP-2023-0130**

**Abstract Title: "Reversing the Rising Trend of Stunting in Meghalaya: A Public Health Priority"**

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**Background:** The prevalence of stunting, a critical indicator of chronic malnutrition, has shown an alarming upward trend in Meghalaya, India. Despite a significant reduction from 55.1% in NFHS-3 to 43.8% in NFHS-4, the latest National Family Health Survey (NFHS-5) reports an increase to 46.5%. This reversal underscores the urgency to reassess and strengthen the existing nutritional interventions. **Method:** Our study aims to investigate the underlying causes of this increasing trend and propose evidence-based strategies to combat stunting effectively. We will examine the maternal height that contributes to stunting. The last 3 rounds of NFHS Data will be used. Binary Logistic regression and trend analysis will be done to get the results. All the analysis will be performed using STATA 17 and MS Excel. **Result:** In Meghalaya, the average height of mothers, at 148 cm, is the shortest among all Indian states. This is significant as there is a strong correlation between maternal height and stunting in children. Stunting, a critical indicator of chronic malnutrition, has been on the rise in Meghalaya. The increase in stunting is an outcome of the short stature of Meghalayan mothers. However, a secular change in height, which could potentially reduce stunting, will take considerable time. Even to reach the Indian average, it requires a long-term commitment to improving nutrition and health services. Therefore, while addressing child nutrition, it's equally important to focus on improving maternal health and nutrition. This dual focus can help break the intergenerational cycle of malnutrition and pave the way for a healthier future for Meghalaya. **Conclusion:** The findings from this study will provide valuable insights for policymakers and health professionals to design and implement effective strategies for reducing stunting in Meghalaya. The goal is not only to reverse the current trend but also to ensure sustainable progress in improving child nutrition and overall public health.

**Keywords:** Stunting, Malnutrition, Meghalaya, NFHS, Height

OP-2023-0148

**Abstract Title: A Systematic review on diet history of oedematous malnutrition in children between 0-5 years globally.**

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**Background:** Severe Acute Malnutrition (SAM) is pervasive and fatal throughout the world. Based on the presence of oedema and nutritional deficiency, SAM is classified into Oedematous malnutrition (OM) and Non-oedematous children (NOM) indicating the presence of pitting or bilateral oedema. There had been conflicting theories in etiology with regard to the role of diet (protein) in children with OM. **Method:** A Systematic Review adhering to PRISMA Guidelines was carried out to assess the diet history in OM from January to May 2023. We searched PubMed and Google Scholar using a Boolean search strategy. Two authors reviewed all the abstracts and studies that did not report diet were excluded. The studies were divided based on the type of the study and themes were developed. Meta-Analysis was conducted using R programming software using Metabin package to assess the odds ratio (OR) along with 95% confidence intervals (CI) for current breastfeeding in children with OM and NOM in case control studies. **Result:** We screened 1505 reports with full texts out of which records sought for study were 354 and finally categorized the eligible records into case series and case reports (74), cross sectional studies (28) and case control studies (16). Highest number of case reports and case series were reported from the USA and maximum were reported during the year 2001. Milk intolerance, milk allergy, poor dietary intake and intake of protein deficient diets were the key themes from case reports and case series. Delayed supplementary feeding, early weaning, lifestyle changes, artificial feeding and shorter duration of breastfeeding were the key themes from cross sectional studies. Meta-analysis of 5 case control studies revealed that the odds of currently not being breastfed in children with OM were significantly higher than NOM. Both common and random effects models were found to be significant. The common effect model had an OR of 2.42 [CI: 1.59-3.68] whereas the random effect model had an OR of 2.93 [CI 1.50-5.73]. **Conclusion:** Absence of breastfeeding and lack of good quality protein are important determinants of children developing OM than NOM.

**Keywords:** SAM, Kwashiorkor, Breastfeeding, Diet, Oedema

OP-2023-0204

**Abstract Title: Relationship of orthorexia nervosa with personality and perfectionism among nutrition students and gym goers**

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**Background:** Covid-19 has indeed brought with it a flood of changes, in almost all aspects of life. One of the aspects has been nutrition. The idea to boost one's immunity and stay healthy has indeed taken a center stage, however, undue overemphasis has negative implications, and one such looming danger is an obsession with good nutrition, meaning orthorexia nervosa. In orthorexia nervosa, one is known to limit their food consumption to such a degree that their wellbeing declines because of their search for an ultra-healthy diet. Being a relatively new concept, research has found a high sense of control and perfectionism as potential catalysts in developing orthorexia nervosa, while emphasizing the vulnerability of the population actively involved in engagement of physical activity and in possession of nutritional knowledge. **Methods:** The present study attempted to investigate the relationship between orthorexia nervosa, personality and perfectionism among gym-goers and nutrition students. The sample comprised 74 participants (38 gym-goers and 36 nutrition students). Out of 74 participants, 40 were females and 34 were males. The age range of the entire sample was between 21-25 years. Standardized tests such as ORTO-15, Big Five Personality Scale (NEOPII) and Multidimensional Perfectionism Scale (MPS) were administered to assess the orthorexia nervosa, personality and perfectionism respectively. **Result:** The collected data was analyzed using Mean, SD, Spearman Rho and Mann Whitney U. The results highlighted a significant relationship between perfectionism and orthorexia nervosa. **Conclusion:** The implications of the present study are in the provision of direction in developing interventions for the population of concern.

**Keywords:** Perfectionism, Personality, Eating Disorder, Orthorexia

OP-2023-0210

**Abstract Title: Changing pattern of Severe Acute Malnutrition among children in Maharashtra**

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**Background:** Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilization. Out of all forms of malnutrition, Severe Acute Malnutrition (SAM) is one of the most devastating conditions responsible for a 9-11 times higher risk of mortality and morbidity among affected children than well-nourished children. Maharashtra, considered one of India's most economically developed states, still has a persistently high prevalence of SAM. Therefore, there was a need to understand the changes in region-wise SAM trends in Maharashtra and the change in dietary patterns among children. It will enable the policymakers to identify the focus areas and plan the region-specific nutrition policies. **Method:** For this study, the study population was children residing in the state of Maharashtra. The information was obtained from NFHS – 4 and NFHS – 5 databases. The changing pattern in the prevalence of SAM among children in six administrative regions of Maharashtra was studied between NFHS – 4 and NFHS – 5 using descriptive analysis. The Minimum Dietary Diversity (MDD) among these children was calculated and correlated with the changing pattern of SAM among the study population. **Result:** The analysis showed that the SAM prevalence in Maharashtra has increased from 9.4% to 10.9% since NFHS – 4. The study observed overall growth in the prevalence of SAM since NFHS – 4 in all the regions of Maharashtra except the Mumbai Region. The highest growth in the prevalence of SAM was found in the Nagpur region (4.22%), followed by the Amravati region (3.97%). The SAM and MDD were found to be correlated. **Conclusion:** This study showed that despite the nutrition-sensitive policies and efforts by the Maharashtra government, the level of SAM among children is rising in almost all regions. It highlights the need for region-specific measures in the state to overcome the challenges and to re-orient the nutrition efforts by the policymakers.

**KeyWords:** SAM, MDD, NFHS, Maharashtra, Children

OP-2023-0227

**Abstract Title: Social Media Usage and Advertising Food-Related Content: Influence on Dietary Choices of Young Adults**

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**Background:** Excessive social media usage in the current times and high rates of food advertising can impact the health status of individuals by increasing food cues related to perceived hunger and thus dietary behavior. **Methods:** A cross-sectional study was carried out amongst 314 young adults between the ages 18-25 in Surat. Data was collected for social media usage, most used platforms, preferred content, and eating patterns. Anthropometric measurements (height and weight) were also recorded. **Result:** YouTube and Instagram were the most used social media apps. There were no significant differences observed between BMI of those who use social media for 2 hours a day and those who use it 3+ hours a day. However, a significant difference between the BMI of those who viewed advertisements of Ready-To-Eat foods (p-value = 0.004) and between the BMI of those who viewed advertisements of Food delivery platforms was observed (p-value = 0.001). A significant difference between usage of Pinterest (p-value = 0.029); Instagram (p-value=0,047) and BMI was found. **Conclusion:** Thus, more studies need to be conducted in pan India to understand how social media marketing and food content is shaping the dietary choices of young adults.

**Keywords:** Social Media Influencer Food Porn

## CLINICAL NUTRITION

PP-2023-0008

**Abstract Title: A Study of Nutritional Status, Frailty, and Oral Health among Geriatrics**

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**Background:** The aging of the population, is no longer restricted to high-income developed countries as the older population is growing rapidly. Poor nutritional status and malnutrition are important areas of concern as they contribute to progressive decline in health, reduced cognitive function, premature institutionalization, and increased mortality. A further major concern for aging adults is frailty. Diet and nutrition can be compromised by poor oral health. The objective was to correlate nutritional status and frailty with oral health. **Methods:** A cross-sectional study was carried out among elderly 60 years and above residing in an old age home in Pune. The Mini Nutritional Assessment (MNA), Clinical Frailty Scale (CFS), Geriatric Oral Health Assessment Index (GOHAI), and Food Frequency Questionnaire (FFQ) were used for the assessment of the nutritional status, frailty scale, oral health, and dietary patterns respectively and their association was recorded. **Result:** A total of 80 individuals participated in the study including 27 (33.8%) males and 53 (66.2%) females with a mean age of 71.36±6.69 years. Out of 80 participants 15 (18.8%) were of normal nutritional status, 39 (48.8%) were at risk of malnutrition and 26 (32.5%) participants were malnourished, 10 (12.5%) were with well symptoms and were active occasionally, 16 (20%) were managing well and were not regularly active beyond routine walking, 21 (26.2%) were vulnerable and mildly frail with evident slowing and 12 (15%) participants were moderately frail. About half of the participants had teeth sensitivity issues sometimes or frequently and 50% of them never take medications related to dental problems. A significant correlation was found between BMI (p<0.05) and oral health (p<0.01) MNA screening score and oral health (p<0.05), MNA screening score category and oral health (p<0.01) and frailty with oral health (p<0.05) among the elderly. **Conclusion:** Oral health was associated with the risk of malnutrition and frailty among the study population. The increase in the limit of food consumption due to dental problems resulted in lower BMI and MNA screening scores and higher frailty scores.

**Keywords:** Geriatrics, Malnutrition, Frailty, Oral Health

PP-2023-0010

**Abstract Title: The Effect of a Whole Food Plant-Based Diet on the Biochemical Parameters of Chronically ill Patients**

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**Background:** Chronic diseases are a significant concern in India, responsible for 63% of all deaths, driven by factors like obesity, tobacco use, unhealthy diets, and sedentary lifestyles. The increasing prevalence of chronic diseases in India places a heavy burden on the healthcare system and the economy, as it leads to increased healthcare costs and reduced productivity. Addressing this issue requires a comprehensive approach, such as adopting a dietary lifestyle that is minimal or free from processed foods. This research aims to investigate the effectiveness of a whole food plant-based diet as an alternative approach to managing chronically ill patients, focusing on improving key biochemical parameters. The primary biochemical parameters under examination include blood glucose levels, blood cholesterol levels, HbA1c, and nitric oxide levels. **Methods:** This study employs a longitudinal design with intervention participants undergoing a 12-month intervention period. The intervention includes a whole food plant-based diet and regular motivational sessions to support dietary adherence and overall well-being. Data collection will be comprehensive, utilizing patient records, interviews, biochemical assessments and follow ups to thoroughly evaluate the impact of the intervention on the biochemical profiles of the participants. The inclusion of yoga, exercises, meditation sessions further enriches the study's holistic approach to improving the health of chronically ill patients. **Result:** This study to be performed has a potential for the reversal of heart diseases as well as other chronic diseases, with long-term acceptability and sustainability. **Conclusion:** The findings from this research have the potential to not only enhance our understanding of the role of nutrition in managing chronic diseases but also provide practical guidance for healthcare practitioners and patients alike. If the results demonstrate positive outcomes, it could signify a cost-effective and accessible intervention that complements traditional medical treatments, thereby improving the overall quality of life for individuals living with chronic illnesses.

**Keywords:** WFPB diet, plant-based, whole foods.

PP-2023-0020

**Abstract Title: Holistic Nutrition to Improve Fertility markers in women**

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**Background:** This study elaborates about the importance of Nutritious food along with Lifestyle changes that helped a group of women to improve their AMH levels thereby improving their egg quality and quantity. **Method:** The women patients were evaluated with detailed medical history that included their blood work, dietary recall along with their daily lifestyle. Taking into consideration of all these their meal plans have been designed with specific emphasis on their Lifestyle modifications too. Specific diet changes included the following: Starting day with good fats and protein rich nuts like Almonds, brazilnuts, pista and walnuts helps in regular ovulation leading to an increase in the number of their eggs. Daily intake of two servings of green leafy vegetables in meals that are rich in folic acid and fiber leading to an increased secretion of AMH. Two servings of Vitamin C rich fruits and vegetables for the antioxidant boost to reduce damage and aging of eggs. Three to four cooked garlic pods to get the glutathione that increases sexual desire and regularization of menstruation, preventing chromosomal defects thereby increasing secretion of AMH. Adding 1 teaspoon of pumpkin seeds and flax seed powders to their meals or buttermilk. These seeds are good source of zinc and other minerals that helps with the production of hormones like progesterone and AMH. Lifestyle modifications included Regular Exercise for minimum of twenty to thirty minutes that further helped them with weight management as well. Deep breathing techniques to manage their Stress as women facing fertility issues always have their cortisol levels raised. Regular exercise and deep breathing helped them improve their sleep quality thereby helping them with hormonal balancing. **Result:** Improving their AMH levels helped them to cope

up better with their IVF process further and few of the women have been advised to try for natural pregnancy based on their individual outcomes by the Infertility specialist. **Conclusion:** This study helped us to gain better understanding of the importance of Holistic Nutrition and specific functional foods by making the necessary dietary interventions and lifestyle changes play a major role in improving the fertility markers of women. This helped us be a little part of their happy pregnancy journey.

**Keywords:** Fertility AMH Nutrition Lifestyle Eggs

**PP-2023-0031**

**Abstract Title: Urinary metabolomic biomarkers of lysine supplementation in stunted children**

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**Background:** The risk of essential amino acid deficiency (EAAD), like lysine in cereal-based diets, can impact growth in young children. Lysine being the first limiting amino acid in cereal-based diets, is also associated with stunting. Developing a non-invasive urinary based metabolomic profiling for quick screening of EAAD in stunted children can be useful to design targeted nutritional therapies. **Methods:** A parallel group interventional trial of lysine supplementation (80 mg/kg/day in an orange flavored drink) was conducted in stunted (height-for-age Z-score <-2SD, n=24) 6-11 years, South Indian children to evaluate urinary biomarkers for EAAD, in comparison with control non-stunted children (n=27) who received an orange flavored placebo drink for 3-months. At baseline and monthly intervals, clinical examinations, height, weight, circumferences (cranial, forearm, upper-arm, waist), skin folds, muscle strength, food intake-recalls were measured, along with urine and blood sampling at baseline and end-line. The urine metabolome was analyzed by Q-Exactive orbitrap-based mass spectrometer using Compound Discoverer software (Thermo Scientific). Differences in anthropometry were analyzed by t-test and repeated measures models. **Result:** Anthropometric measurements were significantly different ( $p < 0.038$ ) at baseline between groups ( $p < 0.0077$ ). Preliminary urinary metabolomic profiles showed a difference between groups in lysine-related metabolites at baseline and alterations with lysine intervention. Metabolites of tryptophan degradation and utilization, threonine, methionine, cysteine, and branched chain amino acid biosynthesis pathways were altered at baseline between groups and with lysine intervention. The metabolites gly-leu, kynurenic acid, 6-oxo-pipecolinic acid, dimethylhistidine and pyridoxamine were found to be downregulated and 2-oxobutyric acid and 7-ketodeoxycholic acid were found to be upregulated that are linked with protein metabolism pathways specifically lysine degradation and can be used as non-invasive biomarkers of lysine sufficiency state in stunted children. **Conclusion:** Urinary metabolomic profiles showed a difference between groups in lysine-related metabolites at baseline and alterations with lysine intervention in various metabolites that can be used for screening the growth faltering at early stages towards designing targeted nutritional therapies. A validation of urine metabolomic profiles using the blood metabolomic profiles could provide more insights towards designing targeted nutritional therapies.

**Keywords:** Lysine, stunting, urine, metabolomics, intervention

**PP-2023-0073**

**Abstract Title: To evaluate the effect of Pre and Probiotic Capsules in Irritable Bowel Syndrome patients**

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**Background:** Irritable Bowel Syndrome (IBS) is a common functional gastrointestinal condition characterised by recurrent abdominal pain, bloating and alterations in stool habits. The global prevalence of IBS in the general population ranges from 9% to 22%, and its prevalence in India ranges from 4.0% to 7.9%. Recently, the gut microbiome has been implicated as a potential driver of IBS pathophysiology. Therefore, therapeutic targeting of the gut microbiota may be a potential treatment for

IBS. Probiotics, and prebiotics can improve the gut microbiota and limit colonization by pathogenic bacteria. Prebiotics act as food for good bacteria in the gut. They are degraded by gut microbiota and helps growth of healthy bacteria while the probiotics are live strains which increases count of good bacteria in the gut. Nutrilite Pre and Probiotic Capsules containing *B. coagulans* Unique IS2 claimed to reduced abdominal pain, discomfort and disease severity in IBS patients. With an aim to evaluate the effect of Nutrilite Pre and Probiotic Capsules for IBS we conducted a paper based survey **Methods:** The participants were informed about the objectives of the study and they were provided with a physical copy of a questionnaire. Questions used Likert-style responses where appropriate and aimed to take approximately 10 minutes to complete were designed. Participants were asked whether they had experienced 'complete resolution' 'some positive difference', 'no difference' or 'worsening' of their IBS symptoms 100 days after consuming the capsules. The symptoms were abdominal pain, distention, bloating, urgency and bowel habit satisfaction. **Result:** Of the 52, 61% (n=32) were male while 39%(n=20) were female. Among the enrolled cases 91%(n=47) reported improvements ('completely resolved' or 'some positive difference') in IBS after 100 days or more weeks of capsules. **Conclusion:** Nutrilite Pre and Probiotic Capsules is found effective in alleviating the symptoms like Abdominal pain, distention, bloating, urgency, and bowel habit satisfaction in IBS.

**Keywords:** Irritable Bowel Syndrome, prebiotics, probiotics

**PP-2023-0080**

**Abstract Title: Effectiveness Of Nutri Shots on weight Gain pattern among children Aged 4-5 years at selected schools In Thiruvapur district**

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**Background:** Malnutrition is a condition for being under-nourished or over-nourished. The under-nutrition is when a diet does not meet out their body needs for growth and development, and the over-nutrition is when a diet meet too much calories. The under-nutrition is a major problem for morbidity and mortality, especially in low and middle income countries that malnutrition causes more than 3 million child deaths worldwide under five years annually. Globally, many child mortality result from under-nutrition and more than half of the childhood mortality attributed to mild and moderate under nutrition. NH1 - There will be no significant effect in the pre and post test level of weight gain pattern among underweight children aged 4-5 years at  $p < 0.05$  level. AH1 - There will be significant effect in the pre and post test level of weight gain pattern among underweight children aged 4-5 years at  $p < 0.05$  level. **Methods:** A quasi experimental research design was adopted in order to assess the effectiveness of Nutri Shots increasing the level of weight gain pattern among underweight children aged 4-5 years. The sample size consisted of 40 underweight children (who fulfilled the inclusion and exclusion criteria) selected by purposive sampling method. The study sample include underweight children aged 4-5 years. The independent variable of the study is Nutri Shots. The dependent variable is weight gain pattern. The study was conducted in, The Merit Higher Secondary School and Gandhi Kamaraj Matriculation School at Thiruvapur district. The study includes the underweight children aged 4-5 years who are willing to participate the study, and the study excluded those who have normal range of BMI (above 15). The tool consisted of two points that is data collection tool and intervention tool. The data collection tool used in this study was self-structured questionnaire. After completion of pre test, the assessment of weight gain pattern were administered with Nutri Shots. The intervention was given for a period of 30 days. **Result:** The finding of the study revealed that administration of Nutri Shots for 30 days in increasing the weight pattern, state that there was a significant difference in pre and post test weight gain pattern among underweight children aged 4-5 years. The post test analyses on the weight gain pattern among underweight children aged 4-5 years revealed that the mean difference was 14.81 with paired value  $t = 8.561$  and  $p$  value 0.0001 which shows the weight gain pattern in post test was found statistically significant. Thus, the supplementation of Nutri Shots was more effective in increasing the weight pattern among underweight children aged 4-5 years. **Conclusion:** The findings proved that the Nutri Shots was efficacious in increasing the weight pattern among underweight children aged 4-5 years. The health care providers in their practice can use the Nutri Shots as nutritional supplement for



the prevention of under-nutrition. Hence, it can be used as an implied dietary intervention for increasing the weight pattern among children aged 4-5 years.

**Keywords:** Nutri Shots, Weight gain Pattern.

**PP-2023-0086**

**Abstract Title: Menstrual problems and dietary pattern among adolescent girls**

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**Background:** Adolescence is a life period with distinct health and developmental needs and rights. Menstruation is a normal occurrence that serves as an important sign of women's health by reflecting their endocrine function. Nutrient deficiency is caused by insufficient food intake, which leads to obesity in adolescents and has an impact on their general development since they are not getting enough nutrients to meet their needs. **Methods:** The cross-sectional study examined menstrual problems and dietary patterns among adolescent girls. The type of data collection method used was Questionnaire to assess their dietary pattern, physical activity, and menstrual problems. A total of 320 respondents participated in this study. The study was conducted in the school of Pune among adolescent girls aged 11 to 16 years. **Result:** The mean age of menarche was  $13.5 \pm 1.1$  years. The most reported menstruation disorder among these girls was Dysmenorrhea 180 (56.2%). The study reported frequent consumption of junk food and Indian foods in adolescent girls. Also noticed more consumption of bakery products and packaged foods on a daily basis. Girls had a habit of skipping meals 176 (55%). Girls who didn't participate in games were 133 (41.6%). A significant correlation was seen between participants who consume fruits and with menstrual problems (f value=2.216, p value= 0.041). A significant correlation was seen between participants who consume soft drinks, packed juices, and menstrual problems (f value=2.374, p value= 0.029). **Conclusion:** Menstrual abnormalities were causing problems in females. Menstruation may be affected by bad food habits and lifestyle variables, according to the study. Soft drinks and packaged juices were linked to menstrual issues. The majority of the girls consumed insufficient energy and protein.

**Keywords:** Menstrual problems, adolescent girls, nutrition

**PP-2023-0106**

**Abstract Title : ESTIMATION OF GUT INFLAMMATORY MARKERS CALPROTECTIN, MYELOPEROXIDASE AND NEOPTERIN IN SEVERE ACUTE MALNUTRITION.**

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**Background:** Severe acute malnutrition (SAM) or severe wasting, a life-threatening form of undernutrition, remains the highest contributor to morbidity and mortality in children, especially under five years. According to the National Family Health Survey-5, nearly 7.7% of children aged under five are severely wasted. SAM is associated with various underlying factors, including heightened intestinal inflammation. This study aims to understand gut inflammation and intestinal epithelial health in SAM. **Method:** The current case-control study was an attempt to evaluate gut inflammatory markers from fecal samples of 41 SAM and 41 age and gender-matched healthy controls under 5, recruited from Anganwadi Centres, to estimate levels of Calprotectin, Myeloperoxidase and Neopterin using Enzyme Linked Immuno-Sorbent Assay. **Result:** We recruited 82 children aged 6-59 months. In SAM children, Myeloperoxidase median concentration was 1453.6 ng/ml [range: 233.5 to 4833.7 ng/ml], Neopterin was 736.5 nmol/l [range: 36.1 to 4089.2 nmol/l], and Faecal Calprotectin (FC) concentrations varied by age: 6 months to 3 years - 144.4 mg/kg [range: 19.2 to 473.3 mg/kg], 3 to 4 years - 82.1 mg/kg [range: 10.5 to 177.8 mg/kg], >4 years - 169 mg/kg [range: 20.5 to 656.4 mg/kg]. Healthy children had Myeloperoxidase at 1014 ng/ml [range: 15.3 to 3949.1 ng/ml], Neopterin at 580.2 nmol/l [range: 45.9 to

1441.1 nmol/l], and FC concentrations by age: 6 months to 3 years - 100.2 mg/kg [range: 3 to 277.7 mg/kg], 3 to 4 years - 34.64 mg/kg [range: 18.8 to 92.4 mg/kg], >4 years - 59.9 mg/kg [range: 14.9 to 150 mg/kg]. **Conclusion:** Our study confirmed elevated inflammatory markers in SAM children, as hypothesized. This insight into heightened gut inflammation is a critical step toward developing effective treatment modalities for SAM. Understanding the role of these biomarkers in indicating intestinal inflammation not only enhances our knowledge of the condition but also opens doors to potential interventions and therapies to mitigate the devastating effects of SAM in children.

**Keywords:** Gut inflammation, Calprotectin, Myeloperoxidase, Neopterin

#### PP-2023-0108

**Abstract Title: Assessment of the health (hormonal parameters, dietary pattern and lifestyle) of women undergoing in vitro fertilization (IVF) treatment.**

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**Background:** Nutrition is one of the most important factor affecting health and quality of life. In women, nutrition impacts capacity to procreate. Due to urban lifestyle and processed, ready-to-eat foods women have more tendencies to consume such diets which prevent them from conceiving naturally. This indirectly forces them to opt for assisted reproduction technology (ART) known as in vitro fertilization (IVF). **Methods:** The present study is undertaken to understand the impact of dietary pattern and lifestyle of women visiting IVF center and evaluating its correlation with hormonal parameters. The study was carried out at Dr. Mukesh Patil's center for women health; Vasai total 30 women attending IVF center undergoing treatment were enrolled. **Result:** According to the data, women make up 56% of the population between the age of 31 and 35, 60% stays in nuclear families, 80% are non-vegetarians, and 70% have a family history. Women consume 70% more caffeine and 73% are less active. It also showed that 95% women's have carbohydrate rich diet which amounted to 70%, protein content 55%, vitamins and minerals 23% in the form of fruits and vegetables. The hormonal finding showed that FSH is 1.52 mIU/mL, AMH is 1.61 ng/mL and Estradiol is 13.88 pg/mL. **Conclusion:** It is the evident from the findings that womens undergoing IVF had compromised lifestyle, improper dietary pattern which could have impacted hormonal secretion and fertility health of the women.

#### PP-2023-0127

**Abstract Title: Nutritional intervention of Flaxseed extract for the management of inflammation associated Rheumatoid arthritis.**

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**Background:** Rheumatoid arthritis (RA) is a chronic autoimmune disease that typically develops as a result of prolonged, ineffective inflammation, results into synovial hyperplasia with pannus formation and observable joint swelling that are unresponsive to single-target selective medicines. The current study is focussed on evaluation of anti-arthritis activity of *Linum usitatissimum* (commonly known as Flaxseed or Linseed) extract with an emphasis on dysregulated oxi-inflammation and structural integrity during articular injury against Collagen CFA induced RA mice model. **Methods:** Phytochemical analysis of fraction was executed to validate the presence of various phytoconstituents. Collagen II combined with complete Freund's adjuvant (CFA) was induced in male mice through intradermal injection. Mice were subjected to daily oral administration of flaxseed extract (at doses of 150 and 300 mg per kg of body weight) over a span of 42 days. **Result:** Notably, the flaxseed extract exhibited a significant ameliorative effect on the Collagen II-CFA induced disease severity index, articular damage, immune cells infiltration, and pannus formation. Histopathological assessment revealed the extract's efficacy in safeguarding joint integrity by preventing erosion, lesions, and deformations in bone and cartilage tissues. The therapeutic impact of the flaxseed extract on Collagen II-CFA mirrored that of Dexamethasone, a positive control drug. Substantial reductions in the levels of proinflammatory (IL-1 $\beta$ , TNF- $\alpha$  and IL-6) and oxi-inflammatory (iNOS and COX-2) as well as inflammasome (NLRP3 and AIM2)



and autophagy (LC3AB and p62) axis were observed alongside enhanced concentrations structural proteins (BMPs and MMPs) upon flaxseed extract treatment. **Conclusion:** These findings imply that flaxseed extract could be beneficial for assuaging deleterious aspects of RA through inhibiting pro-inflammatory cytokines and oxidation in mice, suggesting its potential preventive and therapeutic effect on rheumatoid arthritis.

**Keywords:** Flaxseed, Immune-response, Inflammasome, Rheumatoid arthritis.

#### PP-2023-0137

**Abstract Title: Nutrient adequacy In pregnant women And It's association with hemoglobin levels**

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**Background:** A hospital based purposive sampling study was designed to measure the nutrient adequacy of pregnant women and to relate the haemoglobin levels during third trimester. The study was carried out in Narayana Multispecialty Hospital, Mysore. The data of pregnant women in their third trimester were collected during their regular checkup. Participants comprised of 30 pregnant women in the age group of 18-40 years. Objective of the study was to evaluate the incidence of anemia among pregnant women, influence of nutrient adequacy and its association with estimated fetal and to study the level of knowledge towards anemia among pregnant women. **Methods:** Dietary Diversity Score (Women's Dietary Diversity Score) and structured interviewed questionnaire was used to collect the data. The questionnaire included questions about the following aspects such as anthropometric parameters like height, weight was obtained from the medical reports and MUAC was measured by the interviewer. Socio-demographic data, biochemical parameters were obtained by the medical reports, diet history, supplements received, and knowledge about anemia and also obtained from practice questionnaire. **Result:** The adequacy of energy, macronutrients, fiber, and vitamin A, C, D and B6, calcium, iron, magnesium, phosphorous, selenium and sodium are higher during 9th month of pregnancy and lower during 8th month pregnancy. The percentage of adequacy of vitamin B9 is higher during 7th month and lowers during 8th month of pregnancy and percentage of adequacy of vitamin B12 is higher during 9th month and lower during 7th month of pregnancy among 30 subjects. It was found that there was no significant association between hemoglobin level and fetal weight. **Conclusion:** Most of the pregnant women were aware about anemia but were unaware about the possible complications and its management. Attitude towards anemia was average. There is a significant association between place of residence and anemia. Awareness should be created through appropriate nutritional counseling during antenatal visits.

**Keywords:** Anemia, nutrient adequacy, pregnancy, hemoglobin

#### PP-2023-0143

**Abstract Title: Assessment of Nutritional Knowledge Among Children with Cerebral Palsy**

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**Background:** Cerebral palsy (CP) is a common neurodevelopmental disorder caused by early childhood brain damage. In children with CP, the etiology of malnutrition is multifactorial. Proper knowledge, positive attitude among parents leads good practices, this would be helpful to improvise the nutritional status of CP children. **Methods:** A focus group discussion of twelve CP children's parents were conducted to assess their knowledge, attitude and practices (KAP) about Cerebral palsy. The study was conducted in Physiotherapy unit of MGM Hospital, Kamothe, Navi Mumbai, Maharashtra. The sociodemographic profile was assessed by structured questionnaire. KAP was assessed by the FGD. FGD guidelines were prepared by the end standardized KAP questionnaire (Mohammed SAER,

2005). Diet was assessed by taking 24-dietary recall and Food Frequency Questionnaire (FFQ). **Result:** Among the participants all were from middle class families. Based on discussion, 88% parents have good knowledge about CP followed by 12% who aren't much aware. The cause of CP was unknown among 41.6% parents whereas others being 33.4% and 25% state the cause being early delivery and absence of cry at birth respectively. Most around 91.6% parents were informed about CP from the doctor, they don't consider ayurvedic medicines and stated that CP leads to mental retardation. Around 58% parents were not sure whether CP shortens lifespan, 75% parents feel that CP children require special school and communities and 58% parents feel that a CP child affects the environment of the house. The percentage of parents that feed their child are around 58.3% whereas 41.7% CP children eat independently. Only 25% of the children attend school at the moment. Currently all the parents take the children to Physiotherapy on an average of 3 times a week and state that CP children require more care and attention. The nutrient intake of all children were lower than the RDA. **Conclusion:** It was observed that most CP children's parents were informed but there is need for more awareness and clarity among the parents. The dietary intake was also observed to be low. Attention should be given to the dietary needs of the children in regards with the RDA.

**Keywords:** Cerebral Palsy, Nutritional Assessment, KAP

#### OP-2023-0019

**Abstract Title: Effect of calorie deficit diet in weight loss: A randomised controlled trial**  
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**Background:** The conventional approach to weight loss typically involves prescribing diets that provide fewer calories than are expended, with an emphasis on balanced proportions of protein, carbohydrates, and fats, often resulting in an energy intake ranging from 800 to 1500 kcal per day. **Methods:** Calorie deficit Diet was a randomized controlled trial. A total of 60 subjects were randomly assigned to either the experimental group (30 subjects) or the control group (30 subjects). Body composition was assessed using bioelectrical impedance analyzer for both the control and experimental group. Calorie deficit diet and intermittent fasting as been suggested to an individual based on their body weight and condition. Advised to follow their respective diets for a 2-month period of Follow-up assessments occurred at the 1-month and at the end of the study period **Result :** Dietary intake was assessed by recording 24-hour recalls at intervals, which included information about food items, quantities, and adherence to recommended dietary allowances (RDA). This analysis revealed the total calorie, protein, fat, and carbohydrate intake among the participants, as well as details on food frequency, meal patterns, timing, and food allergies. **Conclusion:** The effect of calorie deficit diet and Intermittent fasting intervention on body composition in overweight and obese adults were investigated in the study. The findings of respective diet shows an visible result of healthy weight loss.

**Keywords:** Calorie deficit, weight loss

#### OP-2023-0021

**Abstract Title: Comparison of the Age of onset of Menarche between 10-45 years old Indian females and its association with the pre menarcheal dietary and lifestyle patterns.**

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**Background:** Although the Age of Menarche (AOM), is influenced by the genetic and environmental factors, the premenarcheal dietary and lifestyle pattern is evidenced to be influencing the decline in the AOM in recent years. Hence the aim of the study was to compare the age of onset of menarche among adolescent young adults and women along with enumerating the lifestyle and dietary factors associated contributing to the change in the mean age of menarche. **Methods:** In the present study, a sample of (n=323) healthy women from in their reproductive phase from was divided into 3 groups of adolescents of 10 -19 years of age, young adults of 20- 30 years of age and adults 31 - 45 years of age as per WHO

age classification. A structured pretested questionnaire based on retrospective data regarding AOM, food frequency and lifestyle factors was developed and administered among the participants. Descriptive statistics was applied to calculate the average AOM. Regression test was applied to identify and associate the independent variables that may influence the changing AOM. **Result:** The mean AOM in the adults, young adults and adolescents was calculated as 13.26 >12.7 > 12.26 years respectively. The AOM has shown a gradual decline of 1 year across the three age groups and this can be correlated with dietary and lifestyle patterns. It was observed that frequent consumption of ultra-processed HFSS foods (p value <0.05) was positively associated with declining AOM in the young adults and adolescents' group. Modest consumption of red meat showed a significant negative association (p value <0.05) of delayed age of menarche in the adults' group. A notable lifestyle based positive association (p value < 0.05) was observed between good quality sleep and delayed age of menarche in the adults' group. **Conclusion:** The study thus depicts the shift of AOM taken place in the past years suggesting the influence of nutritional status, dietary patterns and healthy lifestyle in young girls in their premenarcheal stage.

**Keywords:** premenarcheal diet, lifestyle, declining AOM

#### OP-2023-0024

**Abstract Title: Minimization of pesticide residue levels in the exposed dermal regions of farm workers by use of personal protective equipment**

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**Background:** Due to unsafe pesticide handling practices and limited use of personal protective equipment (PPE) by Indian farming groups, the risk of pesticide exposure is increased. However, limited epidemiological and analytical studies have assessed the impact of the use of PPE on the exposure to pesticides among Indian farm workers. **Methods:** Community-based follow-up study was conducted to evaluate dermal exposure and to analyse the impact of PPE usage on minimizing pesticide exposure among 120 farm workers of Rangareddy district, Telangana, India. Dosimeters, wipes, and hand-wash technique was adopted to assess dermal exposure to pesticides using liquid chromatography with tandem mass spectrometry (LC-MS/MS). Safety analysis as margins of safety was also assessed. **Result:** The farm workers had an average of 18 years of farming experience and demonstrated resistance to adopting good agricultural practices. A selective and sensitive method developed was validated in-house for the quantification of pesticide residues in dermal washing samples for their detection at the lowest possible levels using LC-MS/MS with satisfactory recovery, correlation, and intra- and inter-day precision. Ten pesticide residues were detected in concentrations ranging from 0.000 to 246  $\mu\text{g mL}^{-1}$  in hand-wash, 0.000 to 198.33  $\text{ng cm}^{-2}$  in patch dosimeter, and 0.000 to 1,740  $\text{ng cm}^{-2}$  in wipe samples collected from farm workers not using PPE. The intervention study results showed that there was a significant reduction in both concentrations and numbers of pesticide residues in the hand wash, patch, and wipe samples from the farm workers who have used PPE provided to them ( $p < 0.01$ ). The safety risk assessment based on the margin of safety suggested that farm workers adhere to risk-prone handling practices. **Conclusion:** This study confirms the high pesticide exposure risk among farm workers and highlights the importance of the use of PPE and might help in developing databases for risk assessment through dermal penetration/absorption.

**Keywords:** occupational-dermal-exposure; hand-wash; patch-dosimeter; wipe; safety-analysis

#### OP-2023-0034

**Abstract Title: Integrating Ayurvedic and Modern Dietetic Principles for Personalized Cancer Diet: Preliminary Observations**

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Center, Bengaluru; Dr. Megha, Associate Professor, University of Trans-Disciplinary Health Sciences and Technology, Bengaluru

**Background:** Dietary advice and management is a key aspect of cancer care. Although there exist elaborate Ayurveda dietetic principles that are implemented in Ayurvedic hospitals, little is known about their usefulness in therapy. Hence, as part of an observational study on cancer patients visiting the Institute of Ayurveda and Integrative Medicine (I-AIM), we are assessing the impact of diets that incorporate Ayurvedic and modern dietetic principles. **Methods:** Detailed dietary history of cancer patients receiving care at I-AIM is recorded and analyzed as per modern nutrition parameters using DietCal. Additionally, Ayurvedic assessment of digestion [Agni bala] and food intake is performed. Together, the modern and ayurvedic assessments are combined to prepare an integrative diet chart. To assess the differences, we compared caloric, protein, fat, and carbohydrate intake between 24-hour dietary recalls, Ayurveda-hospital-based dietary recommendations, Registered Dietitian (RD) recommendations, and the integrated approach. We further examined the frequency of food intake across all approaches and assessed diet diversity using the Diet Quality Questionnaire (DQQ). **Result:** Preliminary outcomes from 10 individuals were analyzed. There appears to be a correlation between Agni Bala assessment and food intake. Patients exhibiting mandagni (impaired digestive fire) were observed to consume an average of 600 - 700 kcal daily, significantly below the recommended intake. Conversely, individuals with tiksha Agni (strong digestive fire) consumed approximately 1800 kcal per day, surpassing recommended levels. Protein intake was notably lower in Ayurveda-hospital diets and 24-hour recall diets but significantly higher in RD and integrated approach diets. Over a 24-hour cycle, both food frequency and diet diversity improved on an integrated approach. **Conclusion:** This study commenced in April 2023 and is yet to include a sample size that can be used for strong conclusions. Our preliminary analysis however suggests that digestive ability [Agni bala] as assessed by Ayurveda may be a useful tool for clinical dietetics. Nutritionally, the integrated approach appears to emphasize higher food intake frequency of highly nutrient foods [horse gram, pomegranate], in low nutrient density formats [soups, gruels, extracts]. We hypothesize that such a diet not only provides nutrients in a highly bioavailable format but also in traditionally acceptable taste to cancer patients.

**Keywords:** Ayurveda, Cancer, Integrative Dietetics, Nutrition

**OP-2023-0036**

**Abstract Title: NUTRITIONAL AND HEALTH STATUS OF OVERWEIGHT WOMEN SUFFERING FROM HYPOTHYROIDISM**

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**Background:** The hormones secreted by the endocrine glands regulate many physiological and biochemical processes in the body. Over activity or under activity of the endocrine glands may leads to the development of several disorders. The thyroid gland secretes three hormones- Thyroxine (T4), triiodothyronine(T3), and calcitonin. A person with too little secretion of thyroid hormone, called Hypothyroidism. The weight gain due to Hypothyroidism is not noticed in some women, but generally the weight gain is pronounced in the majority of women. The aim of the study was to assess the overall nutritional status of the randomly selected patients in the selected government hospital at Auraiya district (UP). **Methods:** The study included 100 subjects between the age group of 0-60 years were personally interviewed and nutritional education and counselling was given once in a week for a period of six months through personal interviews individually. Dietary intake of the subjects was recorded by 24-hour recall method. **Result:** The results indicated that the faulty dietary habits, including a goitrogenic food, a high preference for high fat diets. A low intake of fibre rich foods such as vegetables and whole grain products were found to be the major cause of weight gain in the subjects. **Conclusion:** The result of this study will enlighten and flourish the recovery of severe patients suffering from overweight gain, diabetes, hypertension etc

**Keywords:** Endocrine glands, goitrogenic food, diet

OP-2023-0040

**Abstract Title: Comparison of Hemoglobin Level and Nutritional Status of Vegetarian and Non-Vegetarian Adolescent Girls in Bengaluru Rural, Karnataka**

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**Background:** Adolescence, age group between 10 and 19 years, is a phase of high chances of anemia especially in girls. Hemoglobin is highly essential component of blood in adolescent girls and maintaining normal hemoglobin level during adolescent is must. Bio-availability of iron is higher in animal food sources rather than in plant food sources. **Methods:** The present study cross sectional school-based was conducted among 152 adolescents (12-16 years) girls each group having 76 vegetarian and non-vegetarian studying 8-10 standard of government and private school Devanahalli, Avati, Bengaluru. The schools were selected randomly as purposive systematic order. The participants were interviewed with self-designed questionnaire and their nutritional status was assessed along with hemoglobin estimation by finger prick method. Results were analysed by using Microsoft excel 2007, ANOVAs, percentage, Z-scores, mean, standard deviation, frequencies and SPSS version 20.0 software. **Result:** The mean hemoglobin level of vegetarian and non-vegetarian was found to be 12.50 2.09 g/dl and 12.72 2.43g/dl respectively. Low hemoglobin was found to be prominent (34.2%), with vegetarian (36.84%) and non-vegetarian (31.5%). Mild anemia (11.18%), moderate anemia (17.1%) and severe anemia (1.31%) were prevalent rates among adolescent girls. The mean age of the study sample was 13.64 0.932 years. The majority (54%) of the girls was underweight and (38.16%) had average waist to hip ratio, (38.5%) reached menarche by age of 12 years. There was association between low hemoglobin level and hip and waist circumference ( $p=0.021$ ), parents' education ( $p=0.025$ ), supplements ( $p=0.017$ ), giddiness, packed foods ( $p=0.001$ ), whole grain, refined grains ( $p=0.003$ ) and green leafy vegetables ( $p=0.05$ ). **Conclusion:** It was determined both vegetarian and non-vegetarian had an equal incidence of low hemoglobin; consequently, efforts must be made to promote health camps, educate parents and adolescents, and aid in the development of healthy eating habits, improving intake deworming tablets and iron supplements hence, hemoglobin level and nutritional status can be improved through such programs.

**Keywords:** Adolescents, Menarche, Hemoglobin, Iron supplements

OP-2023-0055

**Abstract Title: Buckwheat and its Potential Role in Scavenging Diseases.**

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**Background:** In recent years, buckwheat (*Fagopyrum esculentum*) has gained attention as a functional superfood, due to its myriad health benefits. The gluten-free pseudocereal grain "buckwheat" is an evergreen crop that is accessible throughout the year. It is a member of the Polygonaceae family. The study aims to review the nutritional profile, bioactive components, functional properties, and potential health benefits. **Methods:** Among 5,202 studies, 40 Studies were included after the final analysis. Most studies encompassed in the study include reviews, systematic reviews, reviews, and meta-analyses from the past 5 years. The search engines used for analysis of reviews were PubMed, Science Direct, and Google Scholar. Only open-access and free full articles were included in the study. **Result:** Buckwheat acts as a powerful pseudocereal and helps in scavenging diseases like hypertension, diabetes, obesity, hyperlipidemia, neurological disorders, oxidative stress, celiac disease, malnutrition, cancer, inflammation, cardiovascular diseases, etc. The main nutritional compounds found in buckwheat are protein, polysaccharides, dietary fiber, lipids, and polyphenols. Furthermore, it is loaded with abundant amounts of vitamins and minerals including vit B1, vit B2, vit B3, Mn, Cu, Mg, Fe, and P, and antioxidants including Rutin, Quercetin, Vitexin, D-chiro-inositol, etc. **Conclusion:** It could be concluded that buckwheat plays an important role in scavenging diseases and helps to improve the nutritional status of the person. Thus, it is recommended to add buckwheat to day-to-day life.

**Keywords:** Pseudo-Cereals, Bioactive-Compounds, Nutrition, health benefits



OP-2023-0060

**Abstract Title: An Overview on Role of Amala Powder as a Dietary Supplements for the Management of Hypertension.**

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**Background:** Hypertension is a global problem, which is associated with cardiovascular renal problems. The available modern medicament solves the hypertension and its related consequences up to some extent. The researchers are inclined towards other systems of healthcare for its prevention & management. Now a days, there is gaining interest in using nutritional supplements as an alternative to conventional medicine for its care and cure. Amala (*Emblica officinalis*) is widely used fruit with rich history of traditional medicine and it has many health benefits. It is commonly known as Indian gooseberry, has the ability to prevent high blood pressure, heart disease, stress, anxiety and other health problems. Amala rejuvenates the body by giving nutritional support, and keep us away from all diseases. **Objectives:** This review aims to assess the potential role of Amala powder as a dietary supplement to control blood pressure. Systemic review will be carried out regarding Amala and its impact on Blood Pressure. It will be focused on various bioactive compounds such as vitamin c, polyphenols, and flavonoids present in Amala powder. We explored their potential of action, including anti-oxidant, anti-inflammatory and vasodilator properties that may help control blood pressure. Research results show that Amala powder supplementation can lead to a reduction in blood pressure and it may be effective in controlling blood pressure. We have trying to emphasize the importance of Amala and its products in general and specific to hypertension. Overall, there is a need for further clinical studies to determine dosage forms and its long- term effectiveness. We finally conclude that Amala powder may be effective as a dietary supplement not only controlling blood pressure but also aid some other health benefits, due to its rich composition of bioactive compounds. At present, Amala powder is still in the search for the planning of new nutritional strategies to prevent heart stroke by offering a simple and easy way to control blood pressure. Although preliminary studies are promising, more research is needed to confirm its long-term safety and effectiveness. Amala, high blood pressure

OP-2023-0063

**Abstract Title : Dietary compliance and profiling of patient with Type 1 Diabetics attending an outpatient clinic in Delhi, India**

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**Background:** Diabetes is a public health issue. Self-management is recognized as a central component of diabetes care. Patients with type 1 diabetes are provided counselling regarding diet, physical activity as part of their disease management. However, poor compliance to the recommendations is influenced by several factors and contributes to poor glycemic control. **Method:** Cross- sectional data from 231 adults with T1D (males and females, aged 18-50 years) attending an outpatient clinic in a tertiary hospital in Delhi- NCR is presented. Data on dietary intake was collected by a 2-day 24-hour dietary recall questionnaire and analyzed through dietCal software (version 10.0). Data on dietary habits, disease management, knowledge of complications and dietary barriers & facilitators were assessed using a structured questionnaire. Anthropometry data was collected using standardized procedures. **Result:** Approximately 53% of subjects perceived their health excellent and good. Almost 68% subjects check their blood glucose at home daily. 43% of subjects had other health issues besides diabetes like thyroid, hypertension, eye or kidney related issue. More than 60% of subjects lack knowledge about complications like retinopathy, nephropathy, etc. Around 72% of subjects reported that they perform physical activity like brisk walking, jogging, yoga, etc. Eating out daily or thrice per week (19%) and at least fortnightly was reported by 45% subjects. In terms of compliance, nearly 58% patients consumed

more carbohydrate than the recommendation. While nearly 50% were consuming less energy from protein, vis a vis the recommendation, 56% reported consuming a diet within the recommended levels of fat; 30% consumed more saturated fatty acids than recommended. The average fibre intake was higher than the recommended levels. Frequently reported barriers to dietary compliance were stress, unaffordability, often going out for parties & easy access of junk food. **Conclusion:** Many participants with type 1 diabetes had lower compliance, specifically for carbohydrate, protein and saturated fat. Patients were not adhering to prescribed diet due to various lifestyle factors, which may prevent them from achieving good glycaemic control. Hence, persistent efforts need to be made to strengthen counselling, keeping in mind the patient's lifestyle to ensure greater compliance.

#### OP-2023-0070

##### **Abstract Title: Understanding Unani Dietary Practices: A Therapeutic Approach to the Management of Metabolic Disorders**

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**Background:** Diet has been recognized as one of the six essential factors for maintaining an individual's health in Unani Medicine. Diet modification is generally recommended as a treatment strategy for every patient in clinical practice. The food items in the diet are classified by assessing their quality to produce good or bad humour and assigned a temperament to be indicated for preventive and therapeutic purposes. This review aimed to highlight the Unani dietary practices and their relevance, significance and importance in clinical practice to prevent and treat disease conditions. This review also discussed a rationale dietary approach to control the epidemic of metabolic disorders. **Method:** This scoping review is based on the online and hand searches of the literature. The classical treatises and scholarly literature were searched for the principles and hypotheses for Unani dietary practices. Recent researches were retrieved from online databases such as Google Scholar, Medline (via Pubmed), Scopus, Web of Science and CINAHL published between 2004 and 2023. The terms used for searching online databases were 'Unani' AND/OR 'Diet'. **Result:** This review found that the therapeutic and medicinal values of a variety of food items have been documented in the Unani classical literature. The physiological functions such as medicatrix naturae and immunity have a role in the maintenance of health and prevention of diseases. The Unani literature provides guidance for controlling metabolic disorders with diet modification. For therapeutic purposes, there are three modalities to deal with metabolic disorders such as diet therapy, pharmacotherapy and regimenal therapy. Intervention by these modalities could manage metabolic disorders and control the epidemic of non-communicable diseases. The dietary therapeutic approach may be given significant importance in clinical practice. Food items are divided into different 8 categories to recommend or restrict in the prevention and treatment of metabolic disorders. **Conclusion:** This paper concludes that the Unani literature documented the long-term clinical experiences for diet and drug intervention in chronic disorders. Unani dietary practices may be used to control metabolic disorders and prevent their complications.

**Keywords:** Non-communicable, Pharmacotherapy, Regimenal, Scoping, Traditional

#### OP-2023-0075

##### **Abstract Title: Nutraceuticals for dyslipidaemia in Unani perspectives- A comprehensive review**

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**Background:** Dyslipidaemia, a metabolic disease is significant risk factor for atherosclerotic cardiovascular diseases. The recent ICMR-INDIAB-17 study has reported that the prevalence rate of metabolic non communicable diseases are rapidly increasing in India. A well-balanced diet, encompassing adequate quantities of protein, fats, carbohydrates, vitamins, and minerals is essential

for preserving health, preventing diseases, and promoting overall well-being. In Unani medicine, “makool va mashroob” (food and drink) is recognized as one of the six essential prerequisites for preservation of life. High prevalence of dyslipidaemia along with life-threatening complications and side effects of conventional medicines there is need to search a effective non-pharmacological therapeutic management of dyslipidaemia. Diathotherapy a widely accepted accessible and cost-effective approach with minimal adverse effects is recommended by Unani physicians to manage dyslipidaemia

**OP-2023-0083**

**Abstract Title: The Genetic Culinary Connection: A Nutrigenomic Approach in Pathogenesis of Obesity and Cardiovascular disease**

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**Background:** The global prevalence of obesity has been on the rise in recent years. With such high rates of prevalence, there is an increased risk of developing multiple chronic diseases, such as cardiovascular disease (CVD), hypertension, and diabetes. Despite the use of various dietary approaches to prevent these diseases, a high prevalence rate has persisted over the years. The increase in mechanization, urbanization, and westernization has led to the consumption of high-fat, high-energy meals and sedentary lifestyles, which may be contributing factors. Additionally, genetics and environmental factors may also contribute. To address this situation, we need to adopt a new perspective called nutrigenomics. It is a combination of two fields that have coexisted but never amalgamated together. There is a need to investigate the interaction between genetics and dietary variables in the development of conditions like diabetes, obesity, and CVD. **Method:** The research gathered information on food habits, meal patterns, and dietary intake, and genetic variants in the fat mass and obesity-associated gene (FTO) with obesity. Single nucleotide polymorphisms (SNPs) are one-letter differences between your genome and another genome sequence. Specifically, the genotype frequency of FTO rs9939609 SNPs might linked to higher BMI and an increased risk of obesity in many populations. It is more likely that the FTO gene, as the BMI/obesity-associated locus, would confer the risk of CVD because obesity is a well-established risk factor for CVD. **Result:** Consistent research shows that unhealthy eating habits are linked to a higher chance of becoming obese which is the root cause of other chronic disease. Furthermore, genotype frequency of FTO rs9939609 SNPs may influence appetite and energy expenditure resulting in obesity. Basically, rs9939609 who have homozygous A allele or at least have one copy of A allele are at higher risk of obesity compared to homozygous T allele. FTO gene mutation may combine with a poor lifestyle, change epigenetic state that may ultimately lead to the onset of obesity and CVD. **Conclusion:** By clarifying these interactions, we hope to offer a deeper understanding of the complexity that underlies relation between obesity and CVD.

**Keywords:** Obesity, CVD, Nutrigenomics, FTO gene

**OP-2023-0086**

**Abstract Title: Association of malnutrition and nutrition impact symptoms among gastrointestinal tract cancer patients**

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**Background:** Malnutrition affects 40 to 80 percent of oncology patients, and 10 to 20 percent of cancer-related deaths are caused by the condition rather than the illness. Patients with gastrointestinal tract cancer, in particular are at most risk for malnutrition. The present study aims to determine the weight loss percentage in six months, stage of malnutrition and its association with nutrition impact symptoms experienced by the cancer patients which contributes to malnutrition. **Method:** The study was carried out in two gastrointestinal speciality hospitals in Coimbatore for a period of one month. Nutrition assessment was done for 56 patients who were admitted for Surgery and/or Chemotherapy. **Result:** It was found that about 31 patients (55.36%) suffered from Upper GI malignancy with an average weight reduction over a period of six months by 13.90 percent. Similarly, 25 patients (44.64%) with Lower GI cancers had lost an average of 7.95 percent of their body weight. As assessed by PG SGA, Stage C (Severe malnutrition) was shown to be present in roughly 15 (48.38%) patients and Stage B (Moderate malnutrition) was determined in 16 (51.62%) Upper GI cancer patients. Similarly, it was found that only 5 (20%) of the lower GI cancer patients were at Stage C (Severe malnutrition) and that 20 (80%) were in Stage B (Moderate malnutrition). The patients experienced various nutrition impact symptoms such as anorexia, nausea, vomiting, diarrhoea, skin itching, fatigue, muscle weakness, loss of appetite, fever, chills, and back pain which contributes to malnutrition. **Conclusion:** According to the study, malnutrition is more prevalent in upper GI cancers than lower GI malignancies as it has greater influence on symptoms related to nutrition. These findings suggest that GI symptoms should be investigated and treated promptly since they might cause weight loss, malnutrition and thereby lead to cancer cachexia.

**Keywords :** Gastrointestinal Cancer, Malnutrition, Nutrition Impact Symptoms

OP-2023-0105

**Abstract Title: Mediating effects of eating behaviors, dietary diversity and perceived stress on measures of gastrointestinal health in adults**

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**Background:** Gastrointestinal (GI) disorders are becoming increasingly common in young people in India and globally. Diet (eating habits, nutrient intake, and dietary diversity) and mental health (stress and anxiety levels) factors can independently and synergistically regulate gut health through dietary modulation of gut microbiota composition and gut-brain axis related mechanistic pathways. Yet, few studies have investigated the associations between diet, mental health, and GI-related disturbances. Hence, this observational study was conducted to explore the possible effects of eating behaviors and stress and anxiety symptoms on self-reported measures of gastrointestinal health among 18-45-year-old adults in Mumbai. **Methods:** A purposive cluster sampling method guided the recruitment of participants (n=407). Two non-consecutive day 24-hour diet recalls were conducted to estimate nutrient intakes and calculate Individual Diet Diversity (IDD) and Food Variety Scores (FVS). Gastrointestinal health was assessed using a validated instrument comprising 35 items related to gastric, small intestine, and colon function, and GI inflammation. Stress and anxiety symptoms were evaluated with the Perceived Stress Scale (PSS-10), and Generalized Anxiety Disorder Scale (GAD-7) respectively. Socioeconomic status and eating habits were self-reported and the anthropometry measurements were recorded by trained investigators. Comparison of categorical and continuous variables between sex and age categories was done using the chi-square statistics, independent sample t-test, and One-way ANOVA. Multivariable logistic regression analysis was performed using sociodemographic characteristics, anthropometry measurements, eating habits, and stress and anxiety levels as independent (predictor) variables, and composite gastrointestinal health risk scores as the dependent variables. **Result:** Participants reported mild anxiety (mean (M) = 7.09, standard deviation (SD)= 3.25) and moderate stress (M=18.44; SD= 9.89) with preponderance among females, higher age groups (> 35 years), and lower socioeconomic status. Higher energy and fat consumption, frequent breakfast skipping, and lower IDDS and FVS scores were associated with a higher prevalence of stress and anxiety. Age-adjusted regression models showed higher waist circumference (OR= 4.69, 95% CI =1.33-7.28, p= 0.034), and stress scores (OR= 1.66, 95% CI= 1.32-1.90, p = 0.042), lower IDDS (OR= 2.34, 95% CI=1.80- 2.91, p <0.001) and presence of > 2 co-morbid conditions (OR= 8.12, 95% CI = 5.34-

11.21,  $p < 0.001$ ) as predictors of higher GI disorder risk scores. **Conclusion:** The preliminary findings of the study highlight associations between diet, stress, and GI health, presenting opportunities to modulate diet and optimize mental health to prevent and reduce the severity of GI disorders.

**Keywords :** gastrointestinal health, diet, stress, anxiety

#### OP-2023-0117

**Abstract Title: Assessment the Nutritional Status of Shift Work Nursing Officers at KIMS Hospital, Hubballi Taluk, Dharwad District, Karnataka, India**

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**Background:** The present study is conducting in KIMS hospital, Hubballi to assess the relationship between the nutritional status with shift work nursing officers and their regular dietary intake of energy and nutrients to determine the meal pattern of shift work, behaviours and nutrient intake among nursing officers at KIMs Hospital. The particular nutritional challenges of shift workers confront and the resulting impact on their health are highlighting in the project. Working shifts can lead to poor diet quality, inconsistent eating habits, unhealthy behaviours, and unpredictable sleeping patterns, Analysis the impact of working shifts on nurses' diet, lifestyle, and obesity rates. **Method:** the research study approach was quantitative and research design was descriptive. A total 60 samples of shift work nursing officers were selected for this study it includes both males (20) and females (40) who were fulfilled the inclusion criteria was selected by simple random sampling technique. The tool used for data collection was structured validated questionnaire that includes socio-demographic profile, nutritional, food intake and frequency of meal consumption, food frequency questionnaire (FFQ), 3 days 24 hours dietary recall and anthropometric measurements and indices. Collected data was analysed by using both descriptive and inferential statistics. **Result:** The study shows that 81.7% of the respondents were consumed 2 meals per day and 18.3% were consumed 3 meals day and' there was a irregularity time in consumption of breakfast, lunch and dinner. Very interesting to note that the meal is replaced with bakery item daily. Only 6.7 percent of the respondents were had normal BMI and 93.3 percent of respondents were had different grades of obesity and WHR graders that will leads to metabolic degenerative diseases. The main reason to weight gains in shift work nursing officers due to higher intake of calorie rich foods, also change in dietary habit, food choice, reduced regular meal consumption used more snacks. **Conclusion:** The findings of the study show that the shift workers had higher BMI, higher intake of calorie rich foods, lifestyle pattern prone to the respondents for different grades of obesity. Recommendations: The study brings rise to future research implications as it is necessary to reconduct this study with a larger sample size. It is necessary to give them nutritional awareness, counselling, and education including physical exercise to reduce metabolic degenerative diseases.

**Keywords:** WHR, BMI, FFQ, KIMS,

#### OP-2023-0125

**Abstract Title: A holistic study on nutritional deficiency and altered health conditions due to sleep disorders.**

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**Background:** This comparative study was carried out to understand the current scenario on health conditions and nutritional deficiencies caused by sleep disorders. The objective was to collect data by performing a case study, online survey and a comprehensive literature review. Nowadays, irregular sleep cycle has become a common lifestyle among the youth and adolescent generation. This is found to be affecting the overall health of an individual. **Method:** The case study was performed on an

individual working in the late hours of night who is not able to achieve a good sleep under normal conditions. Data on his lifestyle, medical conditions, food habits and sleep pattern was collected. Meanwhile, an online survey collecting responses from adolescent teenagers was carried out. The data collected was based on their sleep pattern, medical history, and information on their food and fluid intake. Simultaneously, as a requisite, literature review was performed to know the relation between sleep pattern and health conditions. **Result:** The final result obtained through case study indicated a deficiency in several vitamins, proteins and mal-absorption of mineral salts in the individual. Whereas from the responses of the survey data, it was observed as, though majority of individuals are consuming the requisite amount of fluids, they are not experiencing a sound sleep. This has led to several changes in their physical appearances and mental abilities. Similar information was gathered from the literature survey also. **Conclusion:** Maintaining healthy sleep habits, such as adequate sleep duration, practicing good sleep hygiene, addressing sleep disorders, and a healthy nutritional habit by maintaining a balanced diet, food portion control, and paying attention to our body's response to different foods can support optimal nutrient absorption and utilization. Sleep is a complex biological process that is crucial for well-being of overall health and further, more research is needed to fully understand the mechanisms involved.

**Keywords:** Sleep nutrition absorption health survey

OP-2023-0135

**Abstract Title: Nutritional status and body composition at diagnosis of South Indian children with Acute Lymphoblastic Leukaemia (ALL)**

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**Background:** Accurate estimation of body composition, particularly, Body Cell Mass (BCM), independent of hydration status is necessary in children with cancer. This study aimed to accurately measure anthropometry and body composition of children with ALL at diagnosis and compare them with healthy children from South India. **Method:** Cross-sectional study; children aged 2.0-8.11y with ALL from St. John's Medical College Hospital, Bengaluru, and age and sex-matched, normal-weight children from the community. Nutrition screening tool (SCAN) was used to assess the risk of malnutrition. Anthropometry (weight, height, mid-upper arm circumference (MUAC), waist circumference (WC)) and body composition measurements using a Whole-Body Potassium Counter were performed. Body mass index-for-age, Weight and height for age z-scores were calculated using WHO Child Growth Standards. Categorical and continuous variables were analyzed by chi-square and independent t-tests respectively. **Result:** The mean age of the ALL (n = 40) was  $4.6 \pm 1.9$  y and control (n = 42) children were  $4.7 \pm 1.8$  y; 60% were boys. The prevalence of underweight, overweight, and stunting were 17.9%, 7.7%, and 10.3% respectively and malnutrition was 41% in children with ALL. The mean weight, height, MUAC and WC of children with ALL and the control group were  $16.8 \pm 6.2$  kg and  $16.5 \pm 4.2$  kg,  $104.3 \pm 14.9$  cm and  $105.1 \pm 12.4$  cm,  $14.9 \pm 2.4$  cm and  $15.6 \pm 1.3$  cm,  $53.0 \pm 6.7$  cm and  $49.3 \pm 3.6$  cm respectively and were comparable. Children with ALL showed lower %BCM ( $30.5 \pm 4.3\%$ ) compared to control children ( $32.4 \pm 6.5\%$ ), but higher %fat mass ( $23.6 \pm 4.1\%$  vs.  $22.9 \pm 3.9\%$ ). Comparison of %BCM percentiles between 2 groups indicated that the 50th percentile value of %BCM (33.6%) in control children equated to the 75th percentile value (33.7%) in children with ALL, suggesting ~ 25% lower %BCM in children with ALL compared to controls. **Conclusion:** At diagnosis, anthropometric and body composition measurements were similar between children with ALL and controls, except BCM which was lower in children with ALL. Evaluating early-stage nutritional status and body composition can help in planning appropriate interventions during treatment.

**Keywords:** Leukemia, children, body composition, nutrition

OP-2023-0142

**Abstract Title: Maternal fatty acids influence microRNA regulation of angiogenic factors in Assisted Reproductive Technology (ART) placentae**

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**Background:** Assisted reproductive technology (ART) procedures such as in vitro fertilization (IVF) and intrauterine insemination (IUI) are now being increasingly used for infertility treatments. ART treatment coincides with several phases of epigenetic programming during gametogenesis and early embryo development. Non-coding RNA like the microRNAs (miRNAs) are important regulators of gene expression and are likely to be influenced by nutrients like fatty acids. This study aims to examine the association of maternal fatty acid status with placental epigenetic patterns (miRNA regulation) of angiogenic factors in women undergoing ART procedures. **Method:** Women who underwent ART procedures (ART) and women who conceived naturally (Non-ART) were recruited at Gupte Hospital, Pune and maternal plasma and placenta samples were collected at delivery. This study included 93 Non-ART and 64 ART women. Maternal fatty acids levels were estimated by gas chromatograph. Placental mRNA and miRNA expression were determined by quantitative real time PCR. Data analysis was performed using SPSS/PC+ software. Independent sample t-test and Partial correlation analysis was used. **Result:** Maternal plasma omega-3 and docosahexaenoic (DHA) ( $p < 0.05$ ) levels were lower, whereas the omega-6/omega-3 ratio ( $p < 0.05$ ) was higher in the ART women. The mRNA expression of angiogenic factors - fms-like tyrosine kinase (FLT-1) and Kinase domain receptor (KDR) was higher ( $p < 0.05$ ) in ART placentae. Placental expression of 11 miRNAs of the 28 tested miRNAs were significantly different (5 upregulated and 6 downregulated) in the ART group. These miRNAs were validated on a larger sample size and it was observed that miR-30c-5p, miR-140a-5p and miR-205-5p were significantly different in the ART group as compared to the non-ART group. mRNA expression of placental growth factor (PIGF) was positively associated with miR-30c-5p expression ( $p < 0.05$ ). This miR-30c-5p was negatively associated with maternal plasma linoleic acid (LA), omega-6 fatty acids and polyunsaturated fatty acids ( $p < 0.05$ ). Expression of miR-140-5p and miR-205-5p was also negatively associated with maternal plasma omega-6 fatty acids and omega-6 to omega-3 fatty acid ratio ( $p < 0.05$ ). **Conclusion:** Maternal fatty acids are associated with placental expression of miRNAs targeting angiogenic factors. These changes will thereby influence the placental development and function in women undergoing ART.

**Keywords:** Epigenetics, miRNA, PIGF, IVF, DHA

OP-2023-0145

**Abstract Title: Role of Cardiometabolic risk factors on the association between bone health and body composition among South Indian children aged 5 to 16 years**

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**Background:** Cardiometabolic risk (CMR) is associated with adiposity and bone health, however, the complex interplay between these factors is not clear in Indian children. The objective of this study was to investigate the role of CMR factors on the association between body composition and bone health in



South Indian children aged 5 to 16 y. **Method:** Cross sectional study: 317 healthy children aged 5–16 y from urban schools in Bengaluru. Anthropometry, blood biochemistry and blood pressure were measured. Dual-energy X-ray absorptiometry was used to measure body composition and bone mineral content (BMC). CMR was defined using abnormal waist circumference, hyperglycaemia, hypercholesterolemia, high low-density lipoprotein, low high-density lipoprotein, hyper-triglyceridemia and hypertension. Based on the number, children were categorized as 0 CMR, 1 CMR and  $\geq 2$  CMR. Analysis of variance was used to compare the parameters between CMR categories and multiple linear regression analysis to assess the factors associated with %BMC. **Result:** The mean (SD) age was 10.8 y (0.3); 49.2% were  $\leq 10$  y and 45.1% males. The prevalence of 0 CMR, 1 CMR and  $\geq 2$  CMR was 42.3%, 33.9% and 23.9% respectively. The mean %BMC was significantly lower in children presented with  $\geq 2$  CMR ( $3.61 \pm 0.51$ ), followed by 1 CMR ( $3.73 \pm 0.42$ ), compared to children with 0 CMR ( $3.90 \pm 0.37$ ) ( $p < 0.001$ ). In the whole group of children, %BMC had significant negative correlation with %body fat ( $r = -0.68$ ,  $p < 0.0001$ ), highest in children with  $\geq 2$  CMR (%body fat:  $r = -0.78$ ,  $p < 0.001$ ), followed by children with 1 CMR (%body fat:  $r = -0.68$ ,  $p < 0.001$ ), compared to children with 0 CMR. Adjusted for age, gender, interaction term (%body fat x CMR categories) and lean(kg), %body fat was significantly negatively associated with %BMC [ $\beta = -0.044$ , 95% C.I. (-0.050, -0.039),  $R^2 = 74\%$ ]. Stratified by CMR categories, children with  $\geq 2$  CMR, had significantly greater slope  $\beta = -0.049$  [95% C.I. -0.06, -0.03], followed by children with 1 CMR, slope - 0.045 [95% C.I. -0.05, -0.03], compared to children with 0 CMR. **Conclusion:** In South Indian children, the negative association of %body fat and %BMC was further amplified by the presence of multiple CMR factors; findings have clinical and public health implications.

**Keywords:** Childhood obesity, Cardiometabolic risk factors

**OP-2023-0149**

**Abstract Title: Unani Dietary Therapeutic Approach to Melasma**

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**Background:** Melasma is the most common hyperpigmentary disorder among Indians. Most cases occur in females, though some males also develop Melasma. In Unani Medicine, Melasma is a humoral disease. Dearth in terms of quantity of melanin causes Melasma. It has been hypothesised that some food items produce excess quantity of melanin and cause Melasma. In this, paper, we would discuss about some food items and their role in Melasma. We aimed to highlight the Unani dietary therapeutic approach to manage the clinical conditions of Melasma.

**Method:** We retrieved the published articles from online database such as Google Scholar, Medline (via pubmed), Scopus and Researchgate published between 2004 to 2023. We used the search terms Unani AND Melasma. We also searched classical literature from libraries. **Result:** We found that some food items may cause Melasma in certain person. Unani classics described about the quality foods that produces humoral disbalance. Unani Dietary approach may be therapeutic and preventive.

**Conclusion:** This paper concludes that Unani dietary approach to manage melasma may be used as a therapeutic strategy in clinical practice.

**Keywords:** Kalaf, Melasma, Unani Diet

**OP-2023-0150**

**Abstract Title: A compare Total Fat consumption Among Women and Association Between Trunk Muscle/Fat Composition, Lumbar Disc Bulge, And Low Back Pain in Women Aged Between 20-50Years: A case series**

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**Background:** To investigate the association between Nutritional intake, fat mass and muscle composition in middle aged women. To find the Association between fat mass, central adiposity and lumbar disc space narrowing, and low back pain in women along with nutritional status. **Method:** Women aged between 20 to 50 years were randomly selected from Chennai city. Bone mineral density at lumbar spine, Femoral neck and whole body, lean body mass, fat body mass and percent fat mass ratio were calculated from the DEXA (Dualenergy x-ray absorptiometry) whole body scan. Trunk fat from DEXA report and Lower back pain were assessed and compared. Nutritional assessments were done through 24hours recall on food frequency questionnaire. **Result:** A total of 30 samples were included in this study. The study showed connection between high calorie, high fat and less protein intake leads to central adiposity, low back and knee pain. There was no correlation between nutritional intake and hip or foot pain. **Conclusion:** There were significant relationships between fat indicators with low back pain trunk muscle mass and lumbar disc degeneration. People who have less muscle mass and high fat ratio have higher risk of central adiposity and there was clear evidence seen between nutritional intake and disc degeneration. Since the study done with 30 samples, a larger population study with 100 to 150 samples can clearly shows the evidence of how nutrition plays an important role in trunk fat and lower back pain.

**Keywords:** Fat, Muscle, Disc Bulge, Lumbar,

**OP-2023-0156**

**Abstract Title: Nutrition intake of children with chronic kidney disease (CKD) attending the outpatient department of a tertiary care centre**

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**Background:** Nutrition plays an important role in the growth and development of children, and children with CKD undergo metabolic alterations that affect nutrient intake, metabolism, and energy expenditure, predisposing them to malnutrition and an increased risk of morbidity and mortality. This study was carried out with the objectives of evaluating the nutritional intake of children with CKD and to understand if there is an imbalance between nutrient requirements and nutrient intake. **Method:** This prospective observational study was conducted in pediatrics OPD of Lok Nayak Hospital, New Delhi, India amongst children (2 years-18 years) diagnosed with underlying CKD. Diet recall was taken using 24-hour diet recall method and diet calculations was done using Dietcal software (Profound Tech based on ICMR guidelines). The patients diet intake values of calories and macronutrients (carbohydrates, proteins, fats) and micronutrients (calcium and phosphorous) were recorded and compared to the recommended intake by the guidelines of pediatric renal nutrition taskforce (PRNT) for pediatric CKD patients. **Result:** This study included 71 patients (58 male, 13 female) out of which 79% were in early stages of CKD (stage 1-3) and 21% in later stages of CKD (stage 4-5). Their mean (SD) age was 9.1 (3.81) years, height 122.75 (22.07) cm, weight 24.54 (12.13) kg, and Mid Upper Arm Circumference was 17.35 (3.76) cm. Calorie consumption in males ( $738 \pm 277$  kcal/day) and females ( $779 \pm 527$  kcal/day) was 53% and 50.5% less than recommended by PRNT guidelines, respectively. Mean (SD) protein intake (g/kg/day) for all patients was 1.23 (0.99) g, and 46.6% of the males and 69% of females were consuming less protein than recommended. Mean (SD) calcium intake of all patients was 296 (186) mg and 56.6% of the males and 69.54% of females were consuming less calcium than recommended. Mean (SD) phosphorus intake was 291 (226) mg. The ratio of macronutrients in diet was satisfactory but overall calories intake was significantly low. **Conclusion:** We found that there is an imbalance between the calorie, protein and calcium requirements and consumption resulting in cumulative deficit of energy that may negatively affect the growth and development and other relevant outcomes.

**Keywords:** CKD, nutrition, PRNT, diet, macronutrients

OP-2023-0157

**Abstract Title: Glycemic Indices of Multiple Oral Nutritional Supplements: A Randomized Cross-Over Study in Indian Adults**

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**Background:** Oral Nutritional Supplements (ONSs) are designed to support the nutritional requirements for specific ages, genders, physiological stages, or health conditions. With an increasing prevalence of IGT and diabetes in India, it is important to understand the impact of the macronutrient composition of these ONSs on the blood glucose response. To the best of our knowledge, this research represents the first comprehensive examination of the GI of a diverse range of ONSs designed for different populations. **Method:** The study had two phases viz., phase1 (n=18) studied two ONSs: A1 & B1 and phase 2 (n=20) studied five ONSs: A2, B2, C2, D2 & E2. The subjects were healthy, non-diabetic adults, aged between 20-44 years with a mean Body Mass Index of  $21.2 \pm 1.52$  kg/m<sup>2</sup> (Phase 1) and  $21.0 \pm 1.45$  kg/m<sup>2</sup> (Phase 2). All ONSs were compared with reference drink (glucose). The carbohydrates in one serving of each ONS were matched to carbohydrates from 25 grams of glucose following ISO 2010 guidelines. Capillary blood was assessed for blood glucose response at baseline, 15, 30, 45, 60, 90 and 120 minutes. GI was calculated as the incremental area under the curve (iAUC) for the test drinks and expressed as a percentage of the average iAUC from glucose. **Result :** Phase 1 indicated that the high fiber diabetes supplement A1 with higher protein (23 % energy), higher fat (25 % energy) and reduced carbohydrates (40 % energy) had a significantly ( $p=0.002$ ) lower GI [34 ( $\pm 6$ )] as compared to B1 [63 ( $\pm 7$ )] (protein 19 %, fat 7 % and carbohydrates 60 % energy) even with similar amount (22 %) and type of fiber. Phase 2 reported that all test products [A2 (32 $\pm$ 5), B2 (37 $\pm$ 4), C2 (31  $\pm$ 5), D2 (31  $\pm$ 5) and E2 (55  $\pm$ 4)] had a low GI. As compared to phase 1, ONSs in phase 2 had lower fiber content (1.6 - 4.6 % energy). **Conclusion:** Glycemic Index of ONSs is influenced not only by their fiber content, but more importantly by their overall macronutrient composition including protein ( $\geq 17$  % energy), fat ( $\geq 10 - 27$  % energy) and carbohydrates (40 - 57.5 % energy).

**Keywords:** Glycemic Index; Oral Nutritional Supplements

OP-2023-0162

**Abstract Title: Nutrition Intervention in Reversing Non-Alcoholic Fatty Liver Disease (NAFLD) In Children**

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**Background:** Unhealthy lifestyle practices lead to new breed of diseases called “Lifestyle diseases”, such as Obesity, Diabetics, Cardiac diseases, some cancers, Non –Alcoholic Liver cirrhosis (NAFLD) etc. Obesity among children is rapidly rising in Kerala according to estimates in the last National Health Survey report. Kerala stands second in the country after Punjab in child obesity. Non-alcoholic fatty liver disease (NAFLD) is now the most prevalent form of chronic liver disease, affecting 10-20% of general pediatric population. Within the next 10 years it is expected to become the leading cause of liver pathology, liver failure and indication for liver transplantation in childhood and adolescence. Non-alcoholic fatty liver disease, also called fatty liver disease, is a condition in which fat builds up in the liver. If left untreated, it can lead to serious liver problems like fibrosis and cirrhosis (scarring of the liver) and liver cancer. There are two types of fatty liver disease. Simple fatty liver disease, when a child has accumulated fat in the liver but no inflammation or cell damage. Non-alcoholic steatohepatitis (NASH), when fat in a child’s liver leads to inflammation and cell damage. NASH is a serious condition that can lead to cirrhosis or liver cancer. **Methods:** A study was conducted among the children from adolescent age group 10-16 among male and female from rural and urban society. • A survey method was used to assess the dietary and nutritional status of present and past along with psycho social behaviors of children’s are collected Anthropometry of the children are taken and calculated, to calculate the BMI as per ICMR2020 • Subjective global assessment is used to collect anthropometric assessment. • Along with this blood samples are also collected for further investigation Us abdomen also done for clarification

• Dietary recall for one day was also collected with the help of a questioner with directive interview method among children, parents and teachers too. Subjective Global assessment is used to collect Anthropometric assessment - A day dietary recall for one day was also collected with the help of a questioner with directive interview method - Biochemical investigation along with abdominal scanning is done for the clarification. **Result** : Those who strictly follow the pattern was found to be reducing their weight Without any health issues - Children are found to be more active and energetic - Natural healthy food make them more immune - By the us abdomen it's found they are back to normal **Conclusion**: Healthy eating pattern in childhood and adolescence promote optimal childhood health, growth and intellectual development ,prevent immediate health problems such as Iron deficiency Anemia, Obesity, eating disorders etc. This report summary that it is most likely to be effective in promoting healthy nutrition awareness among children against Life Style Diseases which help to create a healthy young India.

**OP-2023-0163**

**Abstract Title: Efficacy of Vitamin D2 enriched mushroom powder on Vitamin d status and metabolic syndrome biomarkers in adults**

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**Background:** Vitamin D deficiency is widespread in India across all age groups, particularly among vegetarians due to limited Vitamin D rich food options. Mushrooms contain abundant amounts of ergosterol, which is convertible to ergocalciferol (Vitamin D2) through UV exposure. The objective was to evaluate the effectiveness of Vitamin D enriched mushroom powder on Vitamin D status and metabolic syndrome biomarkers in adults. **Methods:** Fresh button mushrooms were sliced and exposed to UV-B radiations at 215-350 nm for a duration of 60 minutes. Subsequently, the treated mushrooms were dried using a solar dryer and ground into a fine powder. The processing resulted in a significant increase in vitamin D2 content from 5.48 µg to 2290 µg/100 g in treated mushrooms. A total of 90 (20-40 years) subjects were recruited, having vitamin D levels within the range of 12-20 ng/ml, and were further categorized into three groups i.e. Group I (Control), Group II (vitamin D2 mushroom powder), and Group III (synthetic vitamin D sachet). The total vitamin D status including vitamin D, calcium, PTH, BMD, and metabolic syndrome biomarkers including blood sugar, blood pressure, LDL, HDL, triglycerides, and total cholesterol were assessed for all the groups. **Result:** After 12 weeks of intervention, subjects in Group II and III exhibited a significant ( $p < 0.05$ ) increase in serum vitamin D levels of (21.32 and 44.1 ng/ml), calcium levels (9.34 and 9.26 mg/ml), Parathyroid hormone (48.8 and 48.2 pg/ml), Bone mineral density (-0.27) respectively. Moreover, Group II exhibited a significant ( $p < 0.05$ ) decrease in the incidence of metabolic syndrome biomarkers including Blood pressure levels (121.46 /76.06 mm Hg), Triglycerides (121.76 mg/ml) and Total cholesterol (167.9 mg/ml) respectively. Group III exhibited a significant ( $p < 0.05$ ) decrease in Blood pressure levels of (121.51/77.56 mm Hg). No significant changes were recorded in the group I. **Conclusion:** UV-treated mushroom powder intervention helped in improving vitamin D status and metabolic syndrome biomarkers in adults. For obtaining better results, long-term intervention is recommended. Thus, vitamin D enriched mushroom powder can be used as a natural supplement in maintaining serum vitamin D levels.

**Keywords:** Mushrooms, Vitamin D, Metabolic Syndrome

**OP-2023-0177**

**Abstract Title: Effect of Different Processing Methods on Glycemic Index (GI) of Value Added Barnyard Millet (*Echinochloa frumentacea* Link.) Based Products**

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**Background:** Millets are small seeded annual grasses with good nutritional profile. In Africa and India, millet has been used as a staple food for thousands of years. The minor millets are familiar staple foods



among weaker sections of the society in developing countries and of great economic importance in starch-making and malt industry. However, exploitation of these minor millets as a ready to eat food products is limited. Among millets, Barnyard millet is one of the important minor millet having good nutritional and therapeutic importance. The present investigation was undertaken to study the effect of different processing methods on Glycaemic Index (GI) of value added Barnyard millet (*Echinochloa frumentacea* Link.) based products. Glycaemic Index (GI) is a measurement carried out on carbohydrate containing foods and their impact on blood sugar. **Methods:** Barnyard millet based products such as Noodles, Cookies and Khakara were developed by extrusion, baking and roasting methods respectively. Value addition with Dried Bengal Gram Leaf Powder, dehydrated carrot gratings and dehydrated carrot powder was incorporated to these products at different levels to prepare Vegetable Noodles, Vegetable Cookies and Vegetable Khakara respectively. By sensory evaluation the highly accepted products were subjected to nutritional and GI studies. The nutritional analysis and GI study was carried out by following standard procedures. The GI study was conducted on Ten healthy female adult volunteers. The volunteers were given glucose and test carbohydrate separately on alternate days, after 12 hour overnight fasting. The rise in blood glucose level after consumption of glucose and test carbohydrate was measured to assess the GI. **Result:** The result of the present investigation indicated that there was increase in macro and micro-nutrient composition after value addition with dried Bengal Gram Leaf Powder, dehydrated carrot grating and dehydrated carrot powder. Vegetable Cookies recorded low Glycaemic Index value (21.65b) which was statistically significant from Vegetable Khakara (37.11a) and Vegetable Noodles (38.02a). **Conclusion:** Thus, it was concluded that among the three different processing methods, products prepared from baking elicited low Glycaemic Index value followed by roasting and extrusion methods.

**Keywords:** Millet, Noodles, Cookie, Khakara

**OP-2023-0182**

**Abstract Title: Assessment of dietary intake of Polyunsaturated Fatty Acid, and Cognition, Concentration, Memory and Behaviour and their correlation among Children aged 7-13yrs**

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**Background:** This study investigated the impact of consuming Omega-3 polyunsaturated fatty acids (PUFAs), such as alpha-Linolenic acid (ALA), Docosahexaenoic Acid (DHA), and Eicosapentaenoic Acid (EPA), on children's cognition and behavior. The research involved 840 children aged 7 to 13 from nine elementary schools in Hyderabad, with exclusion criteria based on eyesight and hearing impairments. **Method:** Dietary intake was assessed via a food frequency questionnaire, and PUFA content was determined using Indian Food Composition Tables. Cognitive assessments included attention, concentration, working memory tests, the Color Trail Test, Visual Retention and Recognition tests, reading assessments, and behavior ratings from parents (PQ) and teachers (TQ). The data analysis was conducted using SPSS version 26. **Result:** Key findings revealed that girls had higher mean levels of DHA and EPA than boys, with no significant difference in ALA. Additionally, children aged 10-13 showed higher PUFA consumption compared to those aged 7-9. Government school students consumed more DHA than private school students. Girls also scored significantly higher in PQ and TQ ratings compared to boys. Similarly, children aged 10-13 had higher behavior ratings than those aged 7-9. Moreover, government school students displayed greater levels of attention, concentration, and behavior compared to private school students. Correlations between PUFA consumption and cognition and behavior indicated a positive association of ALA, DHA, and EPA with TQ ratings for girls. ALA was associated with reading ability in girls. In children aged 7-9, correlations were observed between ALA, DHA, working memory, PQ, and TQ. EPA demonstrated a positive association with PQ and TQ in both age groups (10-13 years). Notably, DHA and EPA exhibited stronger associations with behavior ratings in government schools compared to private schools. EPA showed a positive correlation solely in private schools. **Conclusion:** In summary, this study suggests that Omega-3 PUFA consumption may improve children's cognitive functions and behavior. The primary dietary difference observed was higher egg consumption among government school students, reflecting their elevated PUFA levels and, to some extent, superior cognitive function.

**Keywords:** PUFA, Attention, Behaviour, Concentration, Children

**OP-2023-0184**

**Abstract Title: Nutraceuticals for Acne Vulgaris: An Evidence Based Recommendation**

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**Background:** Acne vulgaris is the most common skin disease across the globe, affects ~85% of young adults. The recent studies indicate that up to 95% of men and 83% of women may suffer from acne vulgaris until they reach their twenties. According to Unani System of Medicine, acne vulgaris is caused by humoral derangement in the body. There are multiple factors responsible for the derangement of humours. These factors are modifiable and diet modification is one of the factors recommended by ancient Unani scholars. The present paper focuses on diet having preventive and therapeutic properties in the management of acne vulgaris. This review also highlights the recent evidences regarding some diets that may be utilized as a treatment strategy in acne vulgaris. **Method:** Classical textbooks of Unani Medicine were reviewed to gather the information related to acne vulgaris from the college library. We have also searched major scientific databases namely Medline, PubMed, Google Scholar, Science Direct and Springer. The search terms used were 'Acne Vulgaris AND Unani', 'Acne Vulgaris AND nutrition', 'Diet AND Unani'. **Result:** We have found that various renowned Unani physician has recommended the diet which can be beneficial in acne vulgaris management. There are certain food items which can produce excess heat in the body. Avoidance of those food items is found to be very beneficial in acne vulgaris. It has mentioned that use of easily digestible foods like vegetable soups, consumption of food having cold properties, use of simple food items like ridge gourd, pumpkin, spinach, turnip, green gram, split red gram, mutton etc. play a major role in prevention and curing of acne. Fruits like oranges, pomegranates, apples and pears have been recommended as they possess medicinal properties in the control of acne vulgaris. **Conclusion:** This paper concluded that nutraceuticals have an impact in the prevention and management of acne vulgaris. There are potential dietary items which correct humoral derangement and temperament that help in physiological function of the body. An integrative approach would be useful to control the morbidity of acne vulgaris.

**Keywords:** Acne, Dietotherapy, Humoral Disease, Unani

**OP-2023-0185**

**Abstract Title: A Brief Review Study of the Effect of Sorghum (*Sorghum bicolor* L.) as an Emerging Therapeutic Food in the Treatment of Non Alcoholic Fatty Liver Disease**

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**Background:** Non-Alcoholic Fatty Liver Disease (NAFLD) is an increasingly preponderant hepatic manifestation of metabolic syndrome characterizing a reversible, benign intrahepatic lipid accumulation (hepatic steatosis), over-activation of lipid signalling pathways, oxidative stress, lipid peroxidation, cytokine action and liver injury markers promoting lipotoxicity, benchmarks of obesity and insulin resistance. A pathoetiological association persists with metabolic comorbidities, Non-Alcoholic Steatohepatitis (NASH) progression triggering portal fibrosis, cirrhosis and mortality via energy starvation, glucose tolerance or endoplasmic reticulum stress stimulating lipoapoptosis and necroinflammation. **Method:** The cumulative methodological approach of the article encapsulates a literature search strategy employing various databases, examination and retrieval of extant knowledge, systematized meta-analytical procedure, data extraction and empirical quality assessment. **Result:** Preclinical studies demonstrate Sorghum as a promising candidate in this quest, a gluten-free, high-fiber, low-calorie, satiety inducing and nutrient-dense functional food with lower glycemic index, B vitamins, magnesium, phosphorus, calcium, iron, prebiotics (resistant starch), and nutraceutical attributes on NAFLD-related parameters. The valorization of sorghum extends to its anti-hepatic steatosis activity, antioxidant, anti-adipogenic and anti-inflammatory properties owing to its bioactive compounds, integrating phytochemicals: polyphenols (especially phenolic acids), flavonoids,

anthocyanins, phytosterols and policosanols. Additionally, it modulates gut microbiota composition, tailors immune-metabolic gut-liver axis homeostasis by enhancing mucosal immune tolerance, mitigates hepatic cholesterol levels and atherogenic index further stimulating hepatoprotection. Sorghum and whole wheat consumption containing gluten, betaine and free choline, imprudent for celiacs has been analogized. The findings render the bioactive component's (Sorghum 3-deoxianthocyanins) biological plausibility to ameliorate hepatic lipogenesis by amplifying adenosine monophosphate-activated protein kinase (AMPK) and acetyl-CoA phosphorylation, augmenting adiponectin 2 receptor gene and protein expressions of peroxisome proliferator-activated receptor  $\alpha$  (PPAR- $\alpha$ ), curtailing sterol regulatory element-binding transcription factor 1 c gene expression for intervening fatty acid synthesis, absorption, activation and oxidation. Molecular docking analysis unveiled extruded sorghum compounds' (luteolinidin, apigeninidin, 5-methoxy-luteolinidin, 7-methoxy-apigeninidin) high affinity with PPAR- $\alpha$  receptor. **Conclusion:** At this cusp of imminent discovery, the umbrella review underscores the potential therapeutic impacts of Sorghum (*Sorghum bicolor* L.) as an apposite dietary intervention in NAFLD management compared to placebo or low intakes. Incorporating millets in the diet can reduce LDL cholesterol and Triglycerides which are risk factors of NAFLD.

**Keywords:** Sorghum, NAFLD, Steatosis, hepatoprotection, Liver

OP-2023-0186

**Abstract Title: Evaluating the Impact of Personalized Digital Weight Loss Program: A Study on Overweight Individuals with the Implementation of Intermittent Fasting, Carbohydrate Reduction and Meal Image Monitoring**

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**Background:** Obesity is a global epidemic marked by excess body fat accumulation, posing severe health risks such as type 2 diabetes, cardiovascular diseases, hypertension, and other metabolic disorders, straining healthcare systems worldwide. Effective weight management strategies that are practical and sustainable are crucial to combat this growing health crisis. One such approach involves the utilization of digital interventions to provide structured and personalized weight loss programs

**Method:** This is a retrospective study which is conducted over a 90 days period based on the analysis of the deidentified data of participants enrolled in the Mfine Weight Loss Program. Participants were recruited through direct referrals by the treating physician on Mfine application, via a social media campaign offering weight loss program, through corporate tie-ups and through webinars. The data was carried out based on the characteristics of an individual, such as dietary habits, total carbohydrate intake, number of fasting hours in a day and physical activity. The aim of this study is to evaluate the effectiveness of Mfine, a digital online platform for weight loss through total carbohydrate restriction and intermittent fasting, specifically by analyzing meal plate images shared by the participants. **Result:** The results of this research indicated a significant reduction ( $p < 0.001$ ) in weight for both male and female participants, demonstrating promising outcomes in terms of weight reduction. Among the 180 participants, 76 were females and 104 were males. At the beginning of the program, the average weight of the female group was 77 kg and male participants were 90 kg respectively. By the end of the program, the average weight reduction of female participants was  $(72.2 \pm 3.91)$  kg and males were  $(85 \pm 3.95)$  kg.

**Conclusion:** In conclusion, the study has offered a simplified lifestyle intervention with a focus on behavior through mobile health monitoring demonstrates feasibility and positive reception. It indicates promising initial outcomes in weight reduction. Importantly, the incorporation of meal image monitoring effectively records dietary habits, allowing timely personalized advice and tailored nutritional approaches that result in improved participant outcomes.

**Keywords:** Overweight, Mfine, Weight loss, Nutrition

OP-2023-0188

**Abstract Title: Maternal diet across pregnancy in women with preeclampsia**

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**Background:** Preeclampsia (PE) is a pregnancy complication which affects 8–10% of women. PE has severe long-term consequences on the health of mother and child. The role of maternal diet and the risk of PE is unclear. The present study for the first-time reports the association of maternal diet with the risk of PE. **Method:** This prospective study includes singleton pregnant women enrolled in the ICMR- CAR study, at 11-14 weeks of gestation and followed till delivery. Food frequency questionnaire (FFQ) was administered on 990 pregnant women (Non-PE=889 and PE=101) across gestation at three time points i.e., 11–14 weeks (V1), 18–22 weeks (V2) and 26–28 weeks (V3) to examine the frequency of consumption of different food items. Chi-Square tests were used to compare food intakes between groups. The association between the food groups and the risk of PE was carried out using logistic regression after adjusting for potential confounders. **Result:** The percentage of women, consuming millets daily was low (14%) in PE as compared to Non-PE (34%) at V1( $p<0.01$ ), further it remained low across pregnancy ( $p<0.01$ ). Percentage of women, consuming leafy vegetables daily was low in PE at V2 ( $p<0.05$ ). Daily Consumption of milk and milk products, Ghee and butter, Nuts and oilseed was high ( $p<0.05$ ) in early pregnancy in PE group. Lower consumption of millets ( $p<0.01$ ) was associated with the increased risk of PE in an unadjusted model at all time points of gestation. **Conclusion:** Dietary differences in early pregnancy were observed in women who developed PE as compared to normotensive women. Large cohort studies are warranted to confirm these findings.

**Keywords:** FFQ, Maternal Diet, Preeclampsia, Pregnancy

OP-2023-0190

**Abstract Title: Development of a Novel Multivariate Risk Prediction model for Gut Dysbiosis in the general population: A Pilot Project**

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**Background:** Although there are screening tools for several conditions such as diabetes, cardiac dysfunction, and neurodevelopmental disorders, no known predictive model exists to assess the risk for gut dysbiosis, which is hypothesized to be central to the development of former conditions. Current gut microbiome analyses are limited to laboratory-based techniques, which are not the most viable option for large population-wide studies. To present as a cost-effective feasible option to researchers & clinicians working with the human gut microbiome, we develop a multivariate predictive model, to assess gut dysbiosis risk in the general populace. **Method:** Based on systematic review and expert inputs, a total of 21 risk predictors are identified and grouped into four categories: Host specifics, Xenobiotics, Early-life ecosystem, and Miscellaneous. Of them, 15 predictors are used to develop a gut dysbiosis risk assessment questionnaire and given a score each, with the total scale ranging from 0-30, where 0 indicates no gut dysbiosis risk and 30 indicates the highest predicted risk. Survey tool reliability is assessed via the “test-retest” method (Pearson coefficient,  $r = 0.98$ ) and finally, the responses are recorded from 120 participants (20 March- 11 April 2023, Ahmedabad, INDIA) who volunteered for the study. **Result:** Of the 120 participants, 67.5% ( $n=81$ ) were females, with a mean participant age of 31.5 years. A majority of them ( $n=86$ ) recorded “Don’t know” or “Don’t remember” for questions concerning their early-life conditions which limited true analysis of their gut dysbiosis risk score. The data was thus bifurcated into two; those with “complete data set” and those with “incomplete

data set". Participants from each data set were further categorized into three: "Low risk", "Moderate risk" and "High risk" for gut dysbiosis. On a risk scale of 0-30, 39 participants scored low (0-10) while the rest were categorized as moderate on gut dysbiosis risk. Those at the upper limit of moderate risk (with scores of 17-18) were further typed as high-risk individuals. **Conclusion:** This study presents a first-of-its-kind attempt to scale gut microbiota composition in the general population into workable outcomes for clinicians and researchers. Further, we plan to analyze gut microbiota composition via 16S rRNA metagenomic analysis of stool samples of at least two participants representative of each group/ risk category, within the complete and incomplete data sets (n=12). This will help to understand whether the predicted scores were reflective of the host gut microbiome environment. The study will be recalibrated as per the findings of the metagenomic analysis to increase the accuracy of the scoring method. This will also aid in assessing which of the 15 predictors is better in predicting gut dysbiosis, in the absence of data for certain variables.

**Keywords:** gut-microbiome, risk-assessment, gut-dysbiosis, gut-health

#### OP-2023-0197

##### **Abstract Title: Diabetes Mellitus Type 2: Dietary Management in Unani Perspective**

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**Background:** Diabetes Mellitus is a chronic metabolic disease characterized by elevated levels of blood glucose, which leads over time to damage to the heart, vasculature, eyes, kidneys and nerves. Now a days Diabetes Mellitus is a major public health problem. In Unani Tibb Diabetes Mellitus type 2 is caused by the distemperament of kidneys or weakness of the kidneys. In unani system of medicine the diet plays important role in maintaining humoral balance and homeostasis. Unani physicians recommend some food item which strengthen the kidneys and pancreas and normalize their temperament resulting in control of serum glucose level. This review discusses the role of some dietary items in the prevention and management of Diabetes Mellitus type 2. **Method:** We searched literature available online. Major databases such as pubmed, scopus, science direct, research gate, etc. for scientific evidences published between 2010 to 2023. The classical literature such as Al Qanoon Fit tib, Kamil Us Sanat, Akseer e Azam were searched in the library. The research term used were "Diabetes Mellitus" AND "Diet", " Unani" AND "Diabetes Mellitus", and "Unani" and "Diet". **Result:** The classical literature describes the philosophy for aetiology and therapeutics and diet to manage Diabetes Mellitus. The recent researches showed that diet control is an important strategy. There are some food items which may be included in the diet of diabetic patient for blood glucose level control and prevention of complications. Unani dietary recommendation may be a therapeutic approach to control Diabetes Mellitus type 2. **Conclusion:** This study concluded that, Unani Tibb recommends diet for Diabetes Mellitus to be taken in proper proportion to control the blood glucose level and there by decrease the risk of complications of Diabetes Mellitus.

**Keywords:** Diet, Humoral, Intervention, Therapy, Unani

#### OP-2023-0202

##### **Abstract Title: Nutritional Management in Cerebral Palsy and Dystonia: A Case Report**

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**Background:** The patient was a 53-year-old male presented with Cerebral Palsy & Dystonia co-existing with Metabolic Encephalopathy and Altered GI Motility (Diarrhoea). He was on Enteral Nutritional support throughout this study. Impaired Nutritional condition resulted in Malnutrition, growth failure, decline in Sensorium E2VTM5 (GCS), pressure ulcers (Grade III), micronutrients deficiencies (Sodium, Potassium, Magnesium), Protein Energy Malnutrition (PEM) and a BMI of 14.7 kg/m<sup>2</sup>. Despite growing recognition of nutritional interventions for treatment of Diarrhoea, there is limited understanding and evidence, primarily due to small sample sizes and absence of precise biochemical indicators. The case study aimed to introduce an adequate nutritional support and monitoring as an integral part of care for CP. Chronic constipation is the dominant symptom of CP which further becomes the cause of Rectal Prolapse, as observed in this patient. Diarrhoea (watery stools 12x/day) due to diminished anal tone was the consequence of Rectal Prolapse. The Nutritional requirements of the patient were increased due to impaired intestinal absorption, pressure ulcer and high catabolic rate. Chronic Diarrhoea was followed by constipation in the second month of the study which was further treated through dietary interventions. **Method:** A Calorie target of 30 kcal/kg IBW and protein of 1.5-2.0g/kg IBW (ESPEN guidelines) was set. Nutrition rehabilitation was initiated enterally with peptide-based formula which was modified to starch and chicken-based formula feeding. These feeds were also titrated throughout weeks in accordance with stool frequency and sensitivity of GI tract and continued for a month to achieve the adequate level of energy protein content. Dys-electrolytemia was managed through specific dietary supplementations (Sodium- salt, Potassium - Lemon, Magnesium - Chicken). Probiotic feeds were added to the diet to promote growth of healthy microbes. Constipation was treated by addition of Vegetable fibres fed through Ryle's Tube. **Result:** Improved Sensorium GCS E4V1M6. Alertness, Pessimistic behavioural change, Bed Sore healed to Grade 1. Diarrhoea resolved to 1 time per day. Further, Constipation resolved and BMI improved to 16.7 kg/m<sup>2</sup>. **Conclusion:** Nutritional management continues to be the cornerstone of therapy. The study concludes that Evidence-based dietary and nutritional interventions improve the quality of life of patient with cerebral palsy.

**KeyWords:** Cerebral Palsy, Sensorium, Diarrhoea, Constipation.

**OP-2023-0212**

**Abstract Title: Value addition and assessment of glycemic index and glycemic load of some traditional Gujarati recipes.**

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**Background:** This study focuses on the critical problem of determining the glycemic index (GI) in traditional Gujarati food, particularly in light of recipe alterations aimed at lowering the GI and GL indices. The primary goal of this study is to determine the effect of dietary protein and fiber intake on the glycemic index of two well-known Gujarati dishes: Khandavi and Muthiya. **Method:** The recipes were standardized to maintain a consistent carbohydrate content. Traditional recipes were modified to increase protein and fiber content, resulting in four distinct variations: Khandavi, Modified Khandavi, Muthiya, and Modified Muthiya. Standard procedures were used to assess the proximate composition, which included characteristics such as moisture, ash, fiber, protein, fat, carbohydrate, and calorie content. The glycemic index and glycemic load of conventional and modified recipes were determined using the WHO procedure. The study included eight healthy volunteers, with a 50-gram glucose serving as the reference food for assessing GI. The glycemic index and load were calculated using the incremental area under the curve. **Result:** The comparison of traditional and modified Gujarati cuisines, Khandavi and Muthiya, revealed significant nutritional differences. When compared to their conventional equivalents, the modified Khandavi and Muthiya versions had considerably higher protein content ( $P < 0.05$ ) and enhanced dietary fiber ( $P < 0.05$ ). The fat content remained steady, whereas the carbohydrate amounts remained stable. The modified Muthiya had slightly higher ash content, indicating increased mineral content as a result of the alterations, and decreased moisture content, which contributed to improved shelf stability. The significant increase in fiber content seen in the amended recipe was especially noteworthy. The glycemic response of meals containing Muthiya, modified Muthiya, khandvi, and modified khandvi, respectively, were 112.56, 90.15, 57.04, and 54.54. **Conclusion:** The result revealed that both modified recipes had lower glycemic index than traditional

recipes, so it can be concluded that protein and fiber positively affect the glycemic index of food and little modification in traditional recipes makes them suitable for consumption by diabetes people.

**Keywords:** Glycemic index, glycemic load, protein, fiber, glycemic response.

**OP-2023-0213**

**Abstract Title: Dietary Management in Waja'al-Mafāsil (Osteoarthritis) through Unani System of Medicine**

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**Background:** Waja'al-Mafāsil (Osteoarthritis) is highly prevalent in around the globe, it is strongly related to old age and is major cause of pain and disability in older patient. Around the world estimated 10-15% of adult over 60 years are suffering with Osteoarthritis. So there is great health burden over the health care system. In Unani System of Medicine we have various non-pharmacological modalities to manage osteoarthritis more effectively, efficiently with lesser or no harmful effects. This article discusses the dietary intervention practiced in Unani System of Medicine to manage Waja'al-Mafāsil (Osteoarthritis) **Methods:** The information is retrieved from various Unani classical books, online major databases such as Google Scholar, Pubmed, ScienceDirect, and Researchgate. The article included were published between 2005 and 2023. **Result:** In various classical Unani Books the osteoarthritis management is discussed including non-pharmacological intervention such as dietotherapy. According to Unani Medicine Waja'al-Mafāsil is classified in to various types based on imbalances in Akhlaat (Humours) and Mijaz (Temperament). Accordingly, the treatment module for moderation and modulation in Akhlat (Humours) and Mizaj (Temperament) includes dietary recommendation and restriction. The Ilaj-Bil-Giza (Dietary Management) is one of the method of treatment which can be adopted independently or in combination with other methods of treatment. Basically it is based on modification and modulation in Makul waMashroob (Food and Drinks) that is one of the component of Asbab-e-sittazarooriya (Six Essential Factors). The Modification and Modulation in the diet is further based on the khilt (Humour) involved or the Mizaj (Temperament) of the disease. For example Over eating, Alcohol, and Galeez Giza (Difficult to digest) are strictly restricted in this disease. **Conclusion:** It is concluded that Ilaj-bil-Giza (Dietary Management) may be intervened to manage Waja'al-Mafāsil (Osteoarthritis). It is expected that recommended interventions if adopted can result into great benefits to suffering patients of Waja'al-Mafāsil (Osteoarthritis)

**Keywords:** Ilaj-bil-Giza, Asbab-e-sitta-Zarooriya, Mizaj, Akhlaat, Makul-wa-Mashroob

**OP-2023-0216**

**Abstract Title: NUTRIENT ADEQUACY IN PREGNANT WOMEN AND IT'S ASSOCIATION WITH HEMOGLOBIN LEVELS**

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**Background:** A hospital based purposive sampling study was designed to measure the nutrient adequacy of pregnant women and to relate the haemoglobin levels during third trimester. The study was carried out in Narayana Multispecialty Hospital, Mysore. The data of pregnant women in their third trimester were collected during their regular checkup. Participants comprised of 30 pregnant women in the age group of 18-40 years. Objective of the study was to evaluate the incidence of anemia among pregnant women, influence of nutrient adequacy and its association with estimated fetal and to study

the level of knowledge towards anemia among pregnant women. **Method:** Dietary Diversity Score (Women's Dietary Diversity Score) and structured interviewed questionnaire was used to collect the data. The questionnaire included questions about the following aspects such as anthropometric parameters like height, weight was obtained from the medical reports and MUAC was measured by the interviewer. Socio-demographic data, biochemical parameters were obtained by the medical reports, diet history, supplements received, and knowledge about anemia and also obtained from practice questionnaire. **Result:** The adequacy of energy, macronutrients, fiber, and vitamin A, C, D and B6, calcium, iron, magnesium, phosphorous, selenium and sodium are higher during 9th month of pregnancy and lower during 8th month pregnancy. The percentage of adequacy of vitamin B9 is higher during 7th month and lowers during 8th month of pregnancy and percentage of adequacy of vitamin B12 is higher during 9th month and lower during 7th month of pregnancy among 30 subjects. It was found that there was no significant association between hemoglobin level and fetal weight. **Conclusion:** Most of the pregnant women were aware about anemia but were unaware about the possible complications and its management. Attitude towards anemia was average. There is a significant association between place of residence and anemia. Awareness should be created through appropriate nutritional counseling during antenatal visits.

**Keywords:** Anemia, nutrient adequacy, pregnancy, hemoglobin

**OP-2023-0218**

**Abstract Title: Silkworm Pupae-Derived Protein and its Nutritional Impact on Rat Growth Patterns**

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**Background:** With traditional agricultural methods falling short in meeting the escalating global demand for nutrients, the looming threat of food insecurity by 2050 necessitates exploration into alternative food sources. This study delves into the potential of silkworm pupae protein as a viable solution to this impending crisis. This impending crisis underscores the urgency to explore alternative food sources. Silkworm pupae, owing to their high protein content, emerge as a promising candidate for addressing this challenge. Hypothesis: In light of silkworm pupae's rich protein profile, we postulate that its incorporation into the diet of Wistar albino rats will yield notable growth-promoting effects compared to conventional dietary sources. **Methods:** The study was conducted at Assam Agricultural University, with silkworm (SK6\*SK7) collected from Majuli, Assam. The pupae underwent defatting using n-hexane, followed by pulverization to obtain a protein-rich powder. The protein was then extracted through a non-enzymatic process and made edible by pH adjustment. Young Wistar albino rats, weighing 50 grams each, were selected as the study population. Growth parameters were meticulously recorded over the course of a one-month study period. Comparative analyses were performed against groups fed a protein-free diet, casein diet, defatted silkworm pupa powder, and a standard diet. **Result:** Significant variations ( $P < 0.05$ ) were observed across all experimental groups in key growth indicators including weight gain, total feed intake, protein consumption, Protein Efficiency Ratio (PER), Food Efficiency Ratio, Net Protein Retention Ratio, Net Protein Ratio (NPR), Net Protein Utilization (NPU), and Biological Value (BV). Rats on a protein-free diet exhibited notably inferior results compared to their counterparts in the other groups. **Conclusion:** This study substantiates the potential of silkworm pupae as growth promoters, offering a safe and viable dietary option. The findings highlight the significant impact of silkworm pupae protein on growth parameters in wistar albino rats, underscoring its promise as an alternative nutrient source to combat future food insecurity challenges.

**Keywords:** Silkworm, pupae, Protein, Growth, Insecurity, Defatting



OP-2023-0223

**Abstract Title: Efficacy of quality protein maize bars with special reference to improvement in health status of school children**

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**Background:** Quality protein maize (QPM) was adopted as a biofortified cereal with an enhanced profile of amino acid, and offers a significantly ( $p \leq 0.05$ ) higher biological value (80%) which makes it equivalent to 90 % of the milk protein (casein). The present study was aimed at the development of quality protein maize based nutritious bars and their efficacy to improve the nutritional status of school children. **Methods:** Three different types of bars were formulated. The composition of bar I was only processed QPM (41 to 53%), bar II and bar III were PQPM (20.5 to 33%) + Processed green gram/chickpea (08 to 20.5 %). Other ingredients such as cauliflower leaf powder (2%), carrot powder (5%), and different types of sweeteners (40 to 52%) were also added to all the bars. These were analysed for their organoleptic, nutritional, functional, and anti-nutritional composition. Normal maize was used as a control sample. The shelf life of packed bars (high density polyethylene and aluminium bags) was also assessed at an interval of 30 days for a period of 120 days. These developed bars were supplemented to selected 100 school children (7 to 9 years) by dividing equally into four groups viz. control and experimental (I, II, and III). The efficacy of supplementation of developed bars was assessed in terms of changes in the prevalence of malnutrition and anemia after the trial of 90 days. **Result:** The nutritional and functional properties of the highly acceptable bars viz. protein, fat, energy, lysine, tryptophan, cystine, amino acid score, and protein digestibility corrected amino acid score, unsaturated fatty acids,  $\beta$ -carotene, and percent nutrient digestibility were higher than that of control bars. The maximum increase in weight and mid-upper arm circumference of children was observed in groups supplemented with chickpea bar followed by green gram bar and only quality maize bar. An increase in total protein, serum albumin, and haematological profile was recorded in all the experimental groups after supplementation of bars for 90 days. The shelf life stability of bars revealed that bars I and III packed in high density polyethylene were acceptable till 120 days. **Conclusion:** Reduction in the prevalence rate of malnutrition and anemia among school children was higher with supplementation of bars with a combination of quality protein maize and legumes and are highly recommended in supplementary feeding programs to achieve the target of zero malnutrition.

**Keywords:** bars, haematological, malnutrition, packaging, sweetener

OP-2023-0225

**Abstract Title: Dietary intervention in Ḍaght al-Dam Qawī (Hypertension) in reference to Unani Medicine**

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**Background:** Ḍaght al-Dam Qawī (Hypertension) is a recognized factor for cardio-vascular disorders, with higher rate morbidity and mortality. Unani Medicine offers a dietary approach to hypertension. Unani Scholars established Imtilā' baḥasb al-Aw'iya (repletion in regard to vessels) as the pathological condition for hypertension. This Imtilā' baḥasb al-Aw'iya (repletion in regard to vessels) is a modifiable condition through intervention by diet and drug. This article discusses the role of diet in prevention and treatment of Hypertension. **Methods:** This review article is based on search of online and offline literature. The major databases such as Google Scholar, Pubmed, ScienceDirect and Researchgate were searched with search terms such as Hypertension and Unani. We included the article published between 2010 and 2023. **Result:** In this study, we found the articles explaining Unani dietary practices

that includes restrictions and recommendations of some dietary items in the diet. The recent researches have revealed that some food items increases the process of atherosclerosis including dyslipidaemia. **Conclusion:** This articles concludes that Unani dietary practices may be beneficial for control of hypertension.

**Keywords:** Imtilā'-baḥasb-al-Aw'iyā, Humour, Dietary Management

## EXPERIMENTAL NUTRITION

PP-2023-0004

**Abstract Title: Ragi Brownie -A millet based approach towards Calcium deficiency**

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**Background:** This study deals with the development, sensory evaluation, nutrient analysis and shelf-life study of Ragi Brownie as a supplement for calcium deficiency, a micro-nutrient deficiency. The product development was carried out with three variations of Ragi brownie, and the variation which was approved by the sensory panel was further analysed for nutrient analysis and shelf-life. The Finger Millet (Ragi) was picked to develop calcium rich product as they are nutritionally rich in calcium and ecologically sustainable while being abundantly climate resilient. The process used for development of Ragi Brownie is made simple and cost effective to make the adoption smooth and achieve desired results. **Methods:** The developed product was prepared in 3 variations and subjected to sensory evaluation. The product with the high score in sensory evaluation was analyzed for nutrient, shelf life analysis and cost calculation. The Statistical analysis was carried out with SPSS. **Result:** Formulation 1 with 100% ragi flour was found to be the most popular and palatable option among the developed products. The results of the nutrient analysis were 646g of total carbohydrates, 406 of energy, 5.1 g of protein, 11.1g of fat, 4.6 g of fibre, 196 mg of calcium, 5.1mg of iron and 38.1 µg of folic acid. Total fungal count was <10 cfu/g and 1x10<sup>2</sup> cfu/g for 7th and 10th day respectively. The bacterial count was observed to be 230 cfu/g and 48x10<sup>2</sup> cfu/g on 7th and 10th day respectively. The cost calculation of 100g of Ragi Brownie made with 100% ragi flour is 16.35 rupees. **Conclusion:** The Ragi Brownie is a good product to meet the calcium deficiency. The process used in the development of Ragi Brownie is simple. The result of both total fungal count and total bacterial count shows that the colony count was within the acceptable limit for 7th day and the colony count went beyond the acceptable limit within 10th day. Therefore, the product will have a shelf life or rather we can say the developed product, Ragi Brownie, need to be consumed within 10 days of manufacturing. Ragi brownie is made with ingredients which can be locally procured by common person.

**Keywords:** RagiBrownie, Total Bacterial Count, Nutrient Analysis

PP-2023-0015

**Abstract Title: Cost Effectiveness Of Developed Mung Bean (Vigna Radiate) Based Dairy Analogue**

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**Background:** Customers seek certain features in nutritional plant based beverages that fit into their lifestyles and satisfy a variety of purposes. The primary goal of one of these crucial plant based dairy alternatives is to address the health-related issues that includes incidence of hypercholesterolemia, lactose intolerance, cow's milk allergy, and high calorie consumption. Taking into consideration, present research work was planned to develop mung bean (Vigna Radiate) based dairy analogue that is both

economically adequate and carries a good amount of nutritional properties as well. **Methods:** The acquired mung bean (*Vigna radiata*) from Punjab Agricultural University, Ludhiana having variety of summer mung (SML 1827) was cleansed, unwanted material was thrown away, and the raw material was then processed to extract dairy analogue from the mung bean through different food processing techniques such as soaking, germination and blanching. At 35–40 °C, the extracted dairy analogue was heated and poured into clean glass bottles and then corked at a temperature of 25 °C. The full glass bottles were sterilized for 15 minutes at 121°C. Then the milk was kept at 4°C and then further chilled to 5 °C. **Result:** The results revealed that developed mung bean based dairy analogue (mg/100ml) contains Energy upto 30.9 Kcal, Protein 4%, Total Fat 0.04%, CHO 3.56%, Ash 0.47%, Calcium 1.49 mg, Potassium 1.61mg, Iron 0.41mg, Phenylalanine 12.7mg, Isoleucine 0.9%, Lysine 9.9 mg, Valine 1.51mg, Tyrosine 8.41mg and Histidine 1.91mg. The developed product was highly nutritious along with low cost (Rs.30/L) as well. Moreover, it has storage life upto 5 days in a refrigerator without any use of preservatives. **Conclusion:** It can be inference that the developed product technology can be transferred to the self-help group, farmers or farming community and also among vulnerable group as well. Pilot plants on processing of mung bean (*Vigna Radiata*) can also be installed for developing this dairy analogue to provide this nutritional and cost effective product to the consumers.

**Keywords:** cost, mung bean, nutrition, protein

**PP-2023-0016**

**Abstract Title:** Vitamin D3 improves classical functions more effectively than Vitamin D2 in rat model

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**Background:** Vitamin D (VD) deficiency is widespread globally. Based on the magnitude of VD deficiency in India, FSSAI has mandated the fortification of milk and edible oil with VD2. Owing to vegetarianism and cultural reasons, VD2 is a more popular fortificant in India. However, the structural differences in the side chains of VD2 and VD3, directly affect their metabolism, with VD3 showing a greater half-life than VD2. Thus, it is particularly important to study the relative bioavailability and potency of VD2 and VD3. Therefore, the present study was aimed to decipher the role of the two vitamers (VD2 vs VD3) when used independently or in combination at different levels in impacting the functions of the classical target organs (bone, intestine, and kidney) using animal models. **Methods:** A depletion-repletion study was designed with VD2, VD3, combination of both vitamers or VD deficient diets using weanling male Sprague-Dawley rats. Serum parameters were measured using LC-MS/MS, ELISA and standard procedures. Radioactive 45 Calcium was used to check fractional calcium absorption. Bone mineral density (BMD) and bone mineral content (BMC) were measured by DEXA, and bone strength (BS) was measured using a Digital Force Tester. Gene expression was analyzed using qPCR. **Result:** Serum levels of markers of VD status: 1,25-(OH)<sub>2</sub>D and calcium were significantly decreased in the deficient group than groups given either VD3 or VD2. A trend of higher intestinal 45Ca absorption was found in the groups fed with VD3 based diets in a dose-dependent manner. BMC, BMD and BS were also significantly low in the deficient group and normalized upon rehabilitation. However, VD3 based diets appeared to be more efficacious than VD2 based diets in improving BMC and BS. Expression of Calbindin-D9k and Calmodulin in duodenum were downregulated in the deficient group which appeared to be corrected upon rehabilitation. Expression of Cubilin, PMCA1b and VDR genes in kidney were also reduced in the deficient group and partially corrected in groups rehabilitated with either VD3 or VD2. **Conclusion:** VD3 improved classical functions more effectively than VD2, whereas, the combined diet showed mixed outcomes. VD3 could be a better alternative than VD2 for food fortification and supplementation programs.

**Keywords:** Bone, Calcium Absorption, Fortification, Vitamin D

PP-2023-0024

**Abstract Title: Exploring the Complex Interplay: Neurotoxicity of Pb and Amyloid Peptides in Neuronal Cells and the Potential Neuroprotection by Rosmarinic Acid**

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**Background:** Lead (Pb) exposure and the accumulation of amyloid peptides are recognized factors contributing to neurotoxicity and the pathogenesis of neurodegenerative disorders, including Alzheimer's disease. The present study investigates the intricate mechanisms underlying neurotoxicity induced by Pb and amyloid peptides in neuronal cells, focusing on alterations in antioxidant capacity, glutamate synthesis, protein carbonylation, oxidative damage to DNA, and the elevation of inflammatory cytokines. Additionally, the potential neuroprotective effects of Rosmarinic acid, a natural polyphenolic compound found in various herbs, including rosemary, basil, and mint are explored. **Methods:** SHSY5Y neuronal cells served as the experimental model to investigate the combined impact of Pb and amyloid beta peptides. We assessed the neuroprotective potential of rosmarinic acid against this synergistic insult, employing ELISA kits for inflammatory markers and colorimetric/fluorometric assay kits for other analyses. **Result:** Exposure to Pb and amyloid peptides resulted in a decrease in neuronal antioxidant levels, leading to increased vulnerability to oxidative stress. Furthermore, these neurotoxic agents were found to elevate glutamate synthesis, thereby exacerbating excitotoxicity. Protein carbonylation, indicative of protein oxidation and dysfunction, was substantially augmented in treated cells. Additionally, DNA oxidative damage was observed, suggesting potential genomic instability. Concomitantly, the release of pro-inflammatory cytokines (TNF $\alpha$  and IL-1 $\beta$ ) was significantly upregulated, contributing to neuroinflammation. Notably, treatment with rosmarinic acid exhibited neuroprotective effects against Pb and amyloid peptide-induced toxicity. Rosmarinic acid effectively restored antioxidant capacity, mitigated glutamate overproduction, reduced protein carbonylation, and attenuated oxidative damage to DNA. Moreover, rosmarinic acid reduced the levels of inflammatory cytokines, thus attenuating the neuroinflammatory response. **Conclusion:** In conclusion, this study underscores the neurotoxic effects of Pb and amyloid peptides on neuronal cells, elucidating alterations in antioxidant defenses, glutamate metabolism, protein stability, DNA integrity, and inflammatory processes. Furthermore, the promising neuroprotective properties of rosmarinic acid highlight its potential as a therapeutic agent for ameliorating neurotoxicity associated with Pb and amyloid peptides, offering a promising avenue for the development of interventions in neurodegenerative diseases.

**Keywords:** Neurotoxicity, Neuroprotection, Heavy metals, Neurodegeneration, Rosmarinic

PP-2023-0029

**Abstract Title: Homology Model and Docking- Based Virtual Screening for Ligands of Pomelo Fruits as Inhibitor of 14-3-3 protein involved in Atherosclerosis**

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**Background:** The pomelo fruit variety (*Citrus maxima*) which is a principal ancestor of the grapefruit belonging to the Rutacea family also referred to as giant grapefruit. The pomelo fruit is known to be highly nutritious and a store of valuable vitamins, fiber and important phytochemicals which potentially help in the management of non communicable diseases such as atherosclerosis, diabetes, hormonal imbalance and cancer. To fill the lacune in the work an attempt is made in the present study to perform homology modeling and in silico studies of 14-3-3 protein involved in Atherosclerosis and to Visualize the interactions between ligands of phytochemical components present in pomelo fruit varieties and 14-3-3 protein by Discovery Studio. **Methods:** Identification of protein sequence using UniprotKB , Identification of protein using BLAST, Downloading 3D sequence using PDB, Active site using CastP ,

Docking of Ligand and Macromolecule using Discovery Studio. **Result:** The 14-3-3 protein model was tested against 10 molecules viz Naringenin, Naringin, Antioxidant, Hesperidin, Neohesperidin, Tannin, Limonin, Caffeic acid, Carotenoid and Acridone which showed highest affinity values to test their inhibitory activity of 14-3-3 protein involved in Atherosclerosis. **Conclusion:** Pomelo Fruit has a positive effect in management of Atherosclerosis.

**Keywords:** Homology, Ligands, Pomelo, Docking, Atherosclerosis

#### PP-2023-0032

**Abstract Title: A combined measurement of fat- and water-soluble vitamins in biological fluids by Liquid Chromatography and mass spectrometry.**

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**Background:** Measurement of fat- and water-soluble vitamins is challenging due to their chemical structures and properties. Previously published methods mostly have focused on measuring the individual form or a class of vitamins in a single method. We have developed a combined methodology to quantify both fat (vitamin A) and water soluble (vitamin B1 and B6) vitamins in a single run and can measure all other forms of fat- and water-soluble vitamins by Liquid Chromatography and mass spectrometry. **Methods:** Blood samples collected from 10 healthy volunteers in EDTA vacutainers were processed for plasma separations. Plasma aliquots and pooled quality control samples (300 µl) were spiked with labelled internal standards (D4-retinyl acetate, D3-pyridoxal, and <sup>13</sup>C3-thiamine for vitamin A (retinol), vitamin B1 (Thiamine) and vitamin B6 (pyridoxal) respectively and deproteinized with methanol containing 1% acetic acid in water. The dried extracts were reconstituted with water containing formic acid, heptafluorobutyric acid, butylated hydroxytoluene (0.1% each) and 1% ascorbic acid and analysed by an Agilent 6495 iFunnel Triple Quadrupole Liquid chromatography mass spectrometry (LCMS-MS) equipped with a 1290 Infinity binary pump, autosampler, and a thermostatted column compartment. The MS was operated in heated-electrospray mode with positive polarity in a dynamic reaction monitoring (DMRM) based method. The concentrations of unknown samples were quantified by the respective regression equations for individual vitamins generated by plotting peak-area ratios of respective vitamins against their concentrations in standards. The data was acquired using Agilent masshunter workstation data acquisition (version A.00.08.112). **Result:** Standard curves were linear in the range of 0.05-10 µmol/L for retinol ( $r^2 = 0.9979$ ), 0.0001-0.15 µmol/L for thiamine ( $r^2 = 0.9996$ ) and pyridoxal ( $r^2 = 0.9979$ ). Intra- and inter assay CVs were <8% and <12% respectively. **Conclusion:** A modified methodology to measure both fat- and water-soluble vitamins is developed and can be used in profiling of all the vitamins exhibiting similar chemical properties.

**Keywords:** blood plasma/serum, water-soluble vitamins, fat-soluble

#### PP-2023-0033

**Abstract Title: Relationship of natural abundance of carbon and Nitrogen Stable Isotope Ratios with dietary intake of sugar**

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**Background:** The use of dietary based biomarkers can be useful towards validating the limitations of self-reported dietary intake data. The use of stable isotope ratios of carbon and nitrogen as biomarkers



in dietary assessment studies is increasing. Since the abundance of the  $^{13}\text{C}$  (CIR-carbon isotope ratio) and the  $^{15}\text{N}$  (NIR-nitrogen isotope ratio) isotopes varies in different food sources from plant and animal origin, the stable isotope ratios ( $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$ ) in human biological material can be used to assess the dietary intakes. Here, we investigated the utility of using stable isotope ratios of nitrogen and carbon in serum from participants with added sugar intake. **Methods:** A cross-sectional study was conducted at St. John's Medical College/Hospital, Bengaluru on 73 participants (male and females; 18-45 years) after a written informed consent. Their 24-hour dietary recalls based intakes for 7 non-consecutive days (including 2 weekend recalls) were collected over a maximum period of one-month and a blood sample to measure the CIR and CIR-ala biomarkers of sugar intake on a weekday. CIR and NIR were measured by EA-IRMS and data was exported to excel sheet for further analysis. **Result:** The serum carbon isotope ratio were not found correlating with added sugar intake (average intake for a week). However, the CIR from low sugar intake participants was lower than higher sugar intake participants. **Conclusion:** The natural abundance of carbon and nitrogen isotopes can be used to determine the low vs high sugar intake to assess overall metabolic health. Further work should focus on the advantage of these combinations of biomarkers to monitor dietary changes, and whether stable isotope ratios alone or in combination with other biomarkers provide greater sensitivity, specificity, and ultimately reliability and reproducibility when distinguishing between different dietary habits.

**Keywords:** dietary recall, stable isotopes, IRMS

**PP-2023-0034**

**Abstract Title: Amino acid profiles of cow milk, curd, human breastmilk and curdled human breastmilk by Liquid Chromatography and mass spectrometry.**

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**Background:** Amino acids are building block of protein and form a key aspect of milk protein quality. The available literature of amino acid composition provides values in quantities (mg/g) of total protein or total nitrogen without accounting the differences between crude protein derived from total nitrogen and true protein from protein nitrogen. Since the total amino acids content is composed of protein and non-protein nitrogen, it is important to measure and report the true concentrations. Here we quantified the free amino acids concentrations in the cow milk, curd and human breastmilk by Liquid Chromatography and mass spectrometry to characterise the difference in amino acids profiles precisely.

**Methods:** Commercially available milk and curd samples (Nandini, KMF) and human breastmilk samples (200  $\mu\text{L}$ ) from a volunteer (lactating mother) were spiked with U- $^{2}\text{H}$  labeled amino acid mixture (>97% purity; Cambridge Isotope Laboratories) and Nor-Valine (Sigma-Aldrich) as internal standards (IS) and defatted with diethyl ether (100 $\mu\text{L}$ ) and acidified. Samples were then deproteinized by chilled acetonitrile (400 $\mu\text{L}$ ) and supernatant were transferred to preconditioned cation exchange columns (50WX8–100 ion-exchange resin, Sigma- Aldrich) for further purifications and free amino acids were eluted with 2 mL of ammonium hydroxide ( $\text{NH}_4\text{OH}$ , 4 M, Merck) solution. Eluates were dried and derivatized to their N-ethoxycarbonyl ethyl ester derivatives and analysed by Liquid Chromatography - "Mass Spectrometer (LC-MS/MS, 6460 Triple Quadrupole, Agilent, CA, USA), equipped with Agilent Jet Stream technology, 1290 Infinity binary pump, and a temperature-controlled column compartment and autosampler. The MS was operated in heated-electrospray mode with positive polarity in a dynamic reaction monitoring (DMRM) based method. Amino acid concentrations were quantified by using 8 levels (range: 5-1000  $\mu\text{mol/L}$ ) containing (mixture of Leucine, Lysine, Arginine, Valine, Phenylalanine, Isoleucine, Threonine, Histidine, Methionine, Tryptophan, Proline, Glycine, Serine and Glutamine, >97% purity; Sigma-Aldrich). The concentrations of unknown samples were quantified by the respective regression equations for individual amino acids generated by plotting peak-area ratios of respective

amino acids against their concentrations in standards. In-house pooled milk-based QC samples were analysed with each batch of samples at the beginning and at the end. The data were processed using Agilent Mass Hunter Quantitative analysis software (version B 07.00). **Result:** Standard curves were linear in the range of 5-1000  $\mu\text{mol/L}$  for all the amino acids. The intra- and inter- assay CV of the assay was <6% and <10% respectively. The results show a significant difference in lysine concentrations in milk, curd breastmilk and curd such that the curdled breastmilk showed higher concentrations than curd, milk and human breastmilk. **Conclusion:** A standardized assay to measure free amino acids from dairy based products that can be helpful to assess the protein quality of various foods.

**Keywords:** Breastmilk, curd, amino acids

**PP-2023-0047**

**Abstract Title: Increased inflammation in diabetic women undergoing laparoscopic surgeries**

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**Background:** An increase in inflammatory markers such as total WBC counts (TWC) and C-reactive protein (CRP) has been reported in type 2 diabetic (T2DM) individuals. In this study, we analyzed these differences in a sex-specific manner as the role of sex in T2DM associated inflammation has not been explored. **Methods:** Adult men and women undergoing laparoscopic surgeries were recruited from the Department of General Surgery, St. John's Medical College and Hospital, Bangalore. T2DM was characterized as glycated hemoglobin (HbA1c) values >6.5%. 27 T2DM (men:10; women:17) and 33 normal-glucose-tolerance (NGT) individuals (men:16; women:17) were recruited. Anthropometry and biochemistry were measured. **Result:** TWC (cells/ $\mu\text{l}$ ) [32 NGT: median (Q1, Q3) 6550 (5810, 8263); 27 T2DM: 7590 (6835, 9050);  $P=0.020$ ] and absolute neutrophils count (ANC) (cells/ $\text{mm}^3$ ) [NGT: 3695(3234, 4708), T2DM: 4617 (3805, 5307);  $P=0.031$ ] were higher in diabetics, and in T2DM women, TWC [16 NGT: 6360 (5755, 7675), 17 T2DM: 7770 (6750, 9160);  $P=0.026$ ], ANC [NGT: 3695 (2965, 4370), T2DM: 4870 (4250, 5313);  $P=0.029$ ] were higher, but not in T2DM men. CRP (mg/L) levels [29 NGT: 1.56 (0.70, 3.42), 24 T2DM: 3.74 (1.48, 8.11);  $P=0.044$ ] were higher in diabetics. In T2DM men ( $n=9$ ), TWC (Pearson's correlation ( $r$ )=0.70,  $P=0.035$ ), neutrophils (%) ( $r=0.79$ ,  $P=0.012$ ) and ANC ( $r=0.81$ ,  $P=0.008$ ) positively correlated with CRP levels. In NGT women ( $n=13$ ), neutrophils ( $r=0.75$ ,  $P=0.003$ ) and ANC ( $r=0.62$ ,  $P=0.023$ ) positively correlated with CRP levels. These relations were not seen in NGT men or T2DM women. BMI ( $\text{kg}/\text{m}^2$ ) positively correlated with neutrophils ( $r = 0.72$ ,  $P = 0.028$ ) in T2DM men ( $n=14$ ) (28.2 (26.3, 34.5)) but not in NGT men or in women (NGT and T2DM). **Conclusion:** Total WBC counts, absolute neutrophil count and CRP were higher in diabetics. T2DM women had higher levels of these inflammatory markers when compared to NGT women. However, these differences were not seen among men, suggesting the role of sex in T2DM associated inflammation. Correlation of BMI and neutrophils have been reported previously, but not specifically amongst T2DM men. Future longitudinal studies in larger number of subjects will improve mechanistic understanding of these observed sex-specific differences in inflammatory state in diabetics.

**Keywords:** Type 2 diabetes mellitus, inflammation

**PP-2023-0059**

**Abstract Title: Characterization and Antioxidant activity of the green synthesized Silver Nanoparticles from Finger Millet (Eleusine Coracana .L) Milk**

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**Background:** In India Finger millet (*Eleusine coracana*) is one of the major crops and it plays a significant role in world's millet production map as it produces around 41% of world's production followed by Africa. It has abundant range of protein, fat, and minerals, particularly calcium and iron; It is an easy-to-digest food that doesn't produce acid. It is regarded as one of the least allergenic and get easily digested grains. Hence finger millet grain is extremely nutrient-dense and it has health beneficial effects.

**Methods:** Milk was extracted from finger millet and AgNPs were synthesized by reacting aqueous solution of Ag nitrate (AgNO<sub>3</sub>) and millet milk. The synthesized NPs characters were analyzed by Ultraviolet-Visible spectroscopy (UV), Fourier transform infrared spectroscopy (FTIR), X-ray diffraction patterns (XRD), Energy Dispersive X-ray Analysis (EDAX), and Scanning Electron Microscope (SEM). Qualitative Phytochemical analysis done by standard procedure and DPPH method was used to determine the antioxidant activity of the AgNPs. **Result:** The results of this study shows that the Phytochemical such as phenol, flavanoid, terpenoid, and steroid were present and the antioxidant activity of the developed silver Nanoparticles from finger millet milk contains 70 % **Conclusion:** Since the silver Nanoparticles have the ability to enter into cancer cell effortlessly, the green synthesized silver Nanoparticles from finger millet milk may provide great benefits in cancer treatment.

**Keywords:** Nutrient Dense, Nanoparticles, Antioxidant Activity, Phytochemical

**PP-2023-0063**

**Abstract Title: Formulation And Quality Analysis of Probiotic Ice-Cream Prepared Using Lactobacillus Strains**

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**Background:** Probiotics are live microorganisms, typically bacteria or yeasts, that are believed to have beneficial effects on digestive health when consumed in adequate amounts. They are commonly found in certain foods and supplements. **Methods:** The formulated ice cream was evaluated for its proximate composition, quality parameters and aspects. The storage stability was also evaluated to check the viability of probiotics on storage. **Result:** The findings revealed the probiotic viability was constant for first 15 days & later on decreased gradually. The sensory quality was acceptable & the viability can be increased by some effective processing methods like encapsulation. **Conclusion:** Lactobacillus strains are effective in treating various gastro intestinal disorders, adding them in ice cream can make it accessible for a large population.

**Keywords:** Probiotic, Lactobacillus, Proximate Composition, Encapsulation

**PP-2023-0064**

**Abstract Title: Studies on the Development of RTE EAT THEPLA and its Premix**

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**Background:** Thepla is the nutritious, traditional Indian unleavened flat bread similar to chapati, commonly consumed products in the Indian diet. **Methods:** The preparation of thepla is tedious additives include yeast fat, skim milk powder potato flour & certain emulsifier, hydrocolloids enzymes & preservatives are included in the formulation to improve the dough handling **Result:** The present study of RTE eat thepla& its premix had appearance, color, texture mouth feel and pungency experienced by the panelists. Thepla which had highest overall acceptability. **Conclusion:** Thepla was most journey-friendly snacks thepla has good taste and has a high nutritive value and thepla is cheap and primary source of protein and energy and dietary fiber, low carbohydrate and fat. Changing of modern life style and health conscious among individuals.

**Keywords:** RTE Premix, Emulsifiers, hydrocolloids, skimmilk

**PP-2023-0069**

**Abstract Title: Antimicrobial analysis of medicinal plants used in traditional rice beer starter culture of Assam against five human pathogenic bacteria**

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**Background:** Rice beer is one of the oldest and widely consumed beverages in North Eastern states of India. More than 225 tribes with different cultural background brew this rice beer at their home following age old method of preparations. The preparation of each rice beer is almost similar but each community uses different plants and plant parts and believes that each of these plants contains unique medicinal property which makes the rice beer the healthiest drink for social functions. **Methods:** Six medicinal plants used in the processing of traditional rice beer starter culture of Assam were screened for potential antibacterial activity against 5 bacterial species, namely Salmonella typhi, Escherichia coli, Listeria monocytogenes, Shigella and Serratia. Antibacterial activity of ethanolic and methanolic extracts was performed by agar disc diffusion method. **Result:** The maximum zone of inhibition against Ecoli was showed by Ethanolic extract of Cucurmin longa leaves (25mm), Polygonum hydropiper (23mm), Drymaria cordata (23mm) and Psidium guajava leaves (24mm) and methanolic extract of Polygonum hydropiper (18mm) and Vitex negundo (24mm). **Conclusion:** Many of the plants are found to be a good source of phytochemicals and possess antibacterial activity against all the selected pathogen except Shigella. This validates the use of these selected plants by different communities in the preparation of rice beer starter culture. The outcome of the present study can be recommended for in-depth analysis of the medicinal plants, and further, the rice beer prepared using the selected plants to find out the efficacy of the plants as therapeutic agent for prolonging longevity and attaining positive general health.

**Keywords:** Rice Beer, Medicinal plants, antimicrobial

**PP-2023-0087**

**Abstract Title: Fathers Matter Too: Exploring the Consequences of Paternal Folate Deficiency on Placental Imprinted Genes.**

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**Background:** The impact of maternal folate deficiency during pregnancy on fetal development and epigenetic regulation is well-documented. However, the influence of paternal folate deficiency, a relatively unexplored area, on the placental epigenome and gene imprinting remains a subject of inquiry. The hypothesis was driven by the growing recognition that paternal dietary factors and epigenetic contributions may play a substantial role in fetal health and development. **Methods:** In this comprehensive investigation, C57BL/6 male (n = 16) and female mice (n = 48) were used and were subjected to experimental diets as per their grouping; PNMN (Paternal Normal Maternal Normal), PDMN (Paternal Deficient Maternal normal), POMN (Paternal Over-supplementation Maternal Normal) and PDMD (Paternal Deficient Maternal Deficient). Fetal growth parameters were recorded and fetal sex was determined. Folate levels in serum were assessed using a biochemical assay. The expression levels of folate transporters and imprinted genes were determined by quantitative real-time PCR (qPCR). Methylation patterns of imprinted genes in the placenta was analyzed using bisulfite sequencing. **Result:** In this study, both male and female mice experiencing folate deficiency exhibited reduced body weight compared to their healthy counterparts. Moreover, fetal and placental weights were significantly diminished in groups with both maternal and paternal folate deficiency. A substantial decrease in serum folate levels was detected in the folate-deficient groups. Regarding folate transporters, FR $\alpha$  and RFC exhibited decreased expression in the PDMN group, while PCFT expression increased across all groups with maximum increment in the PDMD group. Among imprinted genes, CDKN1C, PEG3, and IGF2R displayed significant downregulation, whereas expression of H19 notably increased in the PDMN group. The study also examined the methylation patterns of imprinted genes, shedding light on potential epigenetic mechanisms underlying these observed effects. **Conclusion:** This study highlights that paternal folate deficiency has significant repercussions on fetal development as evident from decreased fetal and placental weights and altered expression and epigenetic regulation of growth related imprinted genes. Additionally, the findings underscore the importance of considering paternal folate status as a potential factor in fetal health, complementing the well-established role of maternal folate intake during pregnancy.

**Keywords:** Paternal Folate deficiency, Gene Imprinting.

PP-2023-0096

**Abstract Title : Enhancing Nutrient content and Reducing Anti-Nutrients in Millets through Micro milling Technology: A Comprehensive Research Study**

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**Background:** With the emergence of new processing technologies in the food industry, a product can be produced which will be beneficial in terms of processing advantage, novelty, physiological functions and also in terms of nutritional factors and promoting as a suitable ingredient. Millets at the forefront being constituted as important sources in human diet. Like other grains, several anti-nutritional factors are found in millets, due to which there is a reduction in nutrient bioavailability. This micro milling technique is a mechanical and high shearing operation in reducing the particle size to the micron range. Size reduction done by grinding is most common and extensively used in the food industry. The aim of this research study is to focus on the novel food processing techniques for reduction of the naturally occurring anti-nutrient content in millets. **Methods:** The technology used in the study is Ball milling technique, which is commonly used for ultrafine grinding comprises a hollow cylinder that rotates around its axis, with set parameters like the driving conditions (ball size, milling time and rotational speed). Major millets- Sorghum, Finger millet and Pearl millet were subjected to pre milling for the breakdown of the grains and then designed the experiments using central composite design. A set of 13 experiments were performed. Nutritional, functional properties and anti-nutritional content were examined. **Result:** The results confirmed that all the 3 major millets could effectively reduce the particle size from (132  $\mu\text{m}$  to <9.27  $\mu\text{m}$ ) respectively with a change in reduction of the anti-nutrient content (5.8

to 0.3%) by ball milling. Moreover, the micronization process could even effectively increase the nutrient intake of its initial value given by the IFCT 2017, at a different milling parameter. Significant differences were considered at  $P < 0.05$ . **Conclusion:** The findings of the study showed that particle size distribution has great importance with nutritional and anti-nutritional content of the millet grains besides its functionalization of food material for the food industry. Creating a remarkable solution in the white space of millet processing industry.

**Keywords:** micro milling, anti-nutrient, particle size

**PP-2023-0099**

**Abstract Title : Vitamin B6 deficiency induces cardiac fibrosis through AGE-modification of extracellular matrix proteins.**

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**Background:** Our earlier studies indicated that modification of extracellular matrix (ECM) proteins by advanced glycation end products (AGEs) may have a role in fibrosis. Besides its numerous cellular and metabolic functions, pyridoxamine (B6-vitamer) is reported to counteract the formation of AGEs. Hence, in the present study we investigated the impact of vitamin B6 deficiency on AGEs formation vis-a-vis cardiac fibrosis in a rodent model to provide a strong rationale for targeting AGE inhibition by B6 supplementation in fibrosis. **Methods:** Wistar rats of 2-month-old were divided into control, B6-deficient and B6-supplementation groups. B6 levels in the diet and plasma were estimated by the HPLC method. Analysis of body composition (TOBEC) and recording of electrocardiogram (ECG) were performed on these animals. Heart sections were analyzed for histological (H&E staining) and fibrotic changes (MT staining). The extent of AGE modification in ECM isolated from the heart of experimental rats along with fibrotic markers were determined by immunoblotting. Total collagen and hydroxy proline levels in heart tissue were also determined. **Result:** The depleted levels of B6 in the diets and plasma confirmed B6-deficiency in the deficient group. Typical signs of B6-deficiency appeared in the deficient animals as early as 13-weeks after the feeding schedule, and chronic symptoms like scaly nose, paws & tail, edematouspaws and convulsions were observed by 20 weeks. B6-deficiency resulted in reduction of body weight compared to normal group. It was observed that B6-deficiency reduced body fat mainly due to reduced visceral fat. Abnormal ECG patterns in the B6-deficient rats indicated impaired heart function. The levels of AGE-modified ECM were higher in the heart of B6-deficient rats compared to the control. Increased hydroxyl proline and collagen deposition along with the increased expression of fibrotic markers in the heart of B6-deficient rats suggest fibrotic changes. Interestingly, B6-supplementation ameliorated these changes. **Conclusion:** B6-deficiency promoted AGE-modification of ECM proteins leading to heart fibrosis. B6 supplementation seems to counter the formation of AGEs and prevent fibrotic changes in the heart.

**Keywords:** Vitamin-B6, Cardiac fibrosis, AGEs, ECM

**PP-2023-0105**

**Abstract title : Zinc biofortified rice improves growth and zinc status in zinc deficient Rats**

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**Background:** Biofortification of staple food crops such as rice with limiting micronutrients is often considered a sustainable strategy, but the evidence on the health impact of this zinc enriched rice is still awaited. **Methods:** The weaning Wistar Kyoto male rats were fed on zinc deficient diet (<1ppm Zn) for 4 weeks followed by repletion (pair feeding) with control rice without (DRR Dhan-42; 12.4±0.32 ppm) or with additional zinc(30.3±2.8 ppm) or Biofortified Rice enriched in Zn (DRR Dhan-48; 19±1.2 ppm Zn) for a period of 3 weeks. Body weights, plasma, faecal, liver, pancreatic zinc and intestinal ZIP4 and ZnT1 expression were measured at the end of the experiment. **Result:** The body weight of rats fed on a normal rice diet without (CRD) or with additional zinc (CRD+Zn) or biofortified rice diet (BRD) significantly increased (p<0.01) compared to rats fed on a zinc deficient diet (ZDD). The body weight of rats fed on a BRD diet was significantly higher compared to CRD (P<0.01), both of which remained lower compared CRD+Zn diet (p<0.03). Repletion of zinc through either CRD or BRD significantly increased the PZC and faecal zinc excretion compared to ZDD group rats, but there are no differences between CRD and BRD. The PZC and faecal Zn of rats fed with CRD+Zn were significantly higher compared to CRD and BRD rats. A similar trend in the increase of tissue zinc levels was also noted, except that the liver and pancreatic zinc levels of BRD rats were significantly higher compared to CRD rats. The intestinal Zip4 mRNA expression was in the order of CRD+Zn>BRD>CRD>ZDD. In contrast, the ZnT1 expression was significantly higher with CRD+Zn diet compared to all other groups. **Conclusion:** Overall these results indicate that Zn biofortified rice is efficient in promoting the growth and body zinc status in zinc-deficient rats.

**Keywords :** Zinc Biofortified Rice Bioavailability Deficiency

**PP-2023-0109**

**Abstract Title: Effect of Calorie Restriction on Inflammatory & Apoptotic Genes in Alveolar Epithelial Cells of STZ Induced Diabetic Rats**

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**Background:** Calorie Restriction (CR) has been widely studied as an experimental strategy for increasing longevity in animals. Persistent hyperglycemia observed in both type-1 and type-2 diabetes affects multiple organs in the body. The gradual loss of function in vital organs contributes to the mortality of individuals with diabetes. Studies on laboratory animals suggest that diabetes is associated with induction of inflammatory and fibrotic changes. However, there is limited data on the effect of CR on apoptotic and inflammatory genes. **Methods:** Male Wistar rats were randomly assorted into 2 groups of 10 each. One group was injected STZ intraperitoneally to induce diabetes while another was maintained as control. Animals in both groups were provided diet and water ad-libitum and their biochemical parameters were studied. The animals were sacrificed and alveolar-epithelial cells were isolated from the lung, and cultured. To verify CR's effect on the apoptotic and inflammatory genes, diabetic cells were cultured in 5mM glucose concentration. RT-PCR was performed using SYBR Green I dye and 18S-rRNA as the reference gene. **Result:** STZ-injected animals showed hyperglycemia (FBS-423mg/dl), 3 months post-injection. Cells from the diabetic lung contained fibroblast-type cells. Cells cultured in 5mM glucose-media (hypoglycemia) showed epithelial-like cell morphology. Whereas, cells cultured in 25mM glucose-media, retained the fibroblast morphology even after 10 days post culture. Also, CR down-regulated the expression levels of apoptotic and inflammatory genes. **Conclusion:** CR is known to influence the organism's health at the gene-level when the cells are under diabetes-induced stress. The changes due to the stress were expressed as increase in the expression levels of inflammatory and apoptotic genes. Increased glucose concentration added to oxidative stress and induced inflammatory and apoptotic changes in the cells. This was reversed when the cells were cultured in calorie restricted media.

**Keywords:** Calorie restriction, gene expression.

PP-2023-0111

**Abstract Title: Unravelling The Essence Of Maternal Riboflavin Deficiency On Offsprings Growth And Development**

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**Background:** Riboflavin/vitamin B2 plays a crucial role in the survival and functioning of all living cells. Higher organisms, including humans cannot produce riboflavin and must obtain it from their diet. Riboflavin, and more importantly, its derivatives, flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD), play a crucial role in essential cellular processes, including mitochondrial energy metabolism. Riboflavin is essential in the metabolism of carbohydrates, proteins, and fats. However, the impact of maternal riboflavin deficiency on offspring growth and development has not been adequately studied. The study aims to evaluate the impact of riboflavin deficiency on growth and development using a rat model. **Methods:** Three-month-old female Wistar rats were obtained from ICMR- National Institute of Nutrition, Hyderabad, India. The rats were fed the AIN-93G rodent diet obtained from Research Diets, and were housed at light levels below 30 LUX to prevent riboflavin degradation. The rats were randomly divided into control, pair-fed, and riboflavin deficient groups. Each group was fed the respective control, pair-fed, or deficient diet. After confirmation of riboflavin deficiency by HPLC technique the female rats were kept for mating. The 0th day was considered the day of parturition. Body measurements were taken on the 1st, 7th, 14th, and 21st days after birth, while a DEXA scan was performed on offspring on the 30th day. **Result:** The maternal riboflavin deficiency showed a notable effect on the offspring growth and development as indicated by the physical measurements, including body weight, BMI, head length, body length, tail length, abdominal circumference, heart girth, and anogenital distance. The DEXA reports also indicated a significant decrease in the area, BMC, fat mass, and lean fat. **Conclusion:** This research successfully demonstrated that a deficiency in maternal riboflavin significantly influences the growth and development of offspring.

**Keywords:** Riboflavin, Maternal, Offspring, Hplc, Physical Measurements.

PP-2023-0114

**Abstract Title: Antimicrobial potential of Lactobacillus: the gut commensal**

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**Background:** The human gut hosts trillions of microorganisms that play vital roles in digestion and metabolism. These microorganisms work alongside human genes to ensure complete digestion of otherwise indigestible dietary components. Among them, some are beneficial, while others can harm the host. Those that offer health benefits and support a healthy microbial balance are known as probiotics. We sought to identify and characterize indigenous microbial strains from adult humans evaluating their probiotic qualities and antimicrobial abilities. **Methods:** We gathered 30 fecal swab samples from randomly selected, seemingly well young adults aged 18-24 in the Samba district of Jammu. Out of these samples, we obtained 15 gram-positive bacilli, specifically Lactobacillus, using selective media. To identify them, we conducted morphological and molecular tests, including gram staining, DNA isolation, and PCR amplification. Moreover, we characterized these strains, primarily focusing on their antimicrobial capabilities and other probiotic attributes, such as resistance to lysozyme, tolerance to acid and bile, and potential for co-aggregation. **Result:** Out of a total of 15 isolated strains, six were found to have moderate to strong antimicrobial potential. They were tested



against 3 pathogenic strains, namely *Staphylococcus aureus*, *Escherichia coli*, and *Propionibacterium acne*. These six isolates showed remarkably good antimicrobial potential against these strains and showed clear zones of pathogen clearance with a diameter ranging from 16mm to 20mm. Along with that, these 6 strains showed good co-aggregation potential (>80%) with *P. acne* and *S. aureus*.

**Conclusion:** Our findings indicate that a healthy gut naturally contains probiotic bacteria crucial to the host. These strains exhibit antimicrobial properties that prevent harmful microbes from thriving in the gut. Additionally, their ability to co-aggregate with pathogens obstructs their interaction with the intestinal barrier. These probiotic bacteria play a vital role in digestive health, facilitating efficient nutrient assimilation from the diet. They contribute to establishing and maintaining a healthy gut microbiota. Consequently, consuming foods rich in insoluble dietary fibers, essential nutrients, prebiotic elements, and flavonoids can promote the growth of these beneficial microbes, ensuring gut homeostasis and reducing the risk of diseases associated with gut microbiota imbalances.

**Keywords:** Gut microbiota, *Lactobacillus*, commensals, gut-dysbiosis.

#### PP-2023-0128

**Abstract Title: Exploring the Anti-Inflammatory Potential of Alpha-Linolenic Acid (ALA) and SecoisolariciresinolDiglucoside (SDG): Individual and Synergistic Effects in LPS-Stimulated RAW 264.7 Macrophages**

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**Background:** Given the crucial role of chronic inflammation in a number of disorders, the hunt for potent anti-inflammatory drugs has been a primary objective in medical research. SecoisolariciresinolDiglucoside (SDG) and Alpha-Linolenic Acid (ALA) have drawn interest in this context due to their ability to reduce inflammation. The outstanding anti-inflammatory capabilities of ALA, a strong antioxidant, and SDG, a lignan mostly present in flaxseeds, need further investigation.

**Methods:** Therefore, the purpose of the current investigation is to identify the characteristics and processes of ALA and SDG individually as well as in combination form in connection to immunological homeostasis disruption caused by excessive oxidative stress and inflammatory mechanisms on lipopolysaccharide (LPS)-induced inflammation in RAW 264.7 murine macrophages. **Result:** Results demonstrated that treatment with ALA and SDG at doses (25 and 50)  $\mu\text{M}/\text{ml}$  individually as well as in combination (25:25 $\mu\text{M}/\text{ml}$ ) significantly reduced the amount of NO, ROS and mitochondrial membrane potential produced by LPS-stimulated macrophages. These results were followed by a decrease in TNF- $\alpha$ , IL-1 $\beta$ , IL-6, and iNOS, as well as a concurrent rise in Arg 1 and Mrc 1 expression after treatment individually and in combination. **Conclusion:** Together, these findings signify the attributes of ALA and SDG individually and in combination form act as an alternative anti-inflammatory strategy and affirm it as a promising natural entity to modulate immune-mediated response during inflammatory disorder.

**Keywords:** Inflammation, SDG, ALA, RAW264.7 macrophages.

#### PP-2023-0138

**Abstract Title: Development of the Bowel Movements Enhancing Herbal and Millet Based Liquid Diets for Constipation**

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**Background:** Constipation is a disorder in the gastrointestinal tract, which can result in the infrequent stools, difficult stool passage with pain and stiffness. Foods and herbs play a very important role in gut health especially in removal of toxic substances and enhances the bowel movements. Kadukai is a

traditional remedy for improving gut health and treating a wide range of gastrointestinal disorders. Kodo millet has a rich source of dietary fibers and help in managing constipation by improving bowel movements. Foxtail millet act as a natural laxative, promoting a healthy digestive system. Tulsi helps to clear vata out of the colon. It does this by helping nerve conduction in, around and through the colon. The main objective of the study is to develop and study the acceptability of the liquid diets by using kadukai, tulsi and millets (foxtail millet and kodo millet) and dried grapes for constipation condition. **Methods:** The ingredients were selected based on through scrutiny of the review papers on their carmative and laxative properties which have functional potentiality in gut health especially improving bowel movements. From the functional ingredients, the extract was prepared by soaking and grinding the ingredients separately and mixed with water, then made into a liquid diet. Totally 9 types of the liquid diets were prepared. **Result:** The developed liquid diets namely sample-A (tulsi extract), sample-B (kadukai extract), sample-C (kadukai and tulsi extract), sample- D (foxtail millet and tulsi extract), sample-E (foxtail millet and kadukai extract), sample-F (kodo millet and tulsi extract), sample-G (kodo millet and kadukai extract), sample-H(dried grapes and tulsi extract), sample-I (dried grapes and kadukai extract) were prepared and standardised by Trial-I, Trial-II and Trial-III which showed varied acceptability rating score. **Conclusion:** Herbs and millet based Laxative diets act as stimulator for the bowel movements in Constipation. They also contain antioxidant which reduce the inflammation and heals the wounds created by the constipation problem and that helps in stool output. This type of liquid diets may be supportive and make the people to relief from the constipation conditions smoothly and easily.

**Keywords:** Constipation, Kadukkai, Tulsi, Foxtail millet, Laxative effect

**PP-2023-0139**

**Abstract title: Formulation of leucas aspera (fl.) and millet supplementary tonic mix for cough**

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**Background:** Coughs that persist after a common cold or other upper respiratory infection are called post-infectious or post-viral coughs. Leucas aspera is also known as Thumbai. It plays a major role in reducing cough and cold related symptoms. The flowers are given with honey to treat cough and cold, which was stated in ancient ayurvedic literatures. Medicinally, it has been proven to possess various pharmacological properties like anti-fungal, anti-pyretic, antioxidant, antimicrobial, antinociceptive, analgesic, anti-diarrheal, anti-inflammatory and cytotoxic activity. Millet Bajra, strengthen the immune system and keeps away from cold and cough symptoms. The investigator was desire to formulate, evaluate the shelf life and sensory attributes of the Leucas aspera and Bajra supplementary tonic mix for cough. **Methods:** The fresh Leucas aspera (fl) was collected from the farm, it was shade dried. The herbal ingredient was selected based on the reported pharmacological properties associating to the complication of cough. The other ingredients for the formulation of the selected based on the functional and immunological efficacy. The bajra flour, dried ginger powder, black pepper powder and turmeric powder was mixed in the composition to form the dry mix formulations. **Result:** The extract of the leucas aspera was obtained by crushing the weighed amount of the fresh flowers. The fresh flowers extract showed pungent flavour. For the Trial -I formulations the fresh flowers were shade dried and crushed to form powder by mortar and pestle and mixed with the weighed grams of the other ingredients to standardise the formulation for 100gms. The 30% of the dry mixes was mixed with the 70% of honey (sample-I) and another 30% with the palm jaggery syrup (sample-II). **Conclusion:** This formulation of supplementary tonic mix by herb, millet and spices mix combination may be the eyeopener for the research in alternative medicines. The allopathic tonic treatments given for cough, may induce the ill and severe side effects in our body due to the presence of the chemical ingredient's concentration and sugar syrup present in the formulations.

**Keywords:** Cough, Leucas aspera (fl), bajra

OP-2023-0009

**Abstract Title: Potentiality of Setipinnaphasa Oil in Balb/c Mice Reduces High-Fat Diet Induced Obesity and Related Inflammation**

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**Background:** Obesity is a complex disease involving accumulation an excessive amount of body fat. It is a condition that develops when energy intake and expenditure are out of balance. Inflammation and hypertrophy are caused by storage of too much white adipose tissue, which also secreted a number of pro-inflammatory cytokines. There are FDA approved drugs which have side effects and alternative therapeutic diets established that based on marine fish oil but these are not available in West Bengal.

**Methods:** We have extracted and characterised Phasa fish (Setipinnaphasa) oil for this investigation for the first time to evaluate the anti-obesity and related anti-inflammatory effects on obese mice. In the present investigation, Inbreed male albino BALB/c mice were segregated into four category as control (C), Obese control group (OC), and Phasa fish oil treated group with two different doses (TX1 and TX2). To establish the fish oil's anti-obesity and anti-inflammatory properties, was extracted and characterized using GC-MS method. To evaluate the anti-obesity effect different parameters would be considered as Body weight, lipid composition and different obesity and obesity associated inflammation. **Result:** The Physicochemical characteristics of Setipinnaphasa oil revealed that oil quality was good because all parameters were within the range of standard value. GC-MS study explored the presence of health beneficial fatty acids such as Hexadec-9-enoic acid; Octadec-11-enoic acid; EPA, DHA, Icosa 11-14-17 trienoic acid etc. Application of Setipinnaphasa oil on obese mice on a high-fat diet, the body weight and blood lipid profile were sharply reduced in comparison to the obese group. In this connection few adipocytokines and pro-inflammatory cytokines genes expression were downregulated in treated groups compared to obese group. Phasa oil treated groups had elevated expression of PPAR- $\alpha$ , adiponectin, LPL gene etc. and anti-inflammatory markers than obese group. **Conclusion:** The possibility of using Setipinnaphasa oil, which is rich in essential fatty acids, as an anti-inflammatory and anti-obesity supplement is quite obvious. This therapeutic strategy will be cheap, cost effective.

**Keywords:** Adiponectin, Fatty acid, Obesity, Anti-inflammatory, Phasa oil.

OP-2023-0010

**Abstract Title: ANTI-CANCER EFFICACY OF TAPRA FISH (Opisthopterus tardoore) OIL-DERIVED LINOELAIDIC ACID ON HUMAN BREAST CANCER CELL LINE**

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**Background:** The role of inflammation in the pathogenesis of several malignancies has been the subject of extensive research. Conjugated fatty acids can control inflammation and have anti-cancer properties, which encourage cancer cells to die. In this work, MDA-MB-231 human breast cancer cell lines were used to assess the effectiveness of novel conjugated fatty acids derived from marine Opisthopterus tardoore (Tapra fish). **Methods:** MDA-MB-231 cultured in 90% Leibovitz's L15 medium with 10% FBS and 1X antibiotic antimycotic solution then treated with different dose of linoelaidic acid. The cell viability measured by MTT assay, cell cytotoxicity, gene expression study, morphological study was done by standard protocol. **Result:** According to the MTT assay, cancer cell viability decreased in



a dose-dependent manner. Using Linoelaidic acid at a 5 $\mu$ M dose decreased cell viability by 82.62%. Additionally, the level of TNF- $\alpha$  and IL-1ra was elevated by linoelaidic acid treatment which was further confirmed by using two independent staining DAPI and Acridine orange/ Ethidium Bromide dual stain. To understand the apoptosis mechanism of linoelaidic acid, the expression patterns of numerous proteins (p53, IL 10, and IL 1ra) were checked in immunoblotting which further confer linoelaidic acid induce cell apoptosis on the MDA-MB-231 cell line. **Conclusion:** The Linoelaidic acid had anti cancer effect on MDA-MB-231 breast cancer cell line.

**Keywords:** MDA-MB-231, p53, GSH, GSSG, Opisthopterustardoore, Linoelaidic acid

#### OP-2023-0027

##### **Abstract Title: ISOLATION OF SALMONELLA PHAGES FROM CHICKEN FECES AND ITS EFFECT ON EXPERIMENTALLY CONTAMINATED CARROT SALAD**

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**Background:** Among several foodborne diseases, Salmonella infection is a common and serious public health issue globally and its prevalence remains increasing in both developed and developing nations. Many preventive measures are being used nowadays to control Salmonella outbreaks but those are not efficient to eliminate the pathogen. Additionally, antibiotic resistance is another global threat. Bacteriophage is a promising alternative biocontrol to Salmonella associated foodborne disease. In this study, we aimed to explore the preventive effect of lytic bacteriophage on Salmonella contaminated carrot salad. **Methods:** Salmonella enteritidis (13076) strain specific lytic bacteriophage (P-13076) isolated from chicken feces sample and used throughout the study. Initially bacteriophages were isolated by using agar overlay method and the lytic effect of bacteriophage on Salmonella enteritidis (13076) is detected by spot test assay, agar well diffusion method. To determine the Salmonella lytic activity of bacteriophage on raw carrot salad, collected carrot samples experimentally contaminated with Salmonella enteritidis (13076) at 5x10<sup>6</sup> CFU/ml after checking for any prior Salmonella contamination on Salmonella Shigella agar plate. After 15 minutes of incubation carrot samples were treated with bacteriophage. Bacterial count were calculated at hourly basis upto 6 hours at room temperature and compared with control group (treated with SM buffer). **Result:** Result of this study revealed that Bacteriophage P-13076 application significantly (P<0.05) reduced Salmonella contamination compared to corresponding controls in all examined carrot samples upto 0.9 log CFU/g. Maximum lytic activity of the bacteriophage (P-13076) observed after 4 hours of treatment. **Conclusion:** In conclusion, the present study suggested that lytic bacteriophage has the potential to be an effective agent to control Salmonella from food samples like carrot salad.

**Keywords:** Salmonella, Bacteriophage, Carrot salad, Biocontrol

#### OP-2023-0038

##### **Abstract Title: Lipid modulating effect of sun-dried seed and peel powder of Vitis vinifera L derived polyphenols: In-vivo study on healthy adult wistar rats**

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**Background:** Wineries leftover can be processed in pharmaceutical application, animal feed for the eminent presence of polyphenols. All derivatives from Vitis vinifera L. has potential benefit on health individually. The aim of the study is to recognize and acknowledge the effect of wine waste products

i.e. seed and peel in living organisms with conventional assisted drying method. **Methods:** One adult male (A) and one adult female (B) wistar rat (age: 8 months, BMI: Male-0.68 g/cm<sup>2</sup>, Female- 0.71 g/cm<sup>2</sup>) were fed with sun-dried 5gm seed and 5gm peel powder (SDSP) that were assorted with 300ml of water in 50:50 ratio for four weeks and separated by every weekend as washout period. 2 ml of blood sample were collected to perform biochemical assay of HbA1c and ratio with HDL level and total cholesterol, triglycerides and LDL. Faecal samples were collected for NMR spectroscopy. **Result:** HbA1c in female wistar rat was 4.7% and male rat was 4.2% which falls under normal range. Total cholesterol: HDL, LDL: HDL and Triglyceride: HDL ratio was respectively 2.3:2.5, 0.8:0.8 and 2.9:3.4. The spectrum peak of NMR data showed at 4.716 ppm (A) 4.715 ppm (B) in D<sub>2</sub>O solvent. **Conclusion:** From the performed study it can be concluded that there is no prominent changes occur in the healthy wistar rats after feeding winery waste. Biochemical assay of lipid profile ratio and NMR data in D<sub>2</sub>O solvent validate the bioavailability of SDSP powder may be considered as health feed.

**Keywords:** Vitis vinifera L, lipid modulation

## OP-2023-0050

**Abstract Title: Exploring The Medicinal Potential of Cissus quadrangularis (Asthisamharaka): A Comprehensive Review on Osteoporosis Management and Anti-Arthritic Effect**

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**Background:** Osteoporosis and Arthritis are the most common ailments in India among the bone disorders that significantly affect the population. The rising occurrence of bone problems in younger individuals highlights the study's significance. Cissus quadrangularis (CQ) (Hadjod or Asthisamharaka) has garnered scientific interest due to its potential health benefits, especially for Osteoporosis and Arthritis. Hence, the objective of this review was to comprehend the mechanisms of action, ideal dosages, and long-term effects of the weed CQ in treating Osteoporosis and Arthritis through in vivo studies and review the potential therapeutic effects of CQ. **Methods:** A comprehensive literature search spanning multiple databases (e.g., Pub Med, Scopus, Web of Science) employed keywords like Cissus quadrangularis, Osteoporosis, Arthritis, Veldt grape, Asthisamharaka, and Hadjod. The study exclusively reviewed animal studies assessing bone health, Osteoporosis and Arthritis post-CQ administration. Inclusion criteria included English language studies. The review period for Osteoporosis was between the years 2003-2023, and Arthritis was between the years 2010-2023. Exclusion criteria included human studies, review articles, non-English studies, and accidental fractures. Using Covidence software, initially, 294 papers were identified, and 44 full papers were included for review, encompassing 30 osteoporosis and 14 arthritis studies. **Result:** The studies highlighted the positive impact of bone healing activity by bio-active compounds like  $\beta$ -sitosterol, lupeol, and vitamin C. CQ-based herbal formulations, including Asthiposhak tablets, Sustain Released Tablets (SRT), and Stem Powder, exhibited anti-arthritic and anti-osteoporotic effects on rats. SRT containing 25 mg of CQ in 100 mg showed increased serum alkaline phosphatase, calcium, and phosphorous levels, enhanced trabecular thickness, and reduced osteoclast formation at a 405 mg/kg dose. CQ stem extracts at 300 mg/kg and 500 mg/kg demonstrated joint health improvement by reducing oxidative stress and pro-inflammatory cytokines and preserved bone microarchitecture, protecting against inflammatory bone loss in estrogen-deficient conditions by decreasing osteoclastogenic Th17 cells in rats. **Conclusion:** CQ has been evidenced for its ability to protect bone and manage Osteoporosis and Arthritis due to its anti-inflammatory and anti-osteoporosis activities, respectively. CQ extracts are safe and devoid of side effects at typical doses, as evidenced. Further research trials on humans are essential to assess the functional outcomes of its supplementation.

**Keywords:** Cissus quadrangularis, Asthisamharaka, Hadjod

OP-2023-0065

**Abstract Title : Selected zinc co-factor requiring gene expression regulation by long non-coding RNAs (lncRNAs): A comparative study**

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**Background:** Cellular zinc homeostasis is very tightly regulated through the participation of several ZnT and ZIP proteins. Earlier, while studying the transcriptome of zinc deficient cells, expression of several non-coding RNAs were found to be significantly modulated. To explore their possible roles in zinc homeostasis, in this study we examined the potential role of some long noncoding RNAs (lncRNA) in regulating the expression of zinc-dependent enzymes in silico **Methods:** The sequences of eight major enzymes with zinc as cofactors and lncRNAs (60674) of human origin were collected from UNIPROT and ENSEMBL. lncRNA target prediction was done using free energy minimization ( $\Delta G$ ) and normalized binding free energy (nDG). The secondary structures were developed for the top hits. Experimental validation of the results was done in HepG2 and SaOS2 cells under zinc deficiency and supplementation using qRT-PCR. Statistical analyses were done in GraphPad Prism software using ANOVA test ( $p < 0.05$ ). **Result:** The target binding free energy (dG) was -145.32 kJ/mol for URS00008B33BA lncRNA in Alcohol dehydrogenase (ADH), Alkaline phosphatase (AP), and Thymidine kinase 1 (TK1). Maximum dG was -70.19 kJ/mol for URS00008C2725 lncRNA in Superoxide dismutase 1C (SOD1C) and Histone deacetylase 2 (HDAC2). The observed dG was -97.11 kJ/mol for URS000075CA68 in Malate dehydrogenase 1 (MDH1) and Carbonic anhydrase 6 (CA6) and -79.14 kJ/mol for URS000000EAD5 in Carboxypeptidase A1 (CPA1). The targeting regions by lncRNAs were found conserved with varying base ranges. In HepG2 and SaOS2 cell lines expression of AP, HDAC2, MDH1, and SOD1C genes were found to be decreased with TPEN which was reversed upon zinc supplementation in HepG2, except for MDH1. In SaOS2 cell lines, these genes showed no recovery upon zinc supplementation. Among the top lncRNAs (6), URS00008B33B and URS00008C2725 were expressed in HepG2. TPEN treatment reduced the expression significantly but could not be recovered with zinc supplementation. In SaOS2 cells, URS00008BSSB and URS00008C2725 were not significantly changed by TPEN treatment, but increased significantly with zinc supplementation. **Conclusion :** Analyses of lncRNA target areas on the selected zinc-containing enzymes suggest that lncRNAs may modulate expression of zinc-dependent enzymes during zinc deficiency. Further experimental and functional studies may confirm the observed findings.

**Keywords:** lncRNA, Zinc, Cofactor, GeneExpression, Dg

OP-2023-0097

**Abstract Title: Comparative Study on Blood Glucose Levels and Lipid Profile of Lactating Women Consuming Galactagogues**

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**Background:** Galactagogues are substances that increase milk production, often used to prevent discontinuation of exclusive breastfeeding due to insufficient supply. However, conventional galactagogue recipes in India often contain excessive sugars and fats. This study aimed to understand the effect of these galactagogue preparations on the mothers' blood glucose levels and lipid profile, as well as identify the different galactagogues consumed by lactating women. **Methods:** A prospective observational study was conducted in antenatal clinics of Raigad and Mumbai Suburban district from October 2022 to April 2023 on 102 lactating women (30 to 40 days post-delivery), of which 51 women who had consumed galactagogues for at least 15 days (Group 1) and 51 women who did not consume

any galactagogues (Group 2). Data was collected through structured questionnaire, anthropometric measurements, biochemical parameters were estimated through standardized methods. Nutrient intake was calculated using NSR-NutriCal Nutrient Analysis Tool. The data was analyzed using SPSS software (version 28). **Result:** The participants majorly belonged to lower middle-income group (78.3%) with a mean age of 25.9 + 4.3 years. In group 1 and group 2, majority of the participants (54.9% and 56.8% respectively) had borderline low HDL Cholesterol levels, while Fasting and Post-prandial blood sugar, Total Cholesterol, Serum Triglycerides, LDL Cholesterol and VLDL Cholesterol were in normal or desirable ranges. No significant difference was found among the blood glucose levels and lipid profile between the groups. In Group 1, the most commonly consumed galactagogue was Fenugreek seeds in the form of Ladu (72.5%), followed by Shatavari (11.8%). It was also observed that no standard dosages were followed for galactagogues except Shatavari which was prescribed by the gynaecologist with dosages in accordance to the individual. Dietary intake analysis revealed that the intake of visible fat (187.4% and 205.4% respectively) and carbohydrates (121.4% and 120.5% respectively) for both the groups was more than the RDA, while many nutrient consumptions did not meet the RDA. **Conclusion:** This study shows no significant effect of galactagogue consumption on lactating women's blood glucose levels and lipid profile, suggesting further research to understand the efficiency and safety of different galactagogues and their preparations for lactating mothers and infants.

**Keywords:** Galactagogues, Lactating women, Biochemical parameters

**OP-2023-0195**

**Abstract Title:** In-utero exposure to estrogen mimicking compound bisphenol alters bone mineralization in the offspring

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**Background:** Exposure to estrogen mimicking endocrine-disrupting chemicals such as bisphenols (BPA & BPS) can have a long-lasting effect on offspring's growth & skeletogenesis. However, the impact of maternal exposure to plastic-derived chemical like BPA and its substitute, BPS, on musculoskeletal health, and bone mineralization is not reported. This study examined the effects of in-utero exposure to bisphenols on bone mineralization in the offspring. Additionally, the mechanism of bisphenol's action on canonical bone morphogenetic protein (BMP) signaling was examined in osteoblast SaOS-2 cells. **Methods:** Pregnant Wistar rats were exposed to BPA and BPS (0.0, 0.4 µg/kg bw) dissolved in olive oil from gestational day 4 to 21 via oral gavage. The body composition analysis was performed by DEXA. IGF-1 levels and calcium levels in plasma of offspring were measured by ELISA and AAS respectively. In addition, In-vitro experiments were conducted on SaOS-2 cell lines. SaOS-2 cells were treated with BPA and BPS to understand the effect on SMAD dependent (canonical) BMP signaling. **Result:** Prenatal exposure to bisphenols increased the body weight of the offspring (30 and 90 d). DEXA scans reveal that bone mineral content (BMC) and bone mineral density (BMD) were significantly increased in BPA and BPS exposed offspring compared to control in 30 and 90 d offspring (P<0.05). IGF-1 were increased in the plasma of BPA exposed offspring (30 d). Plasma Calcium and alkaline phosphatase levels of the offspring were altered in bisphenol-exposed offspring. Moreover, bisphenol exposure in SaOS-2 cells decreased the cell viability in a dose dependent manner. The cell cycle analysis revealed that bisphenols promoted the progression of cell cycle to S/G2-M phase. The expression of BMPs such as BMP1, BMP4 and intracellular signaling mediators SMAD1, SMAD5 and RUNX2 were altered upon bisphenol exposure in SaOs-2 cells. In vitro mineralization in SaOS-2 cells was decreased upon bisphenol exposure as measured by Alizarin red S stain. In addition, the expression of ALPL, COL1A1, DMP1 and FN1 were downregulated in BPA and BPS group compared to the untreated control. **Conclusion:** These data suggests that gestational bisphenols exposure could disrupt the bone mineralization process in the offspring by modulating changes in canonical BMP signaling.

**Keywords:** Bisphenols, Bone, Osteoblast, BMP signaling

**OP-2023-0233**

**Abstract Title: Effect of nitrates on endurance athletes- a case control study.**

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**Background:** This study investigates the impact of nitrate supplementation, particularly using Sabeet, a standardized 2% nitrate powdered extract derived from beetroot tubers, on endurance athletes. Nitric Oxide (NO) plays a pivotal role in improving oxygen and nutrient delivery to active muscles, reducing ATP expenditure in muscle contractions, and diminishing the oxygen cost of aerobic exercise. Enhanced NO availability is closely linked to heightened exercise performance in endurance athletes. Endurance, marked by elevated heart rates during physical activity, relies on factors such as VO<sub>2</sub>max, a metric of aerobic endurance. A higher VO<sub>2</sub>max signifies superior cardiovascular fitness and greater energy production potential due to increased oxygen utilization. **Methods:** The study involves both elite and recreational athletes, segregated into case and control groups. Data collection encompasses anthropometric measurements (height, weight, body percentage) and VO<sub>2</sub>max evaluation using the Queen's College Step Test. Participants maintain a detailed daily activity log and dietary intake for one week. The case group consumes 5 grams of Sabeet 90 minutes prior to their regular exercise routine for six days, while the control group abstains from supplementation. VO<sub>2</sub>max is measured and analyzed using SPSS 16 for comparative evaluation. **Result:** The case group exhibits a substantial increase in VO<sub>2</sub>max following Sabeet consumption. Athletes in this group experience a noticeable VO<sub>2</sub>max enhancement from the pre-supplementation period (day 0) through the supplementation phase (day 1 to day 6) and post-supplementation (day 7). In comparison to the control group, the case group demonstrates a significantly greater difference in target heart rate between Day 0 and Day 7, mirroring their heightened VO<sub>2</sub>max levels. These findings suggest that nitrate supplementation, particularly with Sabeet, can serve as an ergogenic aid to enhance the performance of endurance athletes when coupled with dietary guidance. **Conclusion:** Over a six-day period, the intake of 5 grams of Sabeet, a standardized 2% nitrate powdered extract from beetroot tubers, results in a reduction in target heart rate and an increase in VO<sub>2</sub>max among physically active endurance athletes. This study underscores the potential of nitrate supplementation in elevating the performance of endurance athletes by enhancing their VO<sub>2</sub>max levels.

**Keywords:** Nitrate supplementation, Endurance athletes, VO<sub>2</sub>max

**YS-2023-0014**

**Abstract Title: "EFFECTIVENESS OF NUTRI SHOTS ON WEIGHT GAIN PATTERN AMONG CHILDREN AGED 4-5 YEARS AT SELECTED SCHOOLS IN THIRUVARUR DISTRICT"**

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**Background:** To assess and to compare the effectiveness of Nutri Shots on weight gain pattern among children aged 4-5 years. Malnutrition is a condition for being under-nourished or over-nourished. The undernutrition is when a diet does not meet out their body needs for growth and development, and the over-nutrition is when a diet meet too much calories. The under-nutrition is a major problem for morbidity and mortality, especially in low and middle income countries that malnutrition causes more than 3 million child deaths worldwide under five years annually. **HYPOTHESES:-** NH1 - There will be no significant effect in the pre and post test level of weight gain pattern among underweight children aged 4-5 years at p<0.05 level. AH1 - There will be significant effect in the pre and post test level of weight gain pattern among underweight children aged 4-5 years at p<0.05 level. **Methods:** A quasi



experimental research design was adopted in order to assess the effectiveness of Nutri Shots increasing the level of weight gain pattern among underweight children aged 4-5 years. The sample size consisted of 40 underweight children (who fulfilled the inclusion and exclusion criteria) selected by purposive sampling method. The study sample include underweight children in the age group of 4-5 years. The independent variable of the study is Nutri Shots. The dependent variable is weight gain pattern. The study was conducted in, The Merit Higher Secondary School and Gandhi Kamaraj Matriculation School at Thiruvavarur district. The study includes the underweight children aged 4-5 years who are willing to participate the study, and the study excluded those who have normal range of BMI (above 15). The tool consisted of two points that is data collection tool and intervention tool. The data collection tool used in this study was self-structured questionnaire. After completion of pre test, the assessment of weight gain pattern were administered with Nutri Shots. The intervention tool Nutri Shots was prepared by the investigator. The ingredients are ragi, green gram, roasted groundnut, moringa leaves, jaggery, ghee were used in the formulation of Nutri Shots. The intervention was given for a period of 30 days. After the intervention, the investigator did the post test assessment on Weight pattern among underweight children aged 4-5 years. The data collected was analysed and compared to identify the effectiveness of Nutri Shots in weight gain pattern among underweight children aged 4-5 years. **Result:** The finding of the study revealed that administration of Nutri Shots for 30 days in increasing the weight pattern, state that there was a significant difference in pre and post test weight gain pattern among underweight children aged 4-5 years. The post test analyses on the weight gain pattern among underweight children aged 4-5 years revealed that the mean difference was 14.81 with paired 't' value  $t = 8.561$  and p value 0.0001 which shows the weight gain pattern in post test was found statistically significant. Thus, the supplementation of Nutri Shots was more effective in increasing the weight pattern among underweight children aged 4-5 years. **Conclusion:** The findings proved that the Nutri Shots was efficacious in increasing the weight pattern among underweight children aged 4-5 years. The health care providers in their practice can use the Nutri Shots as nutritional supplement for the prevention of under-nutrition. Hence, it can be used as an implied dietary intervention for increasing the weight pattern among children aged 4-5 years.

**Keywords:** Nutri Shots, Weight gain pattern

**YS-2023-0020**

**Abstract Title: Antidiabetic activity of volavetkiseafish oil via the FFAR1 agonistic insulin-mimetics pathway.**

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**Background:** Type 2 Diabetes mellitus (T2DM) represents a chronic metabolic condition marked by high blood glucose levels and disruptions in the metabolism of glucose, proteins, and fats, impacting both the production and efficiency of insulin. According to data from the 10th edition of the International Diabetes Federation, diabetes was globally prevalent in 2019, affecting approximately 463 million individuals (9.3%). Projections indicate a rising trend, with an expected increase to 578 million (10.2%) by 2030 and 700 million (10.9%) by 2045. The main objective of this study was to mitigate hyperglycemia by integrating Volavetkiseafish oil (VFO) into the dietary regimen of a rat model afflicted with Type 2 Diabetes Mellitus (T2DM). **Methods:** At first, we In the initial phase, we prepared VFO from Volavetki (Panna microdon, Bleeker, 1849) seafish and administered it to rats in which Type 2 Diabetes Mellitus (T2DM) was experimentally induced using a high lipid diet (HLD) and streptozotocin (STZ) treatment, at a dose of 40 mg per body weight, over a 28-day period. We divided the rats into three groups, each comprising five individuals, with the exception of the control group. After the 28-day treatment period, we conducted an assessment of various parameters, including fasting plasma glucose

levels (FPG), glycosylated hemoglobin (HbA1c), glucagon-like peptide-1 (GLP-1), dipeptidyl-peptidase 4 (DPP-4), insulin, C-peptide, and GPR40, also known as free fatty acid receptor 1 (FFAR1). **Result:** The results confirmed that the combination of HLD and STZ effectively induced T2DM, as evidenced by the concentrations of C-peptide and insulin in the plasma of the T2DM rats. The hypoglycemic effect of 600 mg/kg VFO supplementation was demonstrated by a significant reduction in FPG, HbA1c, and DPP-4 levels, accompanied by a substantial increase in insulin, C-peptide, GLP1, and FFAR1 activity in the T2DM rats. **Conclusion:** The supplementation of VFO has been proven to effectively act as an anti-hyperglycemic intervention.

**Keywords:** T2DM, Volavetki, STZ, HLD.

## FREE COMMUNICATIONS - POSTER PRESENTATIONS

### SESSION: 2

25<sup>th</sup> November 2023

02:15pm – 04:15pm

- COMMUNITY NUTRITION
- FOOD SCIENCE NUTRITION-1

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
<b>COMMUNITY NUTRITION</b>						
1.	PP-2023-0002	Dr.Susmita Chandra	Maulana Abul Kalam Azad University of Technology WB	Simhat Haringhat a Nadia	susmitachandra2506@gmail.com	Diet Model with Millet Inclusion to Ameliorate Predictors of Hypertension Among Adults in Rural and Semi-Urban Parts of West Bengal
2.	PP-2023-0009	Ms.Priyanka Singh	Dayalbagh Educational Institute	Agra	singhpriyanka91121@gmail.com	Prevalence of malnutrition among children under 5 years in rural areas of Agra district.
3.	PP-2023-0011	Ms.Karthika. M	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	karthikacnd@gmail.com	Nutritional Status and Eating Behaviour of School Children
4.	PP-2023-0049	Ms.Sharona Stalin	Proodle Hospitality Services	Chennai	sharona@proodle.in	Millet based, high fibre diet vs regular south Indian meal at industrial canteen
5.	PP-2023-0056	Dr.R.Arunjyothi	KVK Mamnoori	Warangal	Jyothipunjala@gmail.com	Impact of Nutrigarden on Diet Diversity and Nutritional Security of the Households of Telangana
6.	PP-2023-0065	Ms.Chaitra A Kilpady	St. John's Research Institute	Bengaluru	chaitra.ak@sjri.res.in	Formulation and acceptability of a modified Take Home Ration to meet the nutrient gaps among Anganwadi beneficiaries of Chitradurga district, Karnataka
7.	PP-2023-0081	Mr.Kumar Utkarsh	BAU, Ranchi	Ranchi	contact.utkarsh101@gmail.com	Assessment of dietary diversity and nutritional status of school children of Ranchi district of Jharkhand
8.	PP-2023-0082	Ms.VINEELA VEPAKOMMA	ICMR - NATIONAL INSTITUTE OF NUTRITION	HYDERABAD	vsraovinni@gmail.com	Markers of oxidative stress and advanced glycation end products in elderly with and without frailty
9.	PP-2023-0089	Ms.Sumrana Hashim	Fernandez Foundation	Hyderabad	sumrana128@gmail.com	Obstetric Nutrition Screening (ONS) in a Tertiary Care Center: A Retrospective Study
10.	PP-2023-0102	Ms.Jovis Jacob	ICMR-National Institute of Nutrition	Hyderabad	jovis.jacob96@gmail.com	Assessment of urinary indican in normal, underweight and obese children as an indicator of gut dysbiosis: A case-control study
11.	PP-2023-0110	Dr.chandramati J.Rokhade	Dept. of Nutrition & Dietetics, SDMCMS&H, SDM University	Dharwad	chandupatil5@yahoo.com	Assessment of Nutritional Status and Psychological Problems Through Menopause Transition Period



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12.	PP-2023-0112	Ms.Adapolu Banu Pallavi	ICMR- National Institute of Nutrition	Hyderabad	pallavigeneng@gmail.com	Sensory evaluation, Acceptability and efficacy of Pearl Millet & Peanut Chikki Bar in Anemic women of reproductive age (17-19years)
13.	PP-2023-0113	Mr.Parth Sarin	ICMR-NIN	Hyderabad	parthsarin1998@gmail.com	Unravelling the role of diet in Severe Acute Malnutrition (SAM). Is poor dietary diversity and insufficiency the only cause of undernutrition?
14.	PP-2023-0116	Ms.Fathimath Hibha P V	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	hibhath.fathimath@gmail.com	Consumption pattern of millets among women in Coimbatore and a sustainable nutrition model for improving millet consumption.
15.	PP-2023-0117	Ms.Usha Rajbhar		mumbai	urajbhar3@gmail.com	TO STUDY THE EFFECT OF SCREEN TIME ON NUTRIENT INTAKE IN PRESCHOOL AND PRIMARY SCHOOL GOING CHILDREN
16.	PP-2023-0118	Ms.Aishwarya S	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	itsaishusiva@gmail.com	A study on the various forms of millet products consumed by the selected subjects in coimbatore
17.	PP-2023-0119	Ms.Neelakshi Tanima	CCS, SKRAU, Bikaner	Bikaner	ntneelakshi@gmail.com	Planning and Implementation of Need Based Meals for Pregnant Women of Rural Areas of Rajasthan
18.	PP-2023-0120	Ms.T Ramlansamrin	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfd018@avinuity.ac.in	Prevalence of obesity in relation to production of millets in different states of India
19.	PP-2023-0122	Ms.Swetha D	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfd026@avinuity.ac.in	A study on relationship between socioeconomic profile and consumption of millets among the selected subjects of Coimbatore.
20.	PP-2023-0123	Ms.Hemlata Pisal	Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University)	Pune	hemlata.pisal@bharativedyapeeth.edu	Physical Activity in Women with Preeclampsia: A Longitudinal Study
21.	PP-2023-0125	Ms.Shraddha Ramchandra Chalwadi	National Institute of Nutrition Hyderabad	Hyderabad	shraddhachalwadi2@gmail.com	The double burden of malnutrition is a serious public health concern, in developing nations
22.	PP-2023-0129	Ms.Debjani Das	College of Community Science, Professor Jayashankar	Hyderabad	dasdebjani038@gmail.com	Effect of Dietary Counseling and Nutrition Education on the Prevalence of Anaemia and food habits among Adolescent Girls Belonging to Different Socioeconomic Background, Bihar.

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23.	PP-2023-0136	Ms.Swetha D	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfd026@avinuity.ac.in	RELATIONSHIP BETWEEN MILLET CONSUMPTION PATTERN AND SOCIO ECONOMIC STATUS OF THE SELECTED SUBJECTS IN COIMBATORE CITY
24.	PP-2023-0151	Mr.Sunu PV	ICMR-NIN	Hyderabad	sunupv1@gmail.com	Nutritional status and dietary intake of Indigenous Tribal women of reproductive age group in Attapadi, Kerala
25.	OP-2023-0002	Prof.NEERJA SHRIVASTAVA	Government College, Kota	KOTA	drnshrivastava@gmail.com	Use of Nutri-Cereals in Cuisine of Hadoti Region Of Rajasthan
26.	OP-2023-0012	Ms.Gadthy Deepshika	Sarojini Naidu Vanitha Mahavidyala	Hyderabad	deepshikaparvathi678@gmail.com	Role of dietary proteins in body composition analysis of body muscle mass to body fat ratio among adults aged 18-65 years (both genders included)
27.	OP-2023-0015	Mr.ANIK DEY	PONDICHERRY UNIVERSITY	Kalapet	ad1461353@gmail.com	Assessing Socio-Economic Factors and Child Health in Bankura's Slum Preschoolers
28.	OP-2023-0017	Ms.Subhashini.M	Dr.MGR Educational and Research Institute	Chennai	7338984883hs@gmail.com	A comparative assessment on dietary habits of pregnant women in urban and rural areas.
29.	OP-2023-0026	Ms.Anshula Dwivedi	University of Allahabad	Prayagraj	anshula280296@gmail.com	ANAEMIA IN GERIATRIC SUBJECTS OF URBAN PRAYAGRAJ AS A PUBLIC HEALTH PROBLEM: FINDINGS FROM COMMUNITY BASED STUDY
30.	OP-2023-0028	Ms.Ambika Rani Yadav	University of Allahabad	Prayagraj	ambika.ry5320@gmail.com	THREAT OF HYPERCHOLESTEROLEMIA IN URBAN ADULT SUBJECTS AND IT'S ASSOCIATES: EVIDENCE FROM COMMUNITY BASED STUDY
31.	OP-2023-0042	Ms.Aishwarya Mishra	Banaras Hindu University	Varanasi	amishra@bhu.ac.in	Unveiling the Status of Hidden Hunger and Diet Quality among Tribal Women in Two Blocks of Sundargarh district of Odisha
32.	OP-2023-0043	Dr.Shanta Badaik	SSLNT MAHILA MAHAVIDYALAYA,	Dhanbad	shanta.baraik606@gmail.com	ROLE OF MILLETS IN ACHIEVING HOUSEHOLD NUTRITION SECURITY IN RURAL AREA OF JHARKHAND
33.	OP-2023-0044	Ms.Mala Gurappa	Kulkarni's Medzone Diabetes Center	Bengaluru	mala.gurappa@gmail.com	Prevalence of Prediabetes among Bengaluru Urban Population: A Pilot Study.
34.	OP-2023-0047	Ms.INDU SURESH	Sree Narayana College for Women	Kollam	doctoryesbee@gmail.com	Dietary habits and effectiveness of physical exercise intervention on the fitness level of College students
35.	OP-2023-0052	Ms.Bharti Samir Shah	P.G.Department of Food Science and Nutrition S N.D.T. Women's University	Mumbai	bharti08shah@gmail.com	Using simple self- assessment screening tool to explore osteoporosis risk in the postmenopausal women of Mumbai, Hyderabad, Bidar - A population based study
36.	OP-2023-0058	Prof.Dr. Deepa Kannur	Lady Irwin College,	DELHI	deepakannur0472@gmail.com	Impact of nutritional status on well-being of menopausal women: An intervention study

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			University of Delhi			
37.	OP-2023-0059	Ms.BIJAL LALAN	Post Graduate Department of Food Science and Nutrition	Mumbai	bijallalan29@gmail.com	Trans Fatty Acid Intake among Adolescents in Mumbai
38.	OP-2023-0061	Ms.DEBOSRUTI ROY	NSHM KNOWLEDGE CAMPUS	KOLKATA	debosruti99@gmail.com	Millets : India leading the way to one health
39.	OP-2023-0073	Dr.Arti Muley	Symbiosis Institute of Health Sciences	Pune	arti@sihs.edu.in	Purchase reasons and Consumption Patterns of Sugar Sweetened Beverages - Evaluation across Stages of Adolescence
40.	OP-2023-0078	Dr.MUNESH KUMAR SHARMA	GMC-32, CHANDIGARH	CHANDIGARH	mksdr777@gmail.com	TREND OF NUTRITIONAL STATUS AMONG FAMILIES OF UNDEGRADUATE MEDICAL STUDENTS OF A TERTIARY CARE HOSPITAL IN INDIA
41.	OP-2023-0080	Ms.Dheephiga M	CSIR CFTRI	Mysore	dheephunutri@gmail.com	A cross-sectional study on malnutrition among dysphagic elderly in old age homes in western Tamil Nadu
42.	OP-2023-0096	Ms.ADITHIYA LAKSHMI S	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22phfdf003@avinuty.ac.in	A STUDY ON NUTRITIONAL PROFILE, LIFESTYLE DISEASES AND MILLET CONSUMPTION AMONG SELECTED POST-MENOPAUSAL WOMEN
43.	OP-2023-0108	Ms.PALLAVI MAJUMDER	Asansol Girls' College	Asansol	pllv.majumder89@gmail.com	Study on relationship among occupational stress, eating habits and behavior with their socio-demographic and professional parameters in female customer service associates
44.	OP-2023-0127	Ms.Bhagyashri B Mudagoudra	Jawaharlal Nehru Medical College, KAHER Belagavi.	Belagavi	bhagyashri0991@gmail.com	Development and Validation of Food Frequency Questionnaire for dietary intake of Iron by Pregnant women in Belagavi, North Karnataka
45.	OP-2023-0132	Ms.Mansi	Manav Rachna International Institute of research and studies sector	Faridabad	mansiraghav.2001@gmail.com	Effect of traditional fasting practices on dietary intake and physiological and psychological changes among Indian adults
46.	OP-2023-0151	Ms.Chethana C	MGM School of Biomedical Sciences	Navi Mumbai	chethana.rd@gmail.com	KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO IRON DEFICIENCY AMONG SCHOOL-GOING ADOLESCENT GIRLS
47.	OP-2023-0154	Mr.James Thomas	Icmr - National Institute Of Nutrition	Hyderabad	james2041996@gmail.com	Effect of Socio-economic variables on Infant Growth and Development - A Prospective Study
48.	OP-2023-0155	Ms.Shaonee Saha	West Bengal State University	Kolkata	shaonee.saha2@gmail.com	How much adolescent girls are at risk of malnutrition associated eating disorder?
49.	OP-2023-0158	Ms.K K Shanmukapriya	Avinashilingam Institute for Home Science & Higher Education for Women	Nambiyur	shanmukapriya1807@gmail.com	WORKPLACE HAZARD OF SELECTED GARMENT WORKERS AND THEIR LIFESTYLE

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50.	OP-2023-0159	Dr.V. Premala Priyadharsini	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	premala_fsmd@avinuty.ac.in	GLYCEMIC INDEX OF RECIPES REPLACED WITH BANYARD MILLET
51.	OP-2023-0165	Ms.Jasmine Sooch	Punjab Agricultural University	Ludhiana	jasminesooch07@gmail.com	RELIGIOUS FASTING AND ITS IMPACT ON METABOLIC HEALTH OF ADULT FEMALES
52.	OP-2023-0169	Dr.DEVARAJ J PARASANNA NAVAR	ICMR-National Institute of Nutrition	Hyderabad	jpdevraj26@gmail.com	Nutritional and Iron status in anemic women of reproductive age - An Observational study in Telangana
53.	OP-2023-0174	Ms.Meesala Sushma	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfd014@avinuty.ac.in	A Study on The Prevalence of Morbidity Pattern and its Association with Millet Consumption.
54.	OP-2023-0175	Ms.KANNEP ALLI MYTHILI	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfd011@avinuty.ac.in	A STUDY ON IMPACT OF MILLET CONSUMPTION ON PREVALENCE OF OBESITY AMONG SELECTED ADULTS OF COIMBATORE DISTRICT
55.	OP-2023-0181	Dr.SHUNMUKHA PRIYAS	Institute of Nutrition and Fitness Sciences	Pune	drshunmukha@infs.com	An Observational study on the Knowledge and Practices of Adults about nutrition labels in purchasing packaged products
56.	OP-2023-0183	Ms.Uppala Sri Meghana	Avinashilingam Institute for Home Science & Higher Education for Women	COIMBATORE	22pfd023@avinuty.ac.in	Effects of Lifestyle Practices on the Prevalence of Obesity among selected adults of Coimbatore District
57.	OP-2023-0189	Dr.Soundariya S	PSGR krishnammal College for Women	COIMBATORE	soundariya2314@gmail.com	Consumption pattern of millets among children with ADHD symptoms in Chennai City
58.	OP-2023-0196	Dr.Dhruti Bal	Britannia Industries Limited	Bangalore	dhruti.bal@gmail.com	Micronutrients during developmental years of Children
59.	OP-2023-0203	Mr.Pavan Kumar S. K.	DOS in Food Science and Nutrition, University of Mysore	Mysuru	pavankumar.pk1602@gmail.com	ANTHROPOMETRIC STATUS AND NUTRIENT ADEQUACY IN THE ELDERLY JENU-KURUBA TRIBE
60.	OP-2023-0211	Ms.Arпита dutta	West Bengal State University	Kolkata	arpiarpu95@gmail.com	Determinants of exclusive breastfeeding and its association with infectious diseases among children aged 6-24 months
61.	OP-2023-0219	Ms.Surabhi Singh Yadav	Symbiosis Institute of Health Sciences (SIHS), Symbiosis International	Pune	surabhi201182@gmail.com	Assessment of nutritional status of preschool children (3 to 6 years) in rural areas of Mulshi Taluka, Pune.

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			(Deemed University)			
62.	OP-2023-0221	Dr.Syeda Farha S	JSS Academy of Higher Education and Research	Mysore	syedafarhas@jssuni.edu.in	Impact of nutrition education on knowledge, attitude and practice about iodine deficiency disorder and association of urinary iodine, nutrient-intake, and bakery food consumption among pregnant mothers
63.	OP-2023-0230	Ms.Ananya Anurakta Pattanaik	ICMR-Regional Medical Research Centre, Bhubaneswar	Khordha	ananyaap2023@gmail.com	Dietary diversity and socio-demographic factors of Non-communicable diseases among women(15-49) in India : Evidence from NFHS-5
64.	OP-2023-0032	Dr.Hemant Mahajan	ICMR-NIN, Hyderabad	Hyderabad	hemant.mahajan.84@gmail.com	THE ASSOCIATION OF TOTAL MEAT INTAKE WITH CARDIO-METABOLIC DISEASE RISK FACTORS AND MEASURES OF ATHEROSCLEROSIS IN AN URBANIZING COMMUNITY OF INDIA: A CROSS-SECTIONAL ANALYSIS FOR THE APCAPS COHORT
65.	YS-2023-0018	Ms.Neha Sandesh Rokade	Symbiosis International Deemed University	Pune	nerokade@gmail.com	Anemia-Related Knowledge and Dietary Practices: Responses from Adolescents of Mulshi Taluka, Pune District
66.	YS-2023-0029	Ms.Umme Salama Shabbir Husain	RTM Nagpur University	Nagpur	ummehusain@gmail.com	Correlation of Central Obesity with Blood Glucose and Lipid Profile in Male and Female Adults
<b>FOOD SCIENCE NUTRITION-1</b>						
67.	PP-2023-0003	Ms.Yashvi Rohit Chheda		Mumbai	ycheda14@gmail.com	HEALTHY GUT FRIENDLY PIZZA BASE FORMULATION: AN ALTERNATIVE TO REFINED FLOUR PIZZA BASE
68.	PP-2023-0007	Ms.GULAFSHAN PERWEEN	University Deptt of Home Science -Food & Nutrition, Bhagalpur	BHAGALPUR	gulafshanperween4@gmail.com	NUTRICEREALS & IMMUNITY FOR GOOD HEALTH : A COMPARATIVE STUDY OF COVID & NON COVID PERSONS OF BHAGALPUR TOWN
69.	PP-2023-0012	Ms.Anwasha Mahajan	ICMR-NIN, Hyderabad, India	Hyderabad	ANWESHAMAHAJAN@GMAIL.COM	Biochemical composition and antioxidant properties of Luffa cylindrica (Sponge gourd or dhundhul), an underutilized crop of India.
70.	PP-2023-0013	Ms.SHRUTIKA	PUNJAB AGRICULTURAL UNIVERSITY	LUDHIANA	shrutikakaur109@gmail.com	ADVANCING DAIRY ANALOGUES: HARNESSING THE POTENTIAL OF GERMINATED MUNG BEAN (Vigna Radiate) EXTRACT FROM VARIETY SML-1827
71.	PP-2023-0014	Ms.Kola Rachana Sri	Professor Jayashankar Telangana State Agricultural	Hyderabad	rachanasri32@gmail.com	Development of protein enriched proso and foxtail millet based spicy sticks
72.	PP-2023-0017	Ms.SOWMIYA.N	PSG College of Arts and Science	Coimbatore	nsowmiya0330@gmail.com	"DEVELOPMENT OF NOODLES WITH SUBSTITUTION OF PUMPKIN

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
						SEED FLOUR AND FOXTAIL MILLET FLOUR AS HEALTHY ALTERNATIVE”
73.	PP-2023-0018	Ms.Neelu Nargund	Department of Biotechnology, KLE Technological University, Hubballi	Hubballi	neelu150402@gmail.com	Study of Selected Physico-Chemical and Nutritional Parameters of Nucchu Ambli- a Traditional Jowar-based Fermented Food of North Karnataka
74.	PP-2023-0019	Ms.Sneha.R	PSG College Of Arts And Science	Coimbatore	sneharakkiapan@gmail.com	FORMULATION AND DEVELOPMENT OF VEGAN HONEY AS AN ALTERNATIVE OF HONEY
75.	PP-2023-0021	Ms.Sharon.M	PSG college of arts and science	Coimbatore	sharon2001ashok@gmail.com	Formulation development of chickpea muffins using barley as healthy alternative
76.	PP-2023-0022	Ms.Shafa Farveen M	PSG College of Arts and Science	Coimbatore	shafashamsu22@gmail.com	FORMULATION AND NUTRIENT ANALYSIS OF GRAVIOLA (Annona muricata) LEAVES AND MILLETS INSTANT SOUP MIX POWDER FOR CANCER PATIENTS
77.	PP-2023-0023	Ms.KATAM VEERA CHAITANYA BHAGAVATHI	CSIR-CFTRI RESOURCE CENTRE	HYDERABAD	bhagavathikam14@gmail.com	OPTIMIZATION AND QUALITY EVALUATION OF MULTI MILLET INSTANT SOUP MIX
78.	PP-2023-0025	Dr.Narsing Rao Galla	CSIR-CFTRI Resource Centre, Hyderabad	Hyderabad	narasingrao@cftri.res.in	Nutritional composition and antioxidant activity of dehydrated raw banana (Musa paradisiaca L.) and its application in biscuits
79.	PP-2023-0026	Ms.EVELYN RISHALET LALOO	Assam Downtown University	Guwahati	evelynrishaletladoo@gmail.com	Nutraceutical Properties of Locally Available Underutilized Fruits of Meghalaya
80.	PP-2023-0035	Ms.Dhanya Rao	St. John's Research Institute	Bangalore	dhanya.r@sji.res.in	Spirullina, a potential source of vitamin B12
81.	PP-2023-0036	Mr.Eknath Ashroba Langote	Dept. of Food Science and Nutrition, College of Community Science	Parbhani	eknathlangote@gmail.com	Study on Snacks Formulated by Incorporating Barnyard Millet (Echinochloa frumentacea)
82.	PP-2023-0037	Ms.Dipali Sakharam Sangekar	Dept. of Food Science and Nutrition, College of Community Science	Parbhani	dipalisangekar01@gmail.com	Development of Pearl Millet Based Traditional Food Products
83.	PP-2023-0038	Ms.C. J. GNANANETHRI	College of Community Science, Professor Jayashanka	Hyderabad	gnananethri@gmail.com	REVIEW ON EFFECT OF HYDROTHERMAL AND NON-THERMAL TREATMENTS ON QUALITY AND STORAGE OF PEARL MILLET GRAIN AND FLOUR.
84.	PP-2023-0041	Ms.V.Maheshwari	The Gandhigram rural Institute (Deemed to be University)	Tiruchengode	visitmaheshwari@gmail.com	DEVELOPMENT OF MILLETS AND VEGETABLES BASED WEANING FOOD MIX FOR INFANTS AND ITS EVALUATION

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85.	PP-2023-0042	Ms.Chandrama Baruah	National Institute of Nutrition	Hyderabad	chandramabaruah11@gmail.com	Microbiological quality assesment of street vended foods in Jorhat, Assam
86.	PP-2023-0043	Ms.Pooja Mer	National Institute of Nutrition	Hyderabad	POOJAMER@LIVE.COM	Water chestnut flour as a partial flour replacement and evaluation of its effect on properties of eggless cake
87.	PP-2023-0045	Ms.Guruguntla Sulochanamma	CSIR-CFTRI, Resource Centre, Hyderabad	Hyderabad	sulochana@cftri.res.in	STANDARDIZATION AND NUTRITIONAL EVALUATION OF MILLETS INCORPORATED FRYUMS
88.	PP-2023-0046	Ms.POLAM REKHA	CSIR CFTRI	Hyderabad	polamrekhadhav785@gmail.com	Development of Instant Kheer Mix from ash guard(Benincasa Hisiida L.) and evaluation of its nutritional composition
89.	PP-2023-0048	Dr.Hemalatha M S	Karnataka State Open University	Mysuru	drmsheemap@gmail.com	Impact of high protein on the Rheological properties of crackers
90.	PP-2023-0050	Dr.Prabhakara Rao Pamidighantam	CSIR-CFTRI Resource Centre, Hyderabad	Hyderabad	pgprao@cftri.res.in	STANDARDIZATION AND NUTRITIONAL EVALUATION OF COMPOSITE MILLET BASED INSTANT BREAKFAST MIXES
91.	PP-2023-0051	Ms.KALPANA SINGH	ERA University	LUCKNOW	kalpanasingh.research@gmail.com	Organoleptic and nutritional evaluation of food products utilizing Biofortified and Non biofortified cereals
92.	PP-2023-0052	Ms.SANGEE THA V J	ICMR - National Institute of Nutrition	Hyderabad	sangeethavj04@gmail.com	ANTIOXIDANT ACTIVITY AND POLYPHENOL CONTENT IN GREEN TEAS INFUSED WITH EDIBLE FLOWERS
93.	PP-2023-0054	Ms.APARNA. P	PSG college of arts and science		aparnaprabhu2002@gmail.com	Formulation and Evaluation of Lactobacillus plantarum-Enriched Synbiotic Grape Drink for Gut Health Promotion
94.	PP-2023-0055	Dr.PRADNYA BHUJANGRAO DHUYMAL	Gramin science Vocational College, Nanded, Maharastra	NANDED	pradnya_foodsci@rediffmail.com	Development of Value Added Food Products from Finger Millets (Eleusine Coracana)
95.	PP-2023-0057	Ms.Koushikha N.M	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22phfnf003@avinuty.ac.in	3D Food Printing: A New Revolution in Nutricereals for Nutrition Sustainability
96.	PP-2023-0058	Ms.BHUMIKAM	yuvaraja's college mysore	Mysore	viji934177@gmail.com	Development of Pearl Millet (Pennisetum glaucum) based weaning mix enriched with pumpkin (Cucurbita pepo) flour
97.	PP-2023-0061	Mr.Nandipeta Venkatesh	ICMR NIN	Hyderabad	nandipetavenkatesh@gmail.com	Evaluation of nutritional composition and antioxidant potential of underutilised Indian-origin Cleome gynandra seeds at different growth stages.
98.	PP-2023-0067	Ms.Aishwarya Jayakrishnan	WGSMA, Manipal Academy of Higher Education	Udupi	aishwarya.j99@gmail.com	Standardization, Sensory Evaluation and Shelf-Life of products developed using Foxtail Millet

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99.	PP-2023-0068	Ms.Rekha V Patil	Smt V.G Women's College	Gulbarga	vrekha.patil@gmail.com	Development of low-cost Protein and Fibre rich product by using local available Millets and Dhals
100.	PP-2023-0070	Mr.SRINIVAS ULU KORRA	CSIR CFTRI	Hyderabad	srinivasuluk@cftri.res.in	Preparation and characterization of cardanol incorporated PLA films for food packaging applications
101.	PP-2023-0071	Mr.SHARMA VALAVAN E	The Gandhigram Rural Institute- (Deemed to be University)	Cuddalore	sharmavalavanofficial@gmail.com	STARCH-BASED FILMS TO DEVELOP THE EDIBLE AND BIODEGRADABLE IN FOOD PACKAGING
102.	PP-2023-0076	Ms.KANNEBOINA SOUJANYA	PJTSAU, Hyderabad	hyderabad	kanneboinasoujanya16@gmail.com	EVALUATION OF NUTRITIONAL QUALITY CHARACTERISTICS OF SELECTED UNCULTIVATED GREEN LEAFY VEGETABLES (UCGLVs) OF NALGONDA DISTRICT, TELANGANA STATE, INDIA
103.	PP-2023-0078	Dr.Rekha Sinha	BAU, Ranchi	Ranchi	sinharekha_05@yahoo.co.in	Development and Nutritional Evaluation of Finger Millet Malt-Based Convenience Mix
104.	PP-2023-0079	Ms.Saisree Iyer	NUCSER, Nitte (Deemed to be University)	Mangalore	sasha2141996@gmail.com	Pre-drying Strategies for minimizing Oil uptake in Banana chips
105.	PP-2023-0083	Ms.A.Renuka devi	Muslim arts college, Thiruvithancode	Nagarkovil district	renutamil.2012@gmail.com	DEVELOPMENT OF VALUE-ADDED BAKERY PRODUCTS (RUSK) INCORPORATION OF FINGER MILLET
106.	PP-2023-0084	Ms.KAROLINA	Muslim Arts College, Thiruvithan Code	Thiruvithan Code	motcha.carol@gmail.com	DEVELOPED AND STANDARDIZATION OF MILLETS KULFI ICE
107.	PP-2023-0090	Ms.Vadde Manasa	Bishop cotton's women's Christian college	Bengaluru	manasavadda92@gmail.com	NUTRI DENSE EDIBLE CUTLERY: A SUSTAINABLE, VEGAN, AND ALLERGEN-FRIENDLY ALTERNATIVE TO PLASTIC
108.	PP-2023-0091	Ms.Aburvaa S K	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfn003@avinuity.ac.in	Sustainable Solutions for Food Waste Reduction: pH Sensing Edible Coating on Vegetables for Enhanced Shelf Life and Quality
109.	PP-2023-0092	Ms.Anindita Phani	Sister Nivedita University	kolkata	phanianindita217@gmail.com	'A systematic Review of Calcium Content and Bioavailability in Finger Millet : Implications for Human Nutrition'
110.	PP-2023-0093	Ms.IRFIN FATHIMA.S	Muslim Arts College	Tirunelveli	irfinfathimami@gmail.com	Formulation of Millet and cereal milk paneer incorporated product
111.	PP-2023-0097	Ms.B.RAJAL AKSHMI	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	18phfdp002@avinuity.ac.in	NUTRITIONAL QUALITY OF MILK AND RICE SAMPLE COOKED IN THE GLAZED AND UNGLAZED TRADITIONAL EARTHEN COOKWARE
112.	PP-2023-0104	Ms.Aarushi Verma	Banaras Hindu University	Varanasi	aarushiverma8052@gmail.com	Miracle Grains: health benefits and prevention of lifestyle disease with sustainable nutrition
113.	PP-2023-0107	Mr.Prasad Jagdishrao Shilpe	College of Community Science	Bikaner	prasadshilpe363@gmail.com	Quality Analysis of Millets based Biscuit for Fasting



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114.	PP-2023-0121	Ms.Nandhini R	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	nandhini.rviji@gmail.com	A COMPARATIVE ANALYSIS OF NUTRITIONAL AND ANTI-NUTRITIONAL FACTORS IN DIFFERENT VARIETIES OF MILLETS
115.	PP-2023-0126	Mr.Rajeswari Gubbala	Nitte University	Mangalore	rajeswari.22phdbs205@student.nitte.edu.in	From plate to health: Enhancing pasta with fish protein
116.	PP-2023-0140	Dr.Satish.A	Sri Devaraj Urs Academy of Higher Education and Research Tamaka Kolar	Kolar	satishanandan84@gmail.com	Development of Antioxidant Effervescent Tablet from Mulberry Fruit Extract
117.	PP-2023-0142	Dr.Chagam Koteswara Reddy	GITAM (Deemed to be) University	Visakhapatnam	kchagam@gitam.edu	Complex formation between Amorphophallus paeoniifolius starch and stearic acid: effect of enzymatic debranching for starch
118.	PP-2023-0145	Dr.Mounika Buduru	Bharati Vidyapeeth (Deemed to be University) College of Ayurved	Pune	dr.mounika.b@gmail.com	Nava Dhanyam Abhishyandi: Exploring Digestive Dynamics of Newly Harvested Grains and Pulses in Ayurveda
119.	PP-2023-0146	Ms.Greshma.G	Nehru arts and science college	Coimbatore	greshmagopal99@gmail.com	Antibacterial packaging film from watermelon rind
120.	PP-2023-0147	Ms.DHEEBA A	Nehru Arts and Science College	Coimbatore	nascdheeba@nehrucolleges.com	DEVELOPMENT OF BANANA GRITS USING RIPE NENDRAN BANANA AND PREPARATION OF BREAKFAST CEREAL FOR CELIAC DISEASE CONDITION & INVITRO ANALYSATION OF THE GLUTEN CONTENT
121.	PP-2023-0148	Mr.Vignesh R K	Nehru Arts and Science College	Coimbatore	vigneshrkv1@outlook.com	Instant millet soup and pulao mix
122.	PP-2023-0149	Mr.Muhammed Ali C	Msc. Food Science & Nutrition	Coimbatore	ameenchulliyil@gmail.com	Millet Smoothie Mix
123.	PP-2023-0150	Ms.Swetha	Nehru arts and science college	Coimbatore	swetha.shwet126@gmail.com	Detox capsule
124.	PP-2023-0152	Ms.Dharani Priya S	Avinashilingam Institute for Home Science and Higher Education for Women	Coimbatore	22pfn007@avinuty.ac.in	Green Synthesis of Silver Nanoparticles from Alternanthera sessilis Leaves
125.	OP-2023-0004	Ms.KANMANI .K.M	JAMAL MOHAMED COLLEGE (AUTONOMOUS)	TIRUCHIRAPALLI	kanmanimurgan232@gmail.com	Pearl millet and Kenaf leaf (Hibiscus cannabinus) powder enriched Nutri cookies: A synergistic approach towards health and nutrition

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126.	OP-2023-0006	Ms.RIYA KAR	Midnapore City College	RAJARAM PUR(HAL DIA)	riya.kar1997@gmail.com	Title: Characterization of marine topse (Polynemus paradiseus) fish oil and exploring its impact on high fat diet induced BALB/c mice model to combat obesity
127.	OP-2023-0007	Dr.Archana Ainapure	Symbiosis Skills and Professional University	Pune	archanaainapure41@gmail.com	The Metabolic Matrix: Re-formulation of ultra-processed foods to nourish the gut and safeguard the body's organs such as liver and Brain
128.	OP-2023-0008	Mr.Ayantika Bhakta	Maulana Abul Kalam Azad University of Technology WB		ayantikabhakta2000@gmail.com	Pearl Millet: A healthy nutricereal
129.	OP-2023-0014	Ms.Babina Chanu Khomdram	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	babinachanukhomdram242@gmail.com	Probiotication of Heiyai fruit Juice By Limosilactobassilus fermentum strain BTFSN
130.	OP-2023-0018	Dr.OKRAM ABEMSANA DEVI DEVI	EDUCATION (S), MANIPUR	IMPHAL	okramabemsana@gmail.com	Evaluation of major bioactive compounds and antioxidant activity of wild rice (Zizania latifolia) and its value-added cookies
131.	OP-2023-0020	Ms.Satakshi Mishra	Institute of Medical Sciences, BHU, Varanasi	Varanasi	shatakshi.ald12@gmail.com	Potential of Millets as Nutri-cereal: an overview
132.	OP-2023-0022	Ms.Pooja Ambati	Andhra University	Visakhapatnam	poojaambati186@gmail.com	A STUDY ON NUTRIENT COMPOSITION AND ANTI OXIDANT PROPERTIES OF INDIGENOUS WILD EDIBLE FRONDS OF DIPLAZIUM ESCULENTUM
133.	OP-2023-0031	Ms.NONGMA ITHAM BABITA DEVI	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	beitanong@gmail.com	Characterisation of Ergocalciferol and bioactive compounds in sundried finger millet (Eleusine coracana) and Oyster mushroom (Pleurotus ostreatus): A comparative study
134.	OP-2023-0033	Ms.Syeda Misba Mahmood Rahiman	Bishop Cotton Women's Christian College	Bangalore	syedamisba@hotmail.com	DEVELOPMENT AND EVALUATION OF NUTRIBAR USING FUNCTIONAL INGREDIENTS
135.	OP-2023-0035	Ms.Dipika Das	Prabhat Kumar College, Contai	Contai	dipikadas1985@gmail.com	A Study on Oyster Mushroom Cultivated on Different Substrates and Their Approach to Human Health

# COMMUNITY NUTRITION

PP-2023-0002

**Abstract Title: Diet Model with Millet Inclusion to Ameliorate Predictors of Hypertension Among Adults in Rural and Semi-Urban Parts of West Bengal**

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**Background:** Many rural parts of Eastern India especially West Bengal have experienced rapid urbanization, leading to an increase in the prevalence of non-communicable diseases like hypertension. Hypertension commonly known as high blood pressure, is a significant public health concern. Hypertension has become a major health burden, especially in urban and semi-urban areas, due to lifestyle changes, the use of tobacco, and unhealthy diets. **Methods:** A prospective cross-sectional study was conducted in rural and semi-urban field practice areas of 24 Paraganas North and South of West Bengal, among 200 randomly selected adult populations of both sexes except pregnant and seriously ill subjects from March 2023 to May 2023. Data were collected about age, education, type of family, dietary habits, addiction, family history of hypertension, income, and other significant parameters after ethical clearance. A diet chart was prescribed including some millet-based recipes for half of the population who were found to be contacted with hypertensive attributes. The changes caused by this modification were studied among the patients and considered statistically significant values. The patients were also suggested for their lifestyle changes and an awareness was created for a healthy lifestyle. After resuming the modifications the predictors were revisited and counted for their changed effects. **Result:** The overall prediction of hypertension was male 28.8% and female 71.2%. Hypertension was significantly higher among individuals aged more than 50 years and those who belong to a nuclear family. Less education, a sedentary lifestyle, occupation, and extra salt intake were found to be associated with hypertension. The use of a millet-based diet is not sedentary as suggested by other literature and it has a significant role in reducing the effects of its predictors. **Conclusion:** There is a significant association of hypertension due to smoking, alcohol consumption, physical inactivity, stress, and family history. Diet management with the inclusion of millet-based recipes has beneficiary effects that can contribute as a public health measure to combat hypertension and its consequences.

**Keywords:** Hypertension, risk factors, Millet-diet.

PP-2023-0009

**Abstract Title: Prevalence of malnutrition among children under 5 years in rural areas of Agra district.**

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**Background:** India is the world's second-largest country in food production and the home of malnourished children. The objective of the study was to estimate the prevalence of under-nutrition in children aged 1-5 years as per anthropometric indicators namely underweight, stunting, and wasting among rural children in Agra City followed by the study of dietary habits of rural area children and the comparison of height and weight to their age, MUAC and HC (6 months old - 2.5-year aged children) of the rural area children from the WHO -Child Growth Standards. **Methods:** The study aimed to estimate

the prevalence of undernutrition in children aged 1 to 5 years as per anthropometric indicators among selected rural areas of Agra City. The study was performed on 200 children with a 6.86% margin of error as per the RAO software. Purposive random sampling technique was used. Nutritional assessment (3-day dietary recall and food frequency questionnaire) was conducted and standard anthropometric measurements of height, weight, MUAC, and HC (6 months old – 2.5-year aged children) were taken. **Result:** Among 200 children studied 142 were more than 2.5 years old and 58 were below 2.5 years old. The data was analysed using WHO anthroplus software. The prevalence of underweight (WAZ) among girls above 2.5 years old was 90.14% and boys was 92.95% and stunting among girls was 87.32% and 90.14% in boys. The prevalence of underweight (WAZ) among girls below 2.5 years old was 89.3% and boys was 80.6% and stunting among girls was 92.9% and 83.9% in boys. 88.88% girls had and 77.41% boys lower MUAC, 62.96% girls and 70.96 % boys had lower HC scores. **Conclusion:** Malnutrition remains the ongoing health problem in young children. WHO anthroplus software can be a very useful tool in analysing nutritional status and could be used to shape policies for this age group.

**Keywords:** Anthroplus, MUAC, HC, undernutrition, stunting

#### PP-2023-0011

##### **Abstract Title: Nutritional Status and Eating Behaviour of School Children**

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**Background:** Eating behavior is influenced by a number of personal, social, cultural, environmental, and economic factors. Eating Behavior is a broad term that encompasses food choice and motives, feeding practices, dieting and eating related problems. The nutrition transition in the modern day brings out the need for awareness on dietary habits for the young population. **Methods:** Five hundred school going children (11-14yrs) were selected by purposive sampling from a private urban school. Anthropometry measurements like height, and weight, was carried out using standard procedures, and BMI was calculated using IAP standards. Background Information, Dietary Habits were collected through a food frequency questionnaire. Eating Attitude Test (EAT)-26 Scale (Shashank K.J et al., 2016) was used to elicit details on eating behaviour. Subscales were Dieting (Maximum Score 33), Bulimia and Food Preoccupation (Maximum Score 18), and Oral Control (Maximum Score 21). **Result:** 58.6% were boys and 41.4% were girls. 3.1.6% were in the middle-income category. 40% of children were obese, and 5.4% of children were underweight. 81% were non-vegetarians. The knowledge of balanced diet and food groups was observed to be less. EAT scale score showed 49.2% were at risk of developing an eating disorder. The subscale score for Bulimia and food Preoccupation was higher among the 12 years (37.9%) while it was higher for the 13 years girls (41.1). The chi-square value for the overall subscales for the girls was significant, but for the boys, it was not statistically significant. **Conclusion:** Malnutrition is still prevalent among school children. The magnitude of overweight and obesity is on the rise. 49.2 percent had an eating disorder risk.

**Keywords:** Obesity, EAT-26 Scale, Dietary Habits

#### PP-2023-0049

##### **Abstract Title: Millet based, high fibre diet vs regular south Indian meal at industrial canteen**

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**Background:** This year, 2023 has been declared by United Nations as the “International Year of the Millets”, for the awareness and benefits of millets. The consumption of millets has been a part of ancient India until the mid 1900s. The Green Revolution introduced in India in 1965 encouraged the use of high-yielding cereals to fight food insecurity and reduce famine-related deaths. Farmers received subsidies for rice and wheat production but not for millets. This resulted in the huge shift in Indian agriculture scenario to bringing wheat and rice as the commonest food on Indian plate. There are numerous health benefits of millets such as antioxidant activity; anti-hyperglycaemic effects; anti-cholesterol effects; anti-hypertensive effect; reduction in BMI, weight, body fat percentage, body fat mass and waist circumference. Further advantages noted are that millets are low FODMAP, high fibre and low glycaemic index foods. This observational study was aimed to evaluate why people opted for a millet-based diet; if millet-based diets instead of rice-based diets effected any health indicators such as weight, energy levels, digestive issues and sense of well being and taste acceptability in an industrial canteen.

**Methods:** A lunch diet counter was introduced at an appliance and electronics industrial canteen in Chennai to provide millet-based diets. Before starting the diet counter; a healthy eating campaign was conducted by dietitians in the dining hall, emphasizing portion control and high fibre diets. Staff could choose to have a millet-based, high-fibre, portion-controlled diet instead of a typical unlimited south Indian lunch. There was a calorie reduction of 200 to 300 calories and dietary fibre content was increased by 10g in the millet-based diet compared to the standard diet. As the study is observational, there is no base data available for respondents. The results were obtained from a survey questionnaire and the changes in number of people having the millet-based diet instead of the regular south Indian meals over the last four months (June 2023 to September 2023). Survey respondents are Indian male, aged 23 to 50 years with a mix of white- and blue-collar workers. The survey was completed by dietitians asking questions on why they opted for millet-based diets, taste rating, satiety level, weight difference noticed, how happy they were with the millet diet options and any other health related changes noted.

**Result:** There has been a steady rise in staff opting for the millet-based meal over the 4 months, from average of 89 people in June to an average of 127 in September, indicating a 33% increase. It was found that 35% of respondents’ chose the millet diet over the regular diet “to be healthy and to have better energy levels”; 14% wanted to reduce their bloated feeling after consuming rice; 23% changed their diet to reduce weight, 23% wanted more variety and improvement in taste; while 5% were either prediabetic or diabetic and wanted to control their blood sugar levels. There was a 1 to 2 kg body weight reduction in 9% and 7% reported loss of 2 to 4kg body weight, whilst 79% maintained their body weight with no increase in weight. Overall, 53% of the respondents were very happy with their diet change with 33% being happy with it; whilst 14% were extremely happy. There were 14 respondents that reported feeling hungry 3 to 3.5 hours post their lunch. 56% of respondents rated the taste of meals as very good, 35% as good and 9% as excellent.

**Conclusion:** According to the outcomes above, there has been a positive response to the taste and healthy feel to the millet-based diet option at this industrial canteen. There was no significant weight loss or health indicator changes as respondents did not follow these choices at all meal times, just at lunch time. The satiety levels of a few respondents were due to their physical work load or stress levels at the that time, and may not be associated to the millet-based diet. Further improvement to this study, would be to record base anthropometrics and medical data on the individuals choosing the millet-based diet and following up every 2 months. Adding millets to industrial canteens have shown some benefit to the people who opted to have them and therefore moving forward the healthy eating campaign conducted by dietitians should be more frequent to promote the benefits of millet-based diets.

**Keywords:** millet-based diets, industrial canteen, nutricereals

**PP-2023-0056**

**Abstract Title: Impact of Nutrigarden on Diet Diversity and Nutritional Security of the Households of Telangana**

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**Background:** The study describes the introduction of nutrition garden to address household diet diversity and promotional of nutritional security of the household levels in Mulugu and Mahabubnagar districts of Telangana. The study is taken up as a Front Line Demonstration by KVK Mamoor, Warangal and KVK Palemahabubnagar as ICAR initiative in promoting nutri garden **Methods:** 300 sample sizes from both districts were studied. The study is the result of continuous efforts for a period of five years (2018-2023) with a detailed baseline survey and its assessment in 2018. Three components of the intervention include Preparation, Distribution and Education. Preparation component included the nutrigarden calendar preparation with locally grown vegetables and fruits, designing of plot model and land preparation. Distribution of inputs including seed kits, fruit plantations from Horticulture department and awareness on nutrition and nutrigarden maintenance were the other components. Data on area, types of vegetables grown, number of households participated in production and utilization was collected regularly during monitoring visits in a structured format; Nutrigarden Maintenance Card (NMC). The study examined the nutrigarden maintenance data of following five years of intervention and compared it with base line survey. **Result:** The results on diet diversity showed that a notable change in the variety of plants grown in their garden increased to 28 and 32 varieties including vegetables, fruits and flowers plants compared to 5 and 8 varieties during the baseline. The change in Monthly per capital consumption of vegetables and fruits both quantity and frequency consumed, showed marked increase from 3352g to 6568g and 599g to 3095g respectively. Iron intake was increased from 870 mg to 990 mg along with calcium intake increased from 1800 mg to 3,300mg per month. **Conclusion:** Promotions of nutrigarden have proved to be an ensuring micronutrient rich food accessible to the entire household and contribute to improve the quality of diets.

**Keywords:** Nutrigarden, diet diversity, nutritional security.

**PP-2023-0065**

**Abstract Title: Formulation and acceptability of a modified Take Home Ration to meet the nutrient gaps among Anganwadi beneficiaries of Chitradurga district, Karnataka**

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**Background:** Infancy is a critical period marked with increased nutrient requirements to support optimum growth. National Family Health Survey-5 reports that only 11% of rural Indian children received adequate diets. Take Home Ration (THR, 500kcal, 12-15g protein/day) provided monthly by the Government under Integrated Child Development Services attempts to address this; however, concerns in usage due to quality, distribution, family sharing and lack of awareness persists. Additionally, THR is predominantly cereal based, lacking in protein and fat. A situational analysis in Chitradurga district showed a median energy deficit of 150kcal, with 22% risk of inadequate fat intake, and 72% THR usage. To address this gap, a modified THR with adequate fat and quality protein was formulated and its acceptability was tested among Anganwadi beneficiaries (aged 6-12 months). **Methods:** Solver-based (Microsoft Excel) linear programming approach was employed to address macronutrient gaps. Two formulations, milk-predominant (MP) and legume-predominant (LP) with four flavor-variants each were developed, optimizing for protein quality (Digestible Indispensable Amino Acid Score (DIAAS)>80%), ingredient proportions, protein energy (PE) ratio (<15%), and cost (< Rs. 8). Local ingredients (ragi, roasted Bengal gram, groundnut, oil, whole milk powder and jaggery) were used. Both formulations had similar nutrient composition and processing techniques. Sensory evaluation was performed by semi-trained panelists using a 9-point Hedonic Scale to finalize on formulations to undergo acceptability testing. First, acceptability was tested by mothers using a 5-point Hedonic Smiley Scale and two flavor-variants of each formulation were selected. This was followed by acceptability testing in 70 Anganwadi beneficiaries (aged 6-12 months) of Chitradurga. If consumption of administered quantity (70g) within 15 minutes was >60%, the product was deemed acceptable. **Result:** The two formulations had mean energy, protein, and fat of 202.6±0.6kcal, 7.0±1.4g and 10.0±0.0g respectively, bridging the observed



macronutrient gap. The PE ratio, DIAAS and cost were  $12.5 \pm 0.7\%$ ,  $92 \pm 11\%$ ,  $\text{Rs}/-5.6 \pm 1.4$  respectively. All variants were acceptable ( $>60\%$ ) with highest acceptance (99%) of one MP-variant. **Conclusion:** The above strategy helped develop an acceptable modified THR meeting the observed macronutrient gap among Anganwadi beneficiaries. The selected MP-variant will further be evaluated for its effect on linear growth, body composition and cognition among the same population.

**Keywords:** Complementary-food, linear-programming, Take-Home-Ration, nutrient-gap, acceptability-study

#### PP-2023-0081

**Abstract Title: Assessment of dietary diversity and nutritional status of school children of Ranchi district of Jharkhand**

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**Background:** Child malnutrition is still a major public health problem in state like Jharkhand where the bulk of scheduled tribes, and scheduled cast reside consisting of 40 % of the total population. A diverse diet is important for ensuring adequate intake of all essential nutrients as deficiency of these may lead to adverse consequences like stunting and sub-optimal intellectual development. Information on the dietary diversity and nutritional status of children is scanty concerning the tribal belt of Jharkhand. Therefore, a study was undertaken to assess the dietary diversity score and prevalence of malnutrition among school children. **Methods:** The study was cross-sectional descriptive survey involving 139 mothers and their 5 to 10 years old children covering 2 blocks and four villages of Ranchi districts of Jharkhand. A pretested questionnaire was used to obtain information on socio-demographics. 3- day 24- hour dietary recall method was used to calculate individual dietary diversity score (DDS based on a scale of 12 food groups) and the scores were divided into terciles, low = 4, medium = 5-8, and high = 9-12. Anthropometric measurements were taken following the standard techniques. The degree of malnutrition was calculated according to BMI in comparison with age/gender-specific centile values recommended by WHO. **Result:** Cereals ( $0.91 \pm 0.38$ ) and roots & tubers ( $0.60 \pm 0.29$ ) had higher mean DDS values, while fish ( $0.09 \pm 0.17$ ) had the lowest value. While assessing the prevalence of malnutrition, 35.9 %, 5.76 %, and 10.8 % were found to be suffering from under nutrition, overweight and obesity, respectively. On gender-wise analysis, boys were found to be affected most in terms of under nutrition and obesity as compared to girls. **Conclusion:** The low diversity of the children's diet shows a need to increase the consumption of nutrient-dense food in order to improve the nutritional status of children. Nutrition education along with appropriate location-specific nutrition-sensitive agricultural interventions need to be promoted for the mitigation of problems on a sustainable basis.

**Keywords:** School children, Malnutrition, Dietary diversity

#### PP-2023-0082

**Abstract Title: Markers of oxidative stress and advanced glycation end products in elderly with and without frailty**

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**Background:** In India, life expectancy has improved by 8.68 years from 62.1 years in 2000 to 70.8 in 2019, which calls for a greater attention to improve the quality life of older adults. Frailty is a geriatric syndrome characterized by multisystem dysregulation leading to a loss of dynamic homeostasis, decreased physiological, functional and cognitive reserves that confer vulnerability to adverse

outcomes. In this context, investigating the underlying biological processes of frailty is of great significance. As studies on biological aspects of aging in frailty are limited, this study aims to investigate the biomarkers of oxidative stress and protein glycation amongst the elderly with and without frailty. **Methods:** This community based cross-sectional study involved 200 older adults (>60 years) residing in Telangana. Frailty was assessed according to Fried phenotypic criteria including hand grip strength (HGS), gait speed (GS) and study subjects were classified as frail (F), pre-frail (PF) and non-frail (NF) groups. In addition to socio-demographic, anthropometric details, biomarkers of oxidative stress and protein glycation have been analyzed in the plasma. Advanced glycation end products index (AGI), protein carbonyls (PC) and malondialdehyde (MDA) were measured spectrophotometrically, whereas, carboxymethyl lysine (CML) by ELISA. **Result:** After exclusion, there were 66 frail, 100 pre-frail and 20 non-frail individuals amongst 186 subjects. There is a significant decrease in HGS in pre-frail (9.935) and frail (4.284) groups compared to non-frail (16.004), whereas, significant increase in gait speed (seconds) was observed in pre-frail (15.07) and frail (19.71) compared to non-frail (11.4) group. Lipid peroxidation (MDA) and protein oxidation (carbonyls) levels were higher in pre-frail and frail groups [MDA (nmoles/ml): PF = 4.638, F = 5.069; PC (nmoles/mg protein): PF = 2.73, F = 2.8] compared to non-frail [MDA = 3.47, PC = 2]. CML levels were observed to be higher in pre-frail (524 ng/ml) and frail (523 ng/ml) groups compared to non-frail group (508 ng/ml). **Conclusion:** Oxidative stress and protein glycation markers were higher in pre-frail and frail groups in comparison to non-frail group suggesting aggravated oxidative stress as the underlying process of frailty.

**Keywords:** Frailty, geriatrics, anthropometry, oxidativestress, AGEs

**PP-2023-0089**

**Abstract Title: Obstetric Nutrition Screening (ONS) in a Tertiary Care Center: A Retrospective Study**

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**Background:** Nutritional screening of a woman at conception can influence the maternal and fetal outcomes during antenatal, intrapartum and postnatal period. The study objective was to audit and review the nutrition screening data of pregnant women **Methods:** A retrospective observational study among pregnant women was conducted at the tertiary care center at Hyderabad. A nutrition checklist with a MUST screening tool was used to collect data for every woman registered at the center. All EMR data was analyzed, including patient demographics, medical history, BMI status at conception, HFSS (high fat, sugar, and salt) foods, and physical activity. Descriptive analysis was done using frequency and proportion. P value < 0.05 was considered statistically significant. **Result:** A six-month audit (n=6230) revealed that graduates made up the majority of women (53.34%), followed by postgraduates (29%). Most of the subjects were housewives and had started their pregnancy with no previous medical history. It was observed that 64% of the study population were at low risk (MUST) The median pre-pregnancy BMI was 24.97, and most of the individuals (48%) began their pregnancies with an overweight BMI. Furthermore, we observed that the majority of the subjects in the study (52.4%) were multigravida. Additionally 62% of multiparous mothers had overweight pre pregnancy BMIs (>25kg/m<sup>2</sup>) indicating that many of them may have had weight retention from their previous pregnancy. It was observed that 44% of the study population preferred HFSS foods. Majority of pregnant women (99.7%) didn't exercise at all, not even walking. This highlights the need to focus on raising knowledge about lifestyle modifications throughout pregnancy. **Conclusion:** Obstetric Nutrition Screening is important to understand the dietary and lifestyle factors and provide appropriate nutrition intervention during pregnancy. The study highlights that it is necessary to advise all women to begin their pregnancies with a normal BMI, limit on HFSS foods to reduce any risk during pregnancy and also to avoid developing non-communicable diseases later in life. We would like to explore this study further with a detailed prospective study

**Keywords:** Nutritional screening, MUST, HFSS



PP-2023-0102

**Abstract Title : Assessment of urinary indican in normal, underweight and obese children as an indicator of gut dysbiosis: A case-control study**

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**Background:** Several studies has shown that malnutrition is associated with gut dysbiosis. Dysbiosis is usually inferred by next generation sequencing (NGS). But NGS is not feasible and cost-effective at community level. Urinary indican can serve as a marker for gut dysbiosis. We hypothesize that the level of urinary indole derivatives will be higher in malnourished children. **Methods:** This was an age matched case control study conducted in Health, Nutrition, and Demographic Surveillance System (HNDSS) in the Addagutta area of Hyderabad. Children between 6 and 18 years of age were classified as normal (controls), underweight (Cases- group 1) and obese (Cases-group 2) using World Health Organisation BMI for age Z scores. 24 normal, 24 underweight and 24 obese, age-matched children ( $\pm$  6 months) between 6 and 18 years of age were enrolled in the study. 20 ml of urine sample was collected from the cases and controls. Urinary Indican detection and measurements were performed colorimetrically by DMACA (p-dimethylaminocinnamaldehyde) method using UV-VIS Spectrophotometer (Ultraviolet-visible spectrophotometer). Unpaired t-test was used to compare indican levels between normal, underweight, and obese children. **Result:** Data from 72 age-matched children were used for the final analysis (24 each of normal, underweight, and obese children). The mean (SD) age of normal subjects was 10.7 (3.08) years, underweight children was 10.8 (3.08) years and obese children was 10.07 (3.08) years. The mean indican level of underweight (12.11  $\mu$ g/ml, n=24, p value = 0.001) and obese (13.30  $\mu$ g/ml, n=24, p value=0.02) children were found to be significantly higher than that of normal subjects (5.53  $\mu$ g/ml, n=24). The higher levels of urinary indole derivatives in underweight and obese children might be due to protein putrefaction either in the small intestine (SIBO) or in the colon leading to protein malabsorption. **Conclusion :**Urinary indole derivatives can serve as a marker of gut dysbiosis. Urinary indican levels are found to be higher in children with malnutrition (underweight or obese) compared to healthy children. This cost-effective and simple assay can be used to assess microbial dysbiosis in community studies.

**Keywords:** Urinary Indican, Microbial Dysbiosis ,Malnutrition

PP-2023-0110

**Abstract Title: Assessment of Nutritional Status and Psychological Problems Through Menopause Transition Period**

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**Background:** Menopause transition is generally defined as the time between the onset of irregular menstrual cycles usually accompanied by some menopausal symptoms where women go through decreased level of hormones. During this period body begins to program the hormonal changes and symptoms of hormonal imbalance. This transition is referred to as climacteric period which leads to physiological changes like headache, painful muscle, loss of balance and psychological changes like anxiety and depression. **Methods:** A Cross sectional study was conducted among 168 women between 45-49 years who were attending the OPD of SDM Hospital Dharwad, Karnataka. Nutritional status was assessed through anthropometry and dietary intake by 24 hour recall method. A standard questionnaire was used to measure anxiety and depression using HAD scale. **Result:** The anthropometric measurements indicated that 52.4% of the study women were overweight and 14.3% were obese and

47.3% of women were having abdominal obesity which is the indicator of noncommunicable disease. With respect to nutrient intake the mean energy intake was  $1623 \pm 146$  Kcal which was found to be less as compared to average energy intake i.e. 2172 Kcal and per cent adequacy for energy was also less i.e. 85 and protein intake was also found to be less i.e. 45.8 gms and per cent adequacy was 83. The adequacy for micro nutrients mainly calcium, iron and  $\beta$ -carotene was also found to be less which is the characteristic feature of Indian population. Menopause transition period is associated with psychological problems mainly anxiety and depression which leads to unexplained health problems. Study revealed that 39.3% of the women had severe anxiety and 16.9% of them were having severe depression. **Conclusion:** Menopause transition is affected by physiological and psychological changes which have an impact on the weight status and also their nutrient intake which in turn affects the overall nutritional status of menopause transition period.

**Keywords:** Transition period, Menopause

**PP-2023-0112**

**Abstract Title: Sensory evaluation, Acceptability and efficacy of Pearl Millet & Peanut Chikki Bar in Anemic women of reproductive age (17-19 years)**

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**Background:** Iron Deficiency Anemia (IDA) is a prevalent health issue among women globally. In India, according to the NFHS-5 report, 53% (with a range of 43.7-61.6%) of women aged 15-49 suffer from IDA. This condition is primarily linked to factors such as inadequate consumption of iron-rich foods and poor absorption. Current practices for addressing IDA include the use of standard iron-folic acid supplements, food fortification, and dietary diversification. Pearl millet (*Pennisetum glaucum*) is known for its rich nutritional composition, providing essential macronutrients, both soluble and insoluble fiber. However, millets are underutilized due to their limited acceptance, lack of palatability, and bland taste. Moreover, the labour-intensive preparation of millet-based dishes hinders their consumption. Consequently, our objective was to create a highly nutritious and palatable ready-to-eat pearl millet-based chikki. We assessed its organoleptic properties and efficacy in improvement of hemoglobin levels among anaemic women of reproductive age. **Methods:** In this study, we utilized an iron biofortified pearl millet variety called Dhanashakthi developed by ICRISAT. Two chikki products (A and B) were created with differing textures but identical compositions. To assess these products, sensory evaluation (SE) and acceptability tests were conducted using a 9-point hedonic scale. We enrolled 138 individuals with mild to moderate anemia. The participants were given 100 grams of chikki bar-B variety as a regular snack for 90 days, twice daily. Venous blood samples were collected at both the beginning and end of the study to analyze blood biomarkers in the participants. **Result:** Both products A and B had nearly identical nutritional content: 498Kcal of energy, 11.56g of protein, 63.17g of carbohydrates, 7.50g of dietary fiber, 3.1mg of iron, and 1.1mg of zinc. SE results indicated that Product A outperformed Product B. The overall acceptability of the product demonstrated significant difference. Moreover, a substantial increase in mean hemoglobin levels was observed from the baseline ( $10.5 \pm 1.06$ ) to the endpoint ( $10.99 \pm 1.22$ ) with a p-value of  $<0.000$  along with a significant improvement in mean serum iron levels from the baseline ( $138.6 \pm 101.4$ ) to the endpoint ( $183.1 \pm 128.5$ ) with a p-value of  $<0.002$ . **Conclusion:** The newly created ready-to-eat pearl millet chikki bar received excellent acceptance. Substantial increase in hemoglobin (Hb) levels among individuals with mild and moderate anemia suggests that it could be a valuable addition to programs aimed at reducing anemia prevalence and improving students' performance.

**Keywords:** Pearl millets, Peanuts, acceptability, Evaluation.

PP-2023-0113

**Abstract Title: Unravelling the role of diet in Severe Acute Malnutrition (SAM). Is poor dietary diversity and insufficiency the only cause of undernutrition?**

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**Background:** Severe acute malnutrition (SAM) is a critical form of undernutrition, characterized by a weight-for-height Z score of  $<-3$  SD and a mid-upper arm circumference of  $<115$ mm. The NFHS-5 (2019-2021) data indicates a 7.7% prevalence of SAM in India, posing a significant threat to morbidity and mortality, especially among children under five. SAM is a complex issue with various contributing factors, yet diet plays a pivotal role in children's nutritional status. Despite interventions like supplementary feeding, midday meals, and rehabilitation, children often relapse into undernourishment. Hence, this study aims to explore the dietary factors influencing children's nutritional status. **Methods:** We carried out a cross-sectional case-control study involving 51 children under 5 years with uncomplicated SAM and 62 well-matched healthy controls. We assessed nutrient intake/adequacy and dietary diversity using 24-hour dietary recall and a food frequency questionnaire. The study took place in suburban areas of Hyderabad, Telangana, following the acquisition of required permissions from relevant authorities. **Result:** Children with SAM had significantly lower energy, carbohydrate, fat, zinc, and magnesium intake than their healthy counterparts. Despite this, SAM children did meet over 70% of the recommended Estimated Average Requirement (EAR) for most nutrients according to ICMR-NIN guidelines. Both cases and controls had inadequate consumption of Vitamin A-rich foods. Dietary diversity scores (DDS) were generally good for most SAM and all healthy children, with only three SAM children having slightly lower DDS than recommended. Notably, we found no link between dietary intake/adequacy, dietary diversity, and anthropometric measurements in SAM children. **Conclusion:** In comparison to healthy children, SAM children especially those aged 1-3 years, had a significantly lower mean intake of calories, carbohydrates, fats, zinc, and magnesium. Despite this, they still consumed more than 70% of the recommended nutrients for their age and gender. They also exhibited good dietary diversity. Our study suggests that SAM children might face challenges related to the digestion and absorption of vital nutrients despite having a sufficiently nutritious diet, potentially linked to imbalanced gut microbiota. Future research focusing on understanding the impact of gut microbiota on nutrient absorption will be essential to break the cycle of undernutrition in young children.

**Keywords:** SAM, DDS, Undernutrition, Gutmicrobiota, EAR.

PP-2023-0116

**Abstract Title: Consumption pattern of millets among women in Coimbatore and a sustainable nutrition model for improving millet consumption.**

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**Background:** India, accounting for 41% of global millet production in 2021, boasts a rich historical tradition of millet consumption deeply rooted in ancient culinary practices. Referenced in texts like the Rigveda and ancient Sangam literature, millets have long been celebrated for their nutritional value. As prod is based on the demand, millet cultivation dwindling from 35 million hectares to 15 million hectares causes concern pointing out the lack of awareness of millet consumption. In this context, the objective

was: To understand the Millet consumption pattern among women as they are the producers and caretakers of family health. To develop a sustainable nutrition model to improve millet consumption after identifying the lacuna. The initiative seeks to revive millet consumption and to restore it as a vital aspect of the community's diet. **Methods:** The study encompassed 500 women (250 farm women and 250 urban women) from 36 villages across six blocks, by purposive sampling. Millet consumption pattern was studied from food diaries and Food Frequency Questionnaires. Knowledge, Attitude Perception on millets were studied. A sustainable nutrition model was developed. **Result:** Urban women displayed limited weekly millet consumption (34%) due to awareness gaps, while farm women exhibited high daily consumption (80%). BMI and WHR were higher for urban women. Barnyard millet, Kodo millet, Foxtail millet, and Proso millet were consumed less by farm women. The sustainable model addressed these disparities by implementing awareness campaigns for both rural and urban women and introducing easily prepared millet-based recipes, significantly boosting consumption rates. **Conclusion:** This study underscores the vital role millets play in Indian diets, particularly in enhancing women's nutrition and overall well-being. Through focused efforts, including custom made awareness campaigns for various age groups and clearing the myths about millet utilization, practical solutions to manage millet cooking especially for the working women and the introduction of easy-to-cook millet products will bridge the recognized awareness and consumption gaps. The products were widely accepted, simplifying preparation and encouraging daily consumption. Digital educational materials effectively disseminated knowledge across different education levels.

**Keywords:** Millets, Women, Nutrition, Sustainable Model.

**PP-2023-0118**

**Abstract Title: A study on the various forms of millet products consumed by the selected subjects in Coimbatore**

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**Background:** Millet is a type of pseudo-cereals predominately grown in Asia. It plays a major role in the traditional diets of numerous regions all over the country (Ahamed S. M et.al, 2013). Millet contains superior nutritional value and they could be easily cultivated in areas where water is inadequate. Few research studies shows that it helps in health-promoting factors like anti-obesity, cardiovascular disease and anti-diabetic properties which can be improve through the millet food consumption. The purpose of the study was to understand the awareness on millet products consumed by the selected population groups. (Prathyusha,N et.al 2021) To analyse the consumption patterns of millet in the selected subjects. To create awareness on the availability of various forms of millet products. **Methods:** The study was conducted at Coimbatore district of Tamil Nadu state. The whole district was divided into five parts and a total of 549 subjects were studied using Random Sampling Method. This study was conducted using a well-structured interview schedule which included background information, anthropometric indices and food habits and dietary pattern of the selected subjects. The data collected were tabulated and analyzed statistically using SPSS software. **Result:** This study projected that out of 549 subjects, 52% consumed millet in the form of dosa, 41% consumed millets in the form of cakes or cookies, 34% consumed in the form of ready-to eat meals, 25% consumed it in the form of porridge and 8% consumed it in the form of rice and none of the chosen subjects took millets in the form of beverages. **Conclusion:** The study revealed that majority of the selected subjects consumed millets in the form of dosa, cookies and ready to cook products which were available in Coimbatore. Hence we conclude that people are unaware of the other forms of millet products which can be prepared easily with increased bioavailability of nutrients which will aid in improving overall health.

**Keywords:** Millet products, Health, consumption.

**PP-2023-0119**

**Abstract Title: Planning and Implementation of Need Based Meals for Pregnant Women of Rural Areas of Rajasthan**

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**Background:** Women in rural communities experience higher rates of life-threatening complications during or after childbirth than mothers in urban cities. Researchers analyze 6.8 million births from national hospital discharge data between 2007 to 2015. Policies and programs aiming to improve maternal health and reduce adverse events associated with delivery must address the unique health and challenges face by rural women. **Methods:** Keeping this in mind the following pilot project was carried out in rural area of Bikaner district of Rajasthan. To select the villages for pilot phase an assessment has been done on the basis of various criteria. The inclusive factors were: Road Connectivity, Mobile Network Connectivity, availability of basic resources like water supply, availability of seasonal fruits and vegetables at reasonable prices etc. Data Collection of beneficiaries related to anthropometric measurement, literacy level, food choices, 24 hr diet recall, social status, medical condition has been done. Nutrition Expert has developed food recipes along with the macro and micro nutrient calculation for each meal of weekly menu. Recipes were planned as per the recommended allowances for a pregnant woman in different trimester along with modifications as per availability of resources. **Result:** During survey the data showed that maximum respondents were between age of 18-22 years. Out of them more than 40 percent women were underweight and more than 70 percent had low haemoglobin levels. As far as the food consumption is concerned 86 percent respondents were consuming complete meals only 2 time and in rest of the meals, they were only consuming tea. Consumption of seasonal or any fruit was negligible amongst all the respondents. Training material was prepared to educate and instruct the target group (pregnant females-0-9 months) and the trainees (Cook/Helper) both. Food was tasted by the nutrition expert and appropriate remarks were given. **Conclusion:** Overall, the efforts paid off and the results showed favourable outcomes in terms of better nutritional status and overall improvement in mental health status. This approach can further be introduced in different areas of Rajasthan and other states.

**Keywords:** Pregnancy, Rural community, Nutrition, Program.

**PP-2023-0120**

**Abstract Title: Prevalence of obesity in relation to production of millets in different states of India**

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**Background:** India, being the most populated country in the world stands in 3rd place in Obesity. While all the non - communicable diseases have it's base as obesity, it is necessary to know the rate of obesity in the high populous sub - continent, India. Food and Agriculture Organization and United Nations has recognised 2023 as International Year of Millets for awareness about health and nutritional benefits of millets. The new normal of millet consumption, has now increased among the public for its fiber content, as it prevents diabetes, cardiovascular diseases and also aids in weight loss. As india also holds 12th rank in the millet production, analysis of the relationship of the prevalence of obesity in comparison the rate of production of millet is the fact to be unwinded. Objective To study the production of millet and its



association with prevalence of obesity among different states of India **Methods:** This study is based on the secondary data collected on overall production of millet and different varieties of millets from Agricultural and Processed Food Products Export Development Authority (APEDA) of India (2016-2021). Similarly the prevalence of obesity among different age groups was collected from National Family Health survey (NFHS) of India (2016-2021). By using appropriate statistical tools (spss) we analysed the data and found the average millet production and prevalence of obesity in different states of India. **Result:** According to the secondary data the highest production of the top three millets produced in the country such as jowar, bajra and ragi, it is observed that rate of production of millet is high in the states of Maharashtra (15% of total production), Rajasthan and Karnataka where the rate of obesity is comparatively low. Survey also indicates that the least production of millet is found in Andhra Pradesh which had high prevalence of obesity. **Conclusion:** This study reveals that highest millet producing states had very low prevalence of obesity when compared to low millet producing states. As we walk through the International Year of Millet a proper creation of awareness on millet production and its consumption is a remedy for weight management is suggested.

**Keywords:** Prevalence of obesity, Millet Production.

#### PP-2023-0122

**Abstract Title: A study on relationship between socioeconomic profile and consumption of millets among the selected subjects of Coimbatore.**

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**Background:** The influence of economic status on millet consumption is a complex interplay of affordability, cultural traditions, and access to alternative food sources. This relationship is pivotal in understanding dietary preferences and habits within different socio-economic strata. They are easy and economical to produce and more suited to be grown in our soil. Compared to regular cereals like rice and wheat, they require less water and environment friendly. **Methods:** The study was conducted in Coimbatore including all five zones as North, South, East, West and Central of Coimbatore. The sample for the study includes the adults of Coimbatore. The interview schedule was framed to collect the data on Socio-Demographic profile according to Kuppu swamy scale (2013) and their millet consumption, its frequency, mode of consumption was collected. Direct interaction with sample was done to collect the data. The collected data was consolidated by relating association between Socio-Economic class and their millet consumption. **Result:** The relationship between socio economic and millet consumption of the selected subjects results that the majority of the subjects fall in upper lower class and due to their economical status and preferences in the family the consumption of millets is high about 72% and remaining of the subjects fall in the upper class, due to their lifestyle pattern they show preference more to ready to cook and instant foods, which influence their consumption of millets to be low, and the remaining subjects about 28% consume millets as they are healthy and beneficial to lead a healthy life. **Conclusion:** The people in upper class tend to consume less quantity millets and the people in upper lower class consume more quantity of millets

**Keywords:** Millet consumption, economic status.

#### PP-2023-0123

**Abstract Title: Physical Activity in Women with Preeclampsia: A Longitudinal Study**

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**Background:** Preeclampsia is a disorder of pregnancy with 8-10% prevalence in India. The role of physical activity in influencing risk of preeclampsia is unclear. The current study reports physical activity levels across pregnancy in women who subsequently develop preeclampsia. **Methods:** A total of 1003 (903 non-preeclampsia and 100 preeclampsia subjects) women were recruited at 11-14 weeks of gestation (visit 1 - V1), and subsequently followed across gestation at three time points viz. 18-22 weeks (visit 2 - V2), 26-28 weeks (visit 3 - V3). Physical activity scores were categorized and based on the intensity of the activity and was divided into 3 main domains: sleep time, sedentary and moderate activity. A daily score was calculated, where higher scores indicate more activity. Mean values were calculated using t tests. Association between physical activity and risk of preeclampsia were analysed by using logistic regression. **Result:** Women with preeclampsia had a greater sleep time and were sedentary ( $p < 0.05$  for both) as compared to the non- preeclampsia group at all time points of pregnancy. In contrast, moderate activity levels were lower ( $p < 0.05$  for all) in the preeclampsia group as compared to the non- preeclampsia group. Low activity levels ( $p < 0.05$  for all) were associated with an increased risk of preeclampsia at all the timepoints of pregnancy in an unadjusted model. **Conclusion:** Our findings suggest that women who develop preeclampsia had a sedentary lifestyle. Further studies are needed to confirm the findings.

**Keywords:** Lifestyle, Physical activity, Preeclampsia, Pregnancy.

## PP-2023-0125

**Abstract Title:** The double burden of malnutrition is a serious public health concern, in developing nations

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**Background:** Malnutrition in multiple forms is a renewed public health interest post the COVID-19 pandemic, as it has been exacerbated worldwide irrespective of geography, socioeconomic status, and gender (World Health Organization, 2018). The Maharashtra state in India, located in the central and western region, is the second most populous Indian state and is the business capital of India. Maharashtra is thus an ideal setting to study the trends of double burden in a country experiencing rapid transition. The present study, therefore, aims to assess and compare the household double burden of malnutrition among mother-child dyads in different settings in Maharashtra. **Methods:** A cross-sectional pilot survey was performed among 295 randomly selected mother-child dyads. Study settings were urban households from Pune city, two tehsils each from Pune (rural) and Palghar districts (tribal). Socio-demographic data were elicited using a questionnaire. Anthropometric measurements were recorded to estimate the nutritional status of mothers and children. Descriptive statistics were performed for socio-demographic characteristics, Chi-square and Kruskal-Wallis test to study the association between variables. Z-scores were computed using the WHO Anthro Software. **Result:** The tribal settings recorded 'very-high' prevalence of wasting 37.7% and in the urban settings wasting was high (13.7%) as per the severity threshold. Over 37% of the children manifested overweight and obesity (OWO). Stunting was high in urban areas (49.3%), followed by tribal (45.9%) and rural (37%) settings. Regarding underweight, the tribal regions recorded  $>55.7\%$ , while the rural and urban were nearly 20%. OWO among mothers was strikingly high in the urban setting (82%), twice compared to the rural (42%). The overall prevalence of double burden of malnutrition at the household level (DBMHL) was 19.7%. One-fifth of the households presented co-occurrence of an overnourished-mother and undernourished-

child. The DBMHL was high (46%) in urban households followed by rural (17%) and tribal settings (5.7%). **Conclusion:** Double-duty strategies are the need of the hour to curb the rising double burden across settings.

**Keywords:** Double burden of malnutrition, stunting

**PP-2023-0129**

**Abstract Title: Effect of Dietary Counseling and Nutrition Education on the Prevalence of Anaemia and food habits among Adolescent Girls Belonging to Different Socioeconomic Background Bihar.**

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**Background:** Several recent studies have reported that adolescent girls from every corner of India particularly from rural areas had poor health status and the roots of this problem was found that most of the adolescents were not aware about proper dietary pattern and also lack of nutritional knowledge. Freedom from poor health and nutritional status is a basic human right for every individual. Proper knowledge of health related issue and also dietary pattern could be a significant step towards breaking the vicious cycle of intergeneration under nutrition, obesity, anaemia and also various chronic diseases of adolescent girls. **Methods:** Total 100 respondents were selected from Samastipur district of Bihar aged 15 to 19 years and divided into three socio-economic groups i.e. lower class, middle class and upper class. Nutrition intervention and counseling was given to respondents in different sessions. Their Pre and post haemoglobin level was recorded. **Result:** The study resulted that before nutrition education and dietary counseling majority (53%) of respondents preferred fast food daily in each income class. Only nine per cent adolescents ate fast food on rarely basis. Regarding frequency of skipping meal, it was found that majority of respondents were missing breakfast (53%) than lunch (37%) and dinner (10%). Around 39 per cent of girls were non anaemic and 61 per cent of adolescent girls were suffering from anaemia but after nutrition intervention and counseling it was observed that overall 66 per cent of adolescent girls had normal haemoglobin level. It was also observed that girls from lower class background were more anaemic as compared to middle class and upper class family. In rural areas of Samastipur district of Bihar, adolescent girls were suffered from anaemia due to lower socio-economic background, poor nutrition education and dietary counseling. **Conclusion:** Proper nutrition intervention and counseling must address not only the problem of anaemia, but also in proper dietary habits and deficiencies of other micronutrients. Analysis of food habits helps in understanding the trend and in knowing the demand and supply gaps of food in the state. It also throws light on the nutritional aspects and helps in promoting certain required foods among the citizens.

**Keywords:** Adolescent girls, Anaemia, Nutrition Education.

**PP-2023-0136**

**Abstract Title: RELATIONSHIP Between Millet Consumption Pattern And Socio Economic Status of The Selected Subjects In Coimbatore City**

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**Background:** The influence of economic status on millet consumption is a complex interplay of affordability, culture, traditions, and access to alternative food sources. This relationship is pivotal in



understanding dietary preferences and habits within different socio-economic strata. They are easy, economical and more suitable to be grown in our soil. Compared to regular cereals like rice and wheat, they require less water and are environment friendly. **Methods:** The study was conducted in selected areas of Coimbatore district, random sampling method was used and subjects of age group 19 to 55 years were selected. The whole district is divided into 5 zones and a total of 549 subjects were studied. An interview schedule was framed to collect the data on Socio-Demographic profile using Kuppu-swamy scale (2013), their frequency and mode of consumption of millets were collected. The collected data was consolidated and relation between socioeconomic class and millet consumption is derived. **Result:** Majority of the subjects in all 5 zones comes under upper-lower class (40%). Among them, about 45% of subjects consume millets. In zone 1 (Central) most of the population comes under upper-lower class and there is a good intake of millets, contrary to that in zone 3 (South) most of the population comes under upper class but the consumption of millets is comparatively low because of lack of time to cook and prefer ready to eat, instant foods to save time and the continues with other three zones. Most of the subjects, for about 52% consume millets as they consider them healthy, 21% because of health issues, etc. 52% of the population consume in the form of dosas and idlies and 41% as cakes and cookies. **Conclusion:** The people in upper-lower class tend to consume more quantity of millets when compared to upper class as they consume lesser quantity due to their lifestyle pattern, busy schedule and they show more preference to ready to cook and instant foods. Where as in upper-lower class and lower class subjects tend to consume more as they consider them healthy.

**Keywords:** Millet consumption, Economical status, mode of consumption of millets, Frequency of millet consumption, Lifestyle pattern.

**PP-2023-0151**

**Abstract Title: Nutritional status and dietary intake of Indigenous Tribal women of reproductive age group in Attapadi, Kerala**

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**Background:** Nutritional deficiencies are a pressing concern among indigenous tribal women in the reproductive age group (WRA) in Attapadi, Kerala. Despite advancements in healthcare and implementation nutrition intervention programmes indigenous tribes continue to face disproportionately high maternal and child malnutrition levels. Issues such as premature delivery, low birth weight, and neonatal deaths persist, with 136 infant deaths documented since 2012. The quality of diets by WRA significantly impacts their health and that of their children, potentially leading to issues like intrauterine growth retardation, low birth weight, and premature birth. Therefore, this study aims to assess the dietary quality and estimated dietary intake of WRA. **Methods:** The study involved a cross-sectional survey of 20 randomly selected villages in the Attappadi tribal block in 2022. Investigations such as anthropometric measurements, haemoglobin estimation and 24-hour dietary recall survey conducted in 202 WRA. The WHO's cutoff values were used for assessment of nutritional status, anemia, and FAO-minimum dietary diversity (MDD), while Recommended Dietary Allowances (RDA) values were utilized to calculate nutrient intake. **Result:** About 33% and 40% of NPNL women and lactating mothers, respectively, suffered from chronic energy deficiency (BMI < 18.5 kg/m<sup>2</sup>), while 13.4% of NPNL women and 15% of lactating mothers were overweight or obese (BMI > 25 kg/m<sup>2</sup>). Among adolescent girls aged 15–18, 12.5% were thin, and 10.5% were overweight or obese. Alarmingly, 97% of adolescent girls, 87% of pregnant women, and 80% of lactating mothers were anemic. The predominant dietary pattern among WRA consisted of cereals and root-based starchy staples, with limited consumption of dairy products, fruits, and vegetables. Estimated nutrient intakes, except for protein, fell below the RDAs, with significant deficiencies in dietary iron (45-70%), calcium (57-77%), and Vitamin A (62-93%). A vast majority of women consumed a diet lacking several essential nutrients, and one-third did not achieve MDD. **Conclusion:** The diets of WRA in Attapadi lacked diversity and were deficient in essential nutrients. To address this issue and improve the nutritional status of women and children in

the community, action is needed to promote the utilization of locally available, biodiverse foods that align with indigenous traditions and dietary preferences.

**Keywords:**

**OP-2023-0002**

**Abstract Title: Use of Nutri-Cereals in Cuisine of Hadoti Region of Rajasthan**

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**Background:** Kota is known as Educational hub of India. More than one lakhs student every year came here for preparation of medical and engineering exams. Hadoti region of Rajasthan is not only known as educational hub but is also known for its authentic food. As we know that Nutri-Cereals are good source of dietary fiber antioxidants and protein. Local people of this area are very much aware about this fact any due to cost effective and easy availability of Nutri-Cereals, it is used in daily food of Hadoti region. Bajara, Jwar, Sava, Makka are some Nutri-Cereals which are very easily available in Hadoti region. Some of the popular dishes of Nutri-Cereals include Bajre ki khichdi, Bajara Kathe, Makka Khichda, Sava Pulav, Sava Roti, Jawar ki Roti, Makka Roti etc. Present paper deals that how people of this region use these Nutri-Cereals in their daily food the main emphasis of this paper is to document some local cuisine which is treasure of our culture and also able to full fill our daily nutrition requirement at very low cost. Botanical aspect with nutritional value of these Nutri-Cereals will also present in this paper. **Methods:** Data will Collect by Discussion method, interview and survey of area **Result:** Present paper deals that how people of this region use these Nutri-Cereals in their daily food the main emphasis of this paper is to document some local cuisine which is treasure of our culture and also able to full fill our daily nutrition requirement at very low cost. Botanical aspect with nutritional value of these Nutri-Cereals will also present in this paper. **Conclusion:**

**Keywords:** Hadoti Region, Nutri-Cereals

**OP-2023-0012**

**Abstract Title: Role of dietary proteins in body composition analysis of body muscle mass to body fat ratio among adults aged 18-65 years (both genders included)**

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**Background:** Anthropometric and body composition assessment are used to routinely detect or diagnose several important nutritional related problems among adults and young population. The main aim of the study was to assess the dietary intake of protein by analysis of ratio of body muscle to body fat among adults aged 18-65 years. The hypothesis tested was that there's no significant difference observed within the age group and gender when compared with different mean and standard deviations of body composition analysis. **Methods:** A total of 230 subjects (18-25 years both male n=100, female n=100; 35-65 years male n=15, female n=15) residing in different regions of Hyderabad, Telangana, India were recruited to take part in cross sectional comparative study conducted using offline questionnaire to analyze individuals on demographic profile, anthropometric measurements, Bioelectrical impedance analysis, physical activity, medical history and dietary patterns. The results indicated that subjects falling under age category of 18-25 years were 43% (N=230, male and female) with mean BMI kg/m<sup>2</sup> (23.5±7.4, 20.3±3.8), body fat% (20.86±3.8, 22.7±5.5), Muscle mass (53.8±61.9, 39.9±32.3), 35-65 years were 6% (N=230, male and female) showed mean BMI kg/m<sup>2</sup> (28.4±5.96, 31.56±6.03), body fat% (53.3±5.3, 43.9±7.18), Muscle mass (40.18±7.01, 44.6±3.8). **Result:** There was a significant difference that was observed in the frequency of dietary protein intake with age

and gender( $p<0.05$ ).A strong correlation ( $p<0.05$ ) was noticed in body fat and muscle mass of both genders showing descriptive statistics to be more than the normal range of body fat which mean less than 20% among adults ,being a predictor other than BMI to be used as a marker for liability of chronic metabolic disease conditions.**Conclusion:** Hence, this study has shown strong empirical evidences in body composition of individual is influenced by various factors including gender, age, physical activity, lifestyle and dietary preferences apart from BMI which can be used as effective biomarker in the assessment of risk factor among metabolic disorders.

**Keywords:** Dietary protein, body composition, BMI

#### OP-2023-0015

**Abstract Title: Assessing Socio-Economic Factors and Child Health in Bankura's Slum Preschoolers**

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**Background:** India faces a significant challenge with the highest proportion of undernourished children globally. The nutritional status of children, especially preschoolers aged 1-6, is a critical indicator of national development and well-being. Malnutrition not only contributes to childhood morbidity and mortality but also hampers physical and mental growth in survivors. Despite global goals to combat undernutrition, progress has been slow, emphasizing the need for regular growth monitoring and nutritional surveillance. Thus the nutritional status of the child is a sensitive indicator of not only health of the child but also community health and nutrition. Millennium Development Goals (MDGs) had set the target to halves under nutrition by 2015 which was not achieved while sustainable developmental goal targets to end all forms of by 2030 including stunting and wasting. **Methods:** The objective of the study was to estimate the effect of socio-economic determinants and nutritional status of pre-school children from slum area of Bankura, West Bengal, India. The survey, conducted in October-November 2022, encompassed 200 preschool children and their families. Data collection methods included random sampling, surveys, questionnaires, observations, and interviews. Information was sourced from households, focusing on socioeconomic status, educational backgrounds, and dietary patterns, along with data from an Integrated Child Development Services (ICDS) school, with the permission of the Child Development Project Officer (CDPO). **Result:** Findings revealed that a majority (75%) of household heads earned less than INR 5,000 per month, substantially impacting child nutrition. Alarming statistics showed 36.5% of children suffering from stunting and 31.1% experiencing underweight conditions. These figures indicate a high prevalence of malnutrition according to WHO classifications. **Conclusion:** This study sheds light on the dire nutritional status of preschool children in the urban slums of Bankura district. A significant proportion of households earn meager incomes, exacerbating the nutritional challenges faced by these children. Stunting and underweight prevalence rates are alarmingly high, underscoring the urgent need for government intervention programs. Addressing this issue is crucial not only for individual child health but also for community well-being and overall national development. The study calls for sustained and targeted efforts to combat childhood malnutrition, aligning with the United Nations' Sustainable Development Goals and emphasizing the importance of robust nutritional surveillance systems. **Keywords:** Nutritional status, ABCD method, Pre-school children, Slum Area.

#### OP-2023-0017

**Abstract Title: A comparative assessment on dietary habits of pregnant women in urban and rural areas.**

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**Background:** A nutrient-rich maternal diet before and during pregnancy is associated with improved fetal health, more appropriate birth weight, and increased rates of maternal and infant survival. Good dietary habits during pregnancy play a significant role in determining the long-term nutritional status of both the mother and the fetus. To identify the risk of nutritional inadequacy and to give appropriate dietary recommendations for pregnant women in urban and rural areas. Poor dietary intakes in pregnancy can contribute to suboptimal nutritional status and further influence maternal and child health. **Methods:** Study was conducted in department of obstetrics and gynaecology unit, Chennai. The investigation comprised 100 pregnant women in urban and rural areas. Assessed patients by using anthropometric and dietary methods (Food frequency questionnaire & 24 hrs- recall). **Result:** The results of this study clearly demonstrate that pregnant women in rural and urban regions have very different nutrient and energy intake. Nutrient intake of pregnant women in urban areas is high when compared to rural areas. Daily intake of green leafy vegetables, fruits, fresh juices, egg is high in urban areas than rural areas. Daily intake of beverages, fried foods, meat & poultry, cakes and pastries is high in rural areas than urban areas. Dietary pattern of pregnant women in urban areas is better than rural areas because of their healthy food choices. Although the aggregate data showed some satisfactory dietary habits as well, analysis of the 24-hour recalls revealed the need to enhance the dietary intake of pregnant women living in rural areas. **Conclusion:** The dietary habits of pregnant women in urban areas having higher nutrient intakes than their rural counterparts. Nutrient intake of pregnant women in urban areas is high when compared to rural areas. Dietary pattern of pregnant women in urban areas is better than rural areas because of their healthy food choices. A balanced diet can help a pregnant women to improve a maternal health and also enjoy a safe pregnancy for herself and her foetus.

**Keywords:** Pregnancy, Dietary pattern, Nutritional status

**OP-2023-0026**

**Abstract Title: ANAEMIA IN GERIATRIC SUBJECTS OF URBAN PRAYAGRAJ AS A PUBLIC HEALTH PROBLEM: FINDINGS FROM COMMUNITY BASED STUDY**

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**Background:** Anaemia in geriatric subjects is a global health issue. Any degree of anaemia contributes significantly to the morbidity and affects the quality of life of geriatric subjects. Majority of the studies on geriatric anaemia have been undertaken in hospital settings. The aim of this study was to assess prevalence and spectrum of anaemia in geriatric subjects as well as its linkages. **Methods:** This community based cross sectional study was done on 557 urban geriatric subjects (> 60 years) of Prayagraj district, Uttar Pradesh. Multistage sampling procedure was adopted for selection of subjects. Predesigned and pretested proforma was used to elicit socio demographic information and haemoglobin estimation was done through photometric measurement. For data analysis Statistical Package for Social Sciences (SPSS 21st version) was used; Chi-square test was used for statistical significance. **Result:** Out of 238 (43.1%) subjects with anaemia, 50.4%, 46.6% and 30.0% had mild, moderate and severe anaemia, respectively. Significant linkage of anaemia in geriatric subject prevailed with their age, gender, religion, caste, marital status, education, occupation, socioeconomic status and dietary habits. Extent of anaemia was maximum (57.9%) in subjects > 80 years, male (50%), just literate (72.2%), unskilled labour (75.0%), OBC (74.8%) and vegetarians (52.5%). **Conclusion:** Nearly 9 out of 20 subjects were anaemic. Anaemia in urban geriatric subjects had significant linkages with several socioeconomic variables.

**Keywords:** Anaemia, Geriatrics, Haemoglobin, Community Health

**OP-2023-0028**

**Abstract Title: THREAT OF HYPERCHOLESTEROLEMIA IN URBAN ADULT SUBJECTS AND IT'S ASSOCIATES: EVIDENCE FROM COMMUNITY BASED STUDY**

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**Background:** Hypercholesterolemia is an abnormality of lipids in the blood. It is considered a crucial modifiable risk factor for cardiovascular disease. However, there is paucity of community based studies on hypercholesterolemia in adult population in India. The aim of the present study was to find out extent, spectrum and associates of hypercholesterolemia in urban adult subjects **Methods:** This community based cross sectional study was done on 536 urban adult subjects (30 to 59 years) of Prayagraj district, Uttar Pradesh. Multistage sampling procedure was adopted for selection of subjects. Predesigned and pretested proforma was used to obtain socio demographic information of subjects. For estimation of serum cholesterol blood sample was collected by aseptic procedure and its level was measured through standard technique. For data analysis Statistical Package for Social Sciences (SPSS 21st version) was used; Chi-square test was used for statistical significance. **Result:** Hypercholesterolemia was to the extent of 24.4% in 30-59 years subjects. With advancing age this condition increased significantly ( $p < 0.05$ ). Hypercholesterolemia was maximum (27.0%) in subjects with family size 2-4. As much as 17.5% subjects with family size  $> 7$  had hypercholesterolemia. There existed no significant ( $p > 0.05$ ) association of hypercholesterolemia with other socio demographic variables. With increasing visceral fat%, extent of hypercholesterolemia increased significantly ( $p < 0.05$ ). **Conclusion:** One out of 5 urban subjects of age group 30-59 years had hypercholesterolemia. Advancing age, family size and visceral fat% were significant associates of this condition.

**Keywords:** Adult population, Cardiovascular disease, Hypercholesterolemia

OP-2023-0042

**Abstract Title: Unveiling the Status of Hidden Hunger and Diet Quality among Tribal Women in Two Blocks of Sundargarh district of Odisha**

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**Background:** The concept of hidden hunger has been a growing concern in India. Despite living in a biodiverse environment in West Odisha, the Bhuiyan, Kulha, and Kisan tribal communities, particularly women, experience a high prevalence of multiple micro-nutrients deficiency. The objective of this study was to assess the current state of hidden hunger and association between seasonal variation and dietary habits. **Methods:** The study utilized a combination of cross sectional and longitudinal methods incorporating various methodologies such as Household Surveys, MDD-W, a continuous seven days - Dietary Recall and Blood Test. A total of 294 households consisting of 326 females were covered in Balisankara and Subdega block of Sundargarh district. Various biochemical analyses and Statistical Package for the Social Sciences (SPSS) software were used for data analysis. **Result:** Out of a total of 326 tribal women, 149 exhibited clinical symptoms but 143 women underwent blood tests. Among them, 123 showed a deficiency of Serum Iron and TIBC (Total Iron Binding Capacity), while 64 showed a deficiency of Serum Zinc. The Minimum Dietary Diversity for Women (MDD-W) was lower during the summer and rainy seasons compared to winter. Moreover, the consumption of dairy products, vegetables, and pulses, as well as poultry and meat, was relatively lower than the recommended intake for these tribes. **Conclusion:** The study findings indicate that a significant proportion of tribal women suffer from both Iron and Zinc deficiency. Moreover, the study reveals a correlation between seasonal variation and dietary habits, with lower dietary diversity observed during the summer and rainy seasons.

**Keywords:** Hidden Hunger, Diet Quality, Sundargarh



**Abstract Title: ROLE OF MILLETS IN ACHIEVING HOUSEHOLD NUTRITION SECURITY IN RURAL AREA OF JHARKHAND**

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**Background:** Millets are a group of highly variable small seeded grasses that are often termed nutri-cereals or dry land cereals and include sorghum, pearl millet, Finger Millet, little Millet, foxtail, Millet, porso Millet, kodo Millet etc. Agriculture is the mainstay for 80% of the rural population in Jharkhand. The agricultural economy is characterized by dependence on nature, low investment, low productivity, monocropping with Paddy as the dominant crop, inadequate irrigation facilities and small marginal holdings. Farmers took to paddy cultivation in a large scale due to the traditional millet crop's low productivity, low market value and unavailability of suitable processing technologies. In Gumla, a district of Jharkhand, since 2022 farmers have shifted back to the cultivation of millets specially finger millet crop in acres of land as it now become profitable for nutritional value and market value. Finger millets can be stored for long periods without insect damage (Purseglove, 1972). The initiative was taken by the district administration by encouraging more than 25,000 farmers for cultivation of finger millet in the year 2022-23 covering 30,000 acres of land. **Objective:** To study traditional recipes prepared from Finger Millets in rural area. **Hypothesis:** Rural people usually prepare food by using the flora and fauna of their vicinity for nutritional security. **Methods:** With 2023 being declared the "International Year of Millets", both the agricultural community and Indian consumers have become curious about the importance and nutritional value of millets. Keeping this in mind, the study was carried out in rural area of Gumla district as the district is a Maoist hotbed and grappled with malnutrition among rural people. For study of traditional dishes 25 rural women aged above 50 years were selected from different households. The sample was selected Purposively by using simple random sampling method, These rural women were cultivating and frequently preparing traditional recipes in different occasions. The study was done by observation and interview method in the month of December 2022. **Result:** Rice is an integral part of the food system of rural people. Now, Finger millet and kodo millet are popularly used to prepare a variety of traditional recipes with rice. Due to the development of advanced technologies, millets are processed by Milling Malting, baking, germinating, fermenting and combination methods. Germination of grain is reported to change the amino acid composition, convert starch into sugars and improve the availability of fat, vitamins and minerals. The grain produces alpha Amylase, an enzyme that converts insoluble starch to soluble sugars through germination. Some traditional dishes such as Dhuttu roti, Chirka roti, Pitthas, Porridge, Popcorn were prepared by incorporating millets with rice and dal. These dishes are tested about the texture, flavour, processing methods, appearance etc. Dhuttu Roti is a traditional food. Rice and ragi (finger millet) and Urad dal are soaked overnight. They are grinded to a fine batter. Traditional grinding stones used to grind whole or decorticated grain to flour usually consists of a small stone which is held in the hand and a larger flat stone which is placed on the ground (Subramanian and Jambunathan 1980; Vogel and Graham, 1979). Cones are made by folding Sal leaves by stitching with tiny pieces of twigs. The batter is filled in these cones, sealed properly and steamed these cones for 10 to 15 minutes. Chirka Roti is prepared by mixing rice, ragi and urad dal with water making it a flowing consistency. Here little oil is required for greasing hot tawa. Pittha is prepared by mixing Rice and Ragi in 60 : 40 ratio (for making a dough in hot pan with little oil) and urad dal (for stuffings) soaked overnight and grinded to make fine batter. Urad Dal with green chilli, salt and garlic was used as a stuffings. These pittha are then steamed for 10 to 15 minutes. Khoa with jaggery can be used as stuffings. Pittha may be both sweet or savoury taste based on which occasion they are made. It is a special delicacy and is made during Makar sankranti and Deepavali. In this area, Mahua (*Madhuca longifolia*) are an important uncultivated tree. The mahua flowers provide essential nutrients to the rural people who use it to make a variety of traditional foods like mahua laddoo, LagraLattha or porridge by mixing finger Millet with mahua flowers. Khapra roti are also made with rice and ragi flour in the ratio of 60:40, cooked in earthenware without any oil. Cooking is done by the medium of hot air. Studies have shown that finger millet or ragi develops higher amylase activity than any other millets (Seenappa, 1988). Two varieties of Little Millets ( Seetharam, Riley and Harinarayana, 1989) such as Dangai and Gangai are popularly used to prepare "Lawa" similar to popcorn. The food has its own unique flavor found Particularly in this

region. The flavors and dishes are unique and express a distinct way of life. Most of the dishes cooked are simple with the fresh ingredients that they get from their own vicinity. All the food is cooked in such a way that the maximum nutrients are retained. The dishes prepared are the sources of micronutrients such as iron, magnesium, calcium, potassium, vitamins. Finger millets has the highest Calcium content among all the food grains and the amylose content of the starch in finger millets was 16 percent ( Wankhede, Shahnaj and Raghavendra Rao, 1979 b) and macronutrients such as Carbohydrates, fats and Proteins etc. These nutrients have medicinal values to reduce asthma, high blood pressure, diabetes, providing energy. The fibers present in millets lowers the risk of gallstones, prevents constipation. The usage of minimum spices and salt doesn't make the food bland, but help to retain more nutrients and to tickle the taste buds efficiently. **Conclusion:** The traditional crop Millets are the basis of nutrition in diverse culture and societies. Based on the results obtained from the study, it can be concluded that though rice is the main cereal grain for preparing different traditional dishes, yet the incorporation of finger millets enhance the content of minerals, fibers, Calcium, Copper, Zinc, Beta-Carotene thereby recipes are highly nutritious. Little oil, hot air and water used as the medium of cooking make the recipes healthy. Blends of different millet flours raise the nutrients density. Millets contain many health promoting components such as dietary fiber, minerals, vitamins, and phytochemicals. Preparing food products based on millets are good in taste, texture, appearance.

**Keywords:** Millets, traditional recipes, rural area

**OP-2023-0044**

**Abstract Title: Prevalence of Prediabetes among Bengaluru Urban Population: A Pilot Study.**

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**Background:** In recent decades there has been a huge transition in the incidence of prediabetes which is higher than the incidence of diabetes in India. This pilot study addresses the lack of data on the prevalence of prediabetes among the Bengaluru population in the year 2023. **Methods:** The screening was conducted free of cost in 4 different sites throughout Bengaluru. The study population comprised 130 subjects screened over a month time. Prediabetes was defined based on Random blood sugar levels > 150 mg/dl and biomarkers like Glycated hemoglobin levels > 5.7% and < 6.4%. Co-morbid conditions and anthropometric measurements like height, weight, waist circumference, and hip circumferences were also compared. The data obtained was statistically analyzed and interpreted. **Result:** The prevalence of prediabetes was 16.15% with a mean value of Random blood sugar 135 mg/dl  $\pm$  63.8, HbA1c 6.36%  $\pm$  2.29, BMI 26.19 mg/dl  $\pm$  4.28, and Waist-to-hip ratio 0.94  $\pm$  0.10. Subjects with High BMI, High waist-to-hip ratio, and preexisting co-morbid conditions were more prone to prediabetes. The results exhibited that the prevalence of prediabetes among the Bengaluru population was higher than the average prediabetes status of the Indian urban population. **Conclusion:** Observations of the study revealed that there is a high and increased rate of prediabetes in the Bengaluru population which requires immediate public health initiatives and lifestyle modification with Diet and Exercise interventions to control and prevent prediabetes and its future complications.

**Keywords:** Prediabetes, Bengaluru, Glycated hemoglobin, Lifestyle modification

**OP-2023-0047**

**Abstract Title: Dietary habits and effectiveness of physical exercise intervention on the fitness level of College students**

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**Background:** It is well established that engaging in physical exercises along with dietary modifications markedly enhances individuals' health, thereby reducing the risk of non-communicable diseases. Consequently, the study was conducted with the objective of assessing the dietary habits and gauge the effectiveness of a physical exercise intervention on the fitness level of College students. **Methods:** The study employed an experimental design. A total of 100 female students aged 18-23 years attending an urban College in Kollam district, Kerala were selected and randomly assigned into an experimental group (n=50) and a control group (n=50). Cardiovascular endurance (Cooper test), muscular strength of lower and upper extremities (Standing broad jump test and Extended arm hang test respectively), flexibility (Static flexibility test for hip and trunk) and Body Mass Index (BMI) of the experimental and control groups were assessed at baseline and after the physical exercise intervention. Pre-intervention data on dietary habits were also gathered. Following pre-test, experimental group received a 12-week supervised physical exercise training coupled with nutrition awareness sessions while the control group received no intervention. Post-tests were administered to both the experimental and the control groups to assess the effectiveness of the physical exercise intervention. Data analysis utilized paired sample t-tests and independent sample t-tests. **Result:** Majority of the participants in the intervention group skipped at least one meal a day which was mostly breakfast. Poor consumption of fruits and vegetables was reported in both groups. Paired sample t-test indicated a significant improvement ( $p < .001$ ) in the cardiovascular endurance, muscular strength, flexibility and BMI of the experimental group following the intervention while a significant drop ( $p < .001$ ) in the performance level of control group for the same was observed in the post-test. Independent sample t-test revealed a statistically significant improvement ( $p < 0.001$ ) in the performance of experimental group post-intervention compared to control group with respect to muscular strength of upper extremities, flexibility of hip and trunk and BMI. **Conclusion:** The integration of the physical exercise intervention with nutrition awareness sessions led to a significant enhancement in the physical fitness and nutritional status of the intervention group compared to the control group. Therefore, incorporating physical exercise and fundamental nutrition education into the College curriculum can contribute to improved nutritional and overall health status of students.

**Keywords:** Physical exercise intervention, nutrition education.

## OP-2023-0052

**Abstract Title: Using simple self- assessment screening tool to explore osteoporosis risk in the postmenopausal women of Mumbai, Hyderabad, Bidar - A population based study**

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**Background:** Osteoporosis affects people worldwide. The number of women with osteoporosis with reduced bone mass is increasing in India. The objectives of the study were to use a simple self-assessment screening tool (Osteoporosis Self- Assessment Tool for Asians) to explore osteoporosis risk in the postmenopausal women in the study sites (Mumbai, Hyderabad, Bidar). The study was also carried out to compare OSTA score in perimenopausal and postmenopausal women. **Methods:** This was a population based study using Osteoporosis Self- Assessment Tool for Asians (OSTA) and basic demographic information to identify osteoporosis risk in the postmenopausal women. Osteoporosis risk was analyzed with the help of Osteoporosis Self- Assessment Tool for Asians. A multistage, stratified sampling technique used to select a sample of 1210 women. This study collected data on 620 perimenopausal women and 590 postmenopausal women aged between 40 to 61 years in the study sites (Mumbai, Hyderabad, Bidar). **Result:** Based on the osta score distribution, majority of the women in perimenopausal group at low risk (92%). On the other hand, 22 to 26% of the postmenopausal women in the study sites [Mumbai (22.5%), Hyderabad (22.5%), Bidar (26.3%)] were at moderate risk to osteoporosis. Independent sample t test was computed to compare ostar score in perimenopausal and postmenopausal women. The prevalence of osteoporosis risk in postmenopausal women was higher than in perimenopausal women in the study sites, [Mumbai ( $t=4.586$ ,  $p=0.000$ ) Hyderabad ( $t=5.762$ ,



p=0.000) and Bidar (t=8.161, p=0.000). Postmenopausal age was significantly associated with osteoporosis risk, (p<0.05) indicates the statistical significance. **Conclusion:** The results of this study can be used a reliable and simple self- assessment screening tool of OSTA, to screen potential high risk groups (postmenopausal women) of osteoporosis early and without invasive examinations who should receive targeted therapeutic intervention.

**Keywords:** Postmenopausal women, Osteoporosis, OSTA

**OP-2023-0058**

**Abstract Title: Impact of nutritional status on well-being of menopausal women: An intervention study**

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**Background:** The menopause is the normal aging process in which the women undergo transition from reproductive to non-reproductive state. Before and after the physiological cessation of menstruation and last few the menopause process may extend involving complex physiological and psychological change in women. The study was conducted with an objective of to know the impact of nutritional status of menopausal women and to assess the effect of intervention on well-being. **Methods:** The experimental study was conducted among 480 middle aged women in two districts of Karnataka including both rural and urban area. ICMR subjective well-being inventory and menopause rating scale were used to elicit the information. **Result:** The results of the study showed that, mean age at menopause was 46.21±1.92 years and age at which menopausal symptoms started was 36.43±2.75 years. 2/3rd of respondents experienced joint and muscular discomfort while nearly half (37-50%) of them had hot flushes along with these somatic problems 40-60 per cent of them suffered from irritability and mental exhaustion. Rural working and urban non-working women reported more menopausal problems. It was striking to note that more than 67 per cent of the respondents belonged to overweight category according to BMI and WHTR which indicated that menopausal women had overweight as a risk factor for their health problems. Age at menopause and nutrition status were positively related and parity and BMI were negatively related with well-being. Three months nutritional supplementary and well-being intervention was given to menopausal women who reported menopausal problems and low well-being. The results clearly point out that improvement in well-being and decrease in stress level observed from pretest and posttest score in experimental group but no such improvement was found in control group. **Conclusion:** There is need of nutritional intervention along with psycho-education to improve the well-being among middle aged women.

**Keywords:** Menopause, symptoms, nutritional status

**OP-2023-0059**

**Abstract Title: Trans Fatty Acid Intake among Adolescents in Mumbai**

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**Background:** Globally, more than 500,000 deaths have been attributed due to increased intake of trans fatty acid (TFA). A greater consumption of TFA has been associated with development of several diseases like cardiovascular disease, type 2 diabetes mellitus, various cancers, etc. So, the need for research in this area arise as there is limited reliable data available on the TFA intake. The study was

undertaken with an objective to assess the consumption pattern and intake of trans fatty acid among adolescents. **Methods:** Consumption pattern of trans fatty acids was studied among 132 adolescent boys and girls aged 13 – 19 years using semi quantitative food frequency questionnaire in Mumbai city. The questionnaire included 185 food items branded / unbranded containing hydrogenated fat and/ or trans fat or food items which could be a potential source of trans fatty acids like khari biscuit, biscuits and cookies, Indian sweets like mysorepak and fried dry snacks like kachori, mix farsan and chips. For each item information about their frequency of consumption was collected. Trans fat intake was assessed using 24 - hour diet recall and macronutrient and fatty acid content was estimated using Dietcal software. Information about participants socioeconomic status (SES) was gathered. **Result:** The most popular and commonly consumed products were plain khari biscuit, plain toast/ rusk, laddoo, gulab jamun, cream biscuits, potato chips and banana chips. The study indicated an average daily TFA intake of  $0.072 \pm 0.122$  g/day among adolescent participants. The mean TFA intake of females was marginally higher than males (F value = 1.972, p = 0.163). The TFA intake was considerably higher in upper middle SES category compared to lower middle, upper lower and lower SES category (F value = 1.145, p = 0.334). **Conclusion:** Even though daily TFA intake values did not exceed the WHO limit of 1% of total energy intake from TFA, they substantially contributed to daily TFA intake and may exceed the limit when combined with other foods. Continuous monitoring of TFA content in food supply and its intake among the population would ensure consumer health protection.

**Keywords:** TFA, Bakery products, Snacks, Sweets

**OP-2023-0061**

**Abstract Title: Millets: India leading the way to one health**

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**Background:** "One World One Health" is an integrated approach to balance the health of people, animals and environment. In present era we need to diversify our food along with the cereals used as Nutricereals or millets. Nutricereals are nutritious food for both humans and animals and environment friendly. Different types of pesticides along with fertilizers are used during farming which are detrimental to one health concept. The main objective is to highlight millet, introduced it in food diversity and make it acceptable to maintain healthy and sustainable food habits. Millets are climate resilient, and also resistance to pests. It required no such fertilizers, and it is identified as a hard crop. The natural sources, antimicrobial resistance helps to minimize the risk of disease. Diversity represents the array of nutrients needed for well-rounded diet/ balanced diet. **Methods:** Study is done between the age group of 18 to 23 years using Purposive Sampling Method for data collection through Online Questionnaire mode based on FDA standardized question on food diversity, and statistical analysis was done by using SSPS method. Information's are also collected from National Centre for Disease Control (NCDC), World Health Organization (WHO), Food Safety and Standard Authority of India (FSSAI), Indian Institute of Millet Research (IIMR). **Result:** During this study it is observed that people of Eastern zone are unaware of the concept of introducing the grain in food diversity and are not accustomed with the processing of the grain, thus making them aware of different types of millets along with nutritional benefits. **Conclusion:** Millets are termed as "yesterday's" coarse grain" and today's Nutricereals and titled as the oldest crop making a strong come back in the Indian cereals production segment. Millets having the best nutritional profile it helps in preventing diseases. As it is superior to wheat and rice there is awareness for the people to adapt the grain for more nutritional support. Millets are grown well under dry, high temperature condition with no use of fertilizers making it suitable for one health. From the study it can be concluded that introducing dietary diversity plays an important role in balancing ecosystem.

**Keywords :** Dietary Diversity, Antimicrobial Resistance, Ecofriendly

**OP-2023-0073**

**Abstract Title: Purchase reasons and Consumption Patterns of Sugar Sweetened Beverages - Evaluation across Stages of Adolescence**

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**Background:** Sugar-sweetened Beverage (SSBs) consumption is rapidly expanding and has become a serious public health concern. Therefore, the study aimed to compare the intake of SSBs among adolescents across their ages (Early-Adolescents and Late-Adolescents) **Methods:** A cross-sectional study among 300 adolescents; 150 in their early adolescence (Group 1: 10-15 years), and 150 in late adolescence (Group 2:16-19 years) was conducted. The data on SSBs purchase and consumption patterns was gathered using a standard pre-tested Beverage Intake Questionnaire (BEVQ-15). **Result:** Sweet Tea (Group 1- 40% & Group 2- 34.7%), Sweet Coffee (Group 1 - 25.4% & Group 2 -28%), Whole Milk with added sugar (Group 1-25.3% & Group 2-24.6%) were the highest consumed SSBs daily. Whereas, 100% Fruit Juice (Group 1- 50.6% & Group 2 - 40%), Soft Drinks (Group 1- 44% & Group 2- 39.3%), and Sweetened Juices (Group 1- 32.6% & Group 2- 41%) were consumed weekly. Group2 consumed SSBs like Sweet Tea (21.3%), Energy/sports Drinks (9.4%), and artificially sweetened drinks like Diet-Coke (14.7%) significantly more on daily/weekly bases ( $p = 0.01, 0.002$  &  $0.00$  respectively). The taste emerged as a statistically significant reason for consuming SSBs among Group 1 (64%) and Flavor among Group 2 (36%) ( $p= 0.00$ ). Similarly, shops near home were the frequent place of purchasing SSBs for Group 2 (50%), while Supermarkets and Online sites were the preferred places by Group 1 (55%) with a significance of  $p=0.00$ . BMI was weakly associated with increased consumption of some SSBs ( $p<0.05$ ). **Conclusion:** Keeping in mind the probability of obesity while consuming high amounts of SSBs, adolescents should be made aware of the same.

**Keywords:** Sugar-beverages, Adolescence, consumption, purchase pattern

**OP-2023-0078**

**Abstract Title: TREND OF NUTRITIONAL STATUS AMONG FAMILIES OF UNDEGRADUATE MEDICAL STUDENTS OF A TERTIARY CARE HOSPITAL IN INDIA**

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**Background:** Out of the four categories of malnutrition, the over nutrition is rising on an alarming stage. The Chandigarh is forth amongst Indian states as classified by economic status. The aim of the study, therefore was to find out the prevalence of overnutrition (overweight and obesity) amongst the families of medical undergraduates. **Methods :**To impart the health education to the families, each medical student is suppose to know the health status (with an emphasis on nutritional health). The manual in which students are supposed to write the details of family are frequently checked by demonstrators in the field itself. The nutritional status was measured by calculating body mass index (BMI) from the measurements of height and weight recorded by students. The individuals with BMI less than 20 were considered under weight, 20-44.9 as optimally nourished and those with BMI equal to or more than 25 as overweight with its further classification to overweight ( 25 to 29.9) and obese (30 and more). It was compared with the data from previous records and from National Family Health Survey -5 data recorded separately for males and females. From a sub sample the average per capita income of the families was calculated. **Result:** The majority of individuals ( males 34.2 percent and females 40.2 percent )

were in the age group of 45 to 54 years, were educated to less than graduates ( male 43.1percent and females 49.2 percent ). The per capita income was Rh 3515724. The percentage of over nourished males in the year 2000-2004, 2005-2008 and 2015- 2019 was 34 and 45 respectively the similar figures for females were 30.7, 25.8 and 44 percent. Amongst males overweight was more common for the years 2000-2004 (males 32.4 percent, females 24.4 percent) and 2015-2019 ( males 36.7 percent, females 33.3 percent) Amongst females obesity was more common for 2000 - 2004 ( males 2.60 percent, females 6.3 percent), for 2015-2019 ( males 7.4 percent, females 10.6 percent ). **Conclusion:** After having a smooth breath of over nutrition remaining same from 2000 to 2014, it is again increasing from the year 2015 requiring health education

#### OP-2023-0080

**Abstract Title : A cross-sectional study on malnutrition among dysphagic elderly in old age homes in western Tamil Nadu**

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**Background:** Dysphagia, or difficulty swallowing, is a significant health concern among elderly populations that can increase the risk of malnutrition. Age-related changes in swallowing physiology combined with other comorbidities may impair swallow function. This study aimed to assess malnutrition prevalence among dysphagic elderly in old age homes residents in western Tamil Nadu. **Methods:** A cross-sectional study was conducted among 53 geriatric dysphagia people in the age group of 60-90 years old across 12 old age homes. Dysphagia was screened using the 10-item Eating Assessment Tool (EAT-10) questionnaire. Nutritional status was assessed using the Mini Nutritional Assessment (MNA) tool. Higher EAT-10 and lower MNA scores indicated greater dysphagia severity and malnutrition risk respectively. Dietary intake was evaluated using a 24-hour dietary recall method with caregiver assistance. **Result:** The mean age of the study population was 74.61± 6.5 years with 66.03 % ( n=35) female and 33.96 % ( n=18) male. EAT-10 scores indicated 26.42% (n=14) mild, 62.26% (n=33) moderate, and 11.32 % ( n=6) severe dysphagia. The MNA scores revealed that 37.73% (n=20) were malnourished, 43.4% (n=23) were at risk of malnutrition, and only 18.86% (n=10) had normal nutritional status. Dietary intake analysis using 24-hour recalls showed significantly inadequate consumption of key food groups like fruits (20±9.2g), vegetables (34.81±13.2g), pulses & legumes (41.1±12.45g). 20.7% of the elderly population consumed less than 1200mL of water per day, which is less than the recommendations. **Conclusion:** The study concluded that more than 80% of dysphagic elderly individuals were malnourished or at risk of malnutrition based on MNA scores. Sub-optimal intake of essential food groups and fluids was observed. It highlights the need of nutritional support and dysphagia management through dietary modifications, feeding assistance, and swallowing therapy may improve their nutritional status, swallowing function, and quality of life in this vulnerable population.

**Keywords:** Elderly, Dysphagia, Malnutrition, EAT-10, MNA

#### OP-2023-0108

**Abstract Title: Study on relationship among occupational stress, eating habits and behavior with their socio-demographic and professional parameters in female customer service associates**

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**Background:** Most of the times, stress is integral component of population. Women under dual pressure of workplace and household are particularly vulnerable to occupational stress; which has been linked to compromised nutrition intake, diet practices, corresponding poor nutritional status. This cross-sectional study aims to detect the relationship among occupational stress levels, food consumption habits and behavior with their socio-demographic, professional parameters and Body Fat% (BF%) in

female customer service associates. **Methods:** Responses were collected using Occupational Stress Index (OSI) scale by Shrivastata A.K., & Singh, A.P., 1981 and Faulty Food Habit Questionnaire (FFHQ), a pre-tested self prepared questionnaire including socio-demographic, professional data from female customer service associates (n=99) of age group (20-39) years, by random sampling method in Kolkata with their written consent. BF% was measured using Bio-electrical Impedance Analyzer. Independent two sample t-test and Pearson's correlation test were used as analytical statistics. **Result:** Notable percentage of subjects (39.08%) found to be overweight as per BF%, 70.11% subjects with moderate stress level and 41.37% of subjects with poor food habit category as per FFHQ score. After applying two sample t-test (assuming unequal variance), significant difference found in FFHQ score 'Good' category ( $p=0.05$ ) between Work From Home (WFH) and Non-WFH shifters. FFHQ score in 'Very Poor' ( $p=0.08$ ) and 'Fair' category ( $p=0.004$ ) differed marginally significant and highly significant respectively between rotational and non-rotational shifters. Significant difference observed in OSI score 'High Stress' category ( $p=0.05$ ) between subjects with child and childless. Marginally significant difference recorded in 'Low Stress' category ( $p=0.09$ ) between married and unmarried subjects and 'High Stress' category ( $p=0.06$ ) between (20-39) years and (40-59) years age-groups respectively for OSI score. No such significant relationship found between various parameters of socio-demographic and professional data in relation to BF%. Between OSI and FFHQ score negatively small correlation ( $r=-0.12$ ) found with ( $p=0.26$ ) by using Pearson's correlation test. For all above calculation, significance level ( $\alpha$ ) was fixed at 0.05. **Conclusion:** The study concludes remarkable connections among occupational stress, food habit/behavior with their multiple socio-demographic and professional parameters which are useful in health context.

**Keywords:** Occupational Stress, Customer service, Food-habits

OP-2023-0127

**Abstract Title: Development and Validation of Food Frequency Questionnaire for dietary intake of Iron by Pregnant women in Belagavi, North Karnataka**

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**Background:** Nutrition during pregnancy plays an important role in the well-being of the both mother and foetus, and also later in life it may further influence the health of the children. Iron one among the most important micro-nutrient required during pregnancy. To assess the iron intake in pregnant women there is no validated Food frequency questionnaire (FFQ), this study was taken up with objective of development and validation of FFQ to assess dietary intake of Iron in Pregnant women. **Methods:** Based on their local food items available in this region and foods rich in iron with referring to the standard literature, the FFQ was prepared. FFQ was designed in the following categories- Cereals, Pulses and legumes, Green leafy vegetables, roots- tuber and other vegetables, nuts and seeds, Fruits, Non-veg foods and Milk and milk products. Content validity was carried out with the experts. To perform construct validity, 25 rural and 25 urban pregnant women were interviewed using this FFQ and 24 hour diet recall method, and then the results of both records were analyzed using paired 't' test. Internal reliability (Cronbach's alpha), and construct validity (Pearson correlation) of the questionnaire were determined. **Result:** Overall internal reliability of questionnaire by Cronbach's alpha is 0.804, indicating good reliability. Pearson correlation was significant (at  $p<0.01$  and  $p<0.05$ ) level and shows satisfactory construct validity. Mean dietary iron intake from FFQ method was  $16.03\pm 6.22$  and 24 hour dietary recall method was  $9.81\pm 8.25$ . There was a significant difference between FFQ and 24 hour dietary recall method in assessing dietary iron intake, as FFQ method was showing normal distribution and 24 hour dietary recall method was showing skewed distribution. **Conclusion:** The FFQ is more reliable tool than 24 hour recall. The FFQ designed in this study is reliable and valid tool to assess iron intake among pregnant women.

**Keywords:** Development, Validation, FFQ, Pregnancy, Iron



OP-2023-0132

**Abstract Title: Effect of traditional fasting practices on dietary intake and physiological and psychological changes among Indian adults**

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**Background:** Religion and spirituality are the two essential aspect of an individual identity. About 80% people around the world are believed to be associated with some religion. Fasting is not only the part of worship but also a great practice of self-discipline too. Fasting is related to change in diet and usual day-today practices. It would have an impact on physiological changes, psychological changes, sleep pattern and dietary intake. **Methods:** This review was conducted to access the effect of traditional fasting on sleep pattern and dietary intake among Indian adults. The data for the review sourced from electronic databases PubMed, science direct, scholarly and ICMR using a predefined search term strategy. **Result:** People belonging to different religion practice fasting for different days such as one day, nine days or forty days etc. Different studies have reported the impact of traditional fasting on diabetes, psychological health, and sleep pattern weight management. Mostly people (30%) gain weight due to irregular and high energy food intake before and during fasting day. Study have shown that on the Ramdan fasting there are alot of changes in diet occurs .During the month of Ramadan, food and fluid intake becomes less frequent and, therefore, fluctuations in some anthropometric variables are to be expected. Studies evaluating the effect of Ramadan observance on body mass. The authors found that Ramadan fasting decreases body mass (small effect). In addition, the subgroup analysis indicated that the decrease in body mass was sex-specific as it was observed in men but not in women. Previous reports have indicated that total water intake was less during Ramadan compared to before Ramadan possibly leading to altered kidney function. Fortunately, fluid balance can be maintained by maximizing urinary concentration and decreasing obligatory urine output. Some studies shows that short term fasting can increase negative emotions (depression, anxiety, stress, tension, anger, irritability) and decrease positive emotions from the result of consequent distraction and long time hunger. In 18 hours fasting among healthy women they found that fasting can leads to increase irritability by the results of irregular eating. Also some studies shows that it have impact on diabetes due change in insulin secretion because of long time fasting. Also some people lose weight during fasting because they take only water and liquid foods also it leads to cause the nutrient deficiency. **Conclusion:** This study concluded that fasting has an impact on dietary intake and biochemical parameters. However, there are more studies required to assess the impact of different duration of fasting on physiological and psychological changes and its consequences on health.

**Keywords:** Fasting, Religious, Worship, Human health

OP-2023-0151

**Abstract Title: KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO IRON DEFICIENCY AMONG SCHOOL-GOING ADOLESCENT GIRLS**

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**Background:** Iron deficiency Anemia is the most predominant deficiency seen in the adolescent girls worldwide. About 59% of Indian women of age group 15-19yrs are anaemic (NFHS 5). Awareness

about right nutrition practices among adolescent girls is critical to preventing iron deficiency anemia. Hence this study was conducted to assess the knowledge, attitude and practices associated with iron deficiency anemia among adolescent girls. **Methods:** Sample size of 150 adolescent girls between the age group of 13-18 years were randomly selected from MGM School Nerul, Navi Mumbai, Maharashtra. Socioeconomic status was obtained using structured questionnaire. Their anthropometric measurements were noted using standardized techniques. The knowledge attitude and practices of the participants related to iron deficiency anemia was assessed using validated questionnaire. Dietary Diversity Score was also calculated using the standardized WDDS (Women's Diet Diversity Score) by FAO. **Result:** Among the participants, 16% of them were underweight, 29% overweight and 27% obese and 33% with normal BMI. Majority of them (64%) had poor knowledge related to aspects of iron deficiency anemia like causes, symptoms, prevention, food sources and right dietary practices. 33% believed that anemia is a serious public health problem and only 9% thought that they were susceptible to anemia. Seventy three percent perceived that nutrition awareness and intake of iron rich foods are beneficial to prevent and control anemia while 58% of them expressed barriers like distaste, self-doubt in preparing and consuming iron rich foods. Sixty three percent followed hygiene practices, 43% included dietary iron absorption enhancers and 46% reported consumption of inhibitors like tea and coffee. Only 5% of the participants were taking IFA supplementation. Overall, the participants had low dietary diversity score (intake of  $\leq 3$  food groups) and lower consumption of iron rich foods like leafy vegetables, non-vegetarian foods and nuts on a regular basis. **Conclusion:** The study results depict that there is still lack of knowledge, awareness and right dietary practices among the adolescent girls related to iron deficiency anemia requiring more intense nutrition focused approaches to improve the quality of diet in order to prevent and control iron deficiency anemia.

**Keywords:** Anemia, Iron deficiency, Diet Diversity

**OP-2023-0154**

**Abstract Title: Effect of Socio-economic variables on Infant Growth and Development - A Prospective Study**

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**Background:** There are numerous factors associated with infant growth and development such as nutrition, hygiene, sanitation, genetics and similar factors, socioeconomic factors which are known to have significant implications. However, research from middle and low-income countries, including India is limited. **Objective:** To explore various socioeconomic factors that are associated with infant growth and development at birth and 6 months in a cohort of mothers and infants from a low- and middle-income group in Hyderabad, south India. This research is a part of the GCRF-Action Against Stunting Hub project in India\*. **Methods:** A prospective cohort study where mothers were enrolled in the third trimester of pregnancy. They were assessed for socioeconomic status which included maternal & paternal occupation and education, home status, number of rooms at home, the ration card status in their third trimester using the questionnaires. Anthropometric measures of weight and length of their infants were collected one month post-delivery(N=97) and at 6th month(N=198) using PKP Bardejov MB31 model anthropometric measurement device, and Developmental Assessment of Indian Infants (DASII) was used to assess infant neurodevelopment at 6 months(N=235). Descriptive statistics of mean and standard deviation along with correlation coefficients and chi square tests were used to analyze the variables. SPSS (20) was used to analyze the data. **Result:** Among the socioeconomic factors such as maternal & paternal occupation and education, home status, number of rooms at home, the ration card status was seen associated with infant motor and mental development at 6 months. **Conclusion:** The ration card status, which is considered to be the proxy for low socioeconomic status in the study showed positive association with infant motor and mental development. The lower

socioeconomic status families who avail services like ration card and PDS benefits have better food security in their homes leading which eventually contributes to motor and mental development in their infants.

**Keywords:** Maternal socio-economic status, Infant development, Infant growth, Developmental testing

**OP-2023-0155**

**Abstract Title: How much adolescent girls are at risk of malnutrition associated eating disorder?**

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**Background:** The physiological and psychological changes during adolescent age increase psychological burden of figure consciousness to some individuals followed by unhealthy eating and weight control behaviors. Such negative attitudes give rise to eating disorder (ED); marked among adolescent girls. It leads to poor quality of life with various complications. Obesity from childhood makes the milestone of such negative thoughts. Increasing trend of obesity in India is accompanied with more cases of ED. Socio-cultural pressure, genetics etc lay the foundation of ED. Prevalence was found 38.3%, 19.5% in Howrah and Mysore in 2018. The study aims to determine eating behaviors and its influence on anthropometric status. **Methods:** 385 girls of 13-19 years were randomly selected from listed schools and colleges of North 24 Pargana district of West Bengal. Eating disorder examination questionnaire (EDE-Q 6.0) was used to determine eating attitude. Anthropometric measurements (height, weight, Body fat percentage [BFP], waist and hip circumference) were taken with valid instruments for nutritional assessment. BFP was calculated from skinfold thickness measuring with skinfold calipers. Difference in anthropometric parameters and their relation was observed by independent t and correlation analysis. One-way ANOVA was performed for age wise analysis. These were done using SPSS (version 16). **Result:** 11.94% ED was found mostly from rural area indicating presence of ED irrespective of geographical location. ED participants were detected with significantly higher Body mass index (BMI) ( $p < 0.05$ ) and subscales ( $p < 0.01$ ) of the questionnaire; but majority of the total population were in normal BMI category. BFP and waist-hip ratio were also higher among them. BMI and BFP is significantly correlated ( $p < 0.01$ ) in positive direction. BMI and BFP increase significantly with age ( $p < 0.01$ ) but not severity of ED. **Conclusion:** ED behaviors promote more weight gain. No thinness was found among them suggesting possible weight gain due to negative eating attitudes. Fat accumulation is a general procedure with advancement of age but severity of ED depends much upon other factors. These factors should be identified for early diagnosis and prevention of ED. The study enlightens a new insight on prevalence and nutritional status of ED of institutional adolescent girls of West Bengal.

**Keywords:** Adolescent, BFP, BMI, ED, Obesity

**OP-2023-0158**

**Abstract Title: WORKPLACE HAZARD OF SELECTED GARMENT WORKERS AND THEIR LIFESTYLE**

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**Background:** The International Labour Organisation (ILO) estimates that over 2.3 million people suffer worldwide from occupational accidents and work-related diseases. Work place hazard serves as a primitive role in the onset of non-communicable diseases, particularly disease relating to bone health.



Workers in garment industry are more prone to workplace hazard such as intensity of light and constant exploitation of muscles and joint relating to garment work activities and has a direct impact on bone health. Thus, as a primitive step the proposed work aims at identifying the workplace hazard of garment worker and to study their lifestyle and dietary Behaviour. **Methods:** A detailed focussed one on one discussion with all the 38 garment workers was carried out to identify the work hazard they are exposed to. They employees were probed in between on the concepts on exposure to chemical, cotton dust, sunlight and their impact on their physical mental health, muscular pain, stress, anxiety, depression. Using a structure interview schedule the physical activity, lifestyle (Modified scale) and dietary habits (24-hour dietary recall) of the employee was also studied. The data collected through focused interview was cleaned for grammatical error, concept, biased response and was edited and coded. The coded data was feed into NVIVO software. The response was analyzed using word cloud analysis. **Result:** The findings from this study shows prominent adverse impacts such as allergy, irritation, cough, respiratory distress, eye irritation while handling garments with chemical dyes. Further the study also revealed extended working hours, poor work space allocation, structural and poor ergonomic feature of furniture, fixtures and lighting as strong factors for workplace hazard. **Conclusion:** The current research on suggestive preventive steps to be taken by the industry to provide a safe workplace environment to employee to foster productive healthy life.

**Keywords:** Workplace hazard, Garment Workers, chemical, dust

**OP-2023-0159**

**Abstract Title: GLYCEMIC INDEX OF RECIPES REPLACED WITH BANYARD MILLET**

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**Background:** Diet remains a key player in diabetes prevention and management and rightly so, one of the focuses of the International Diabetes Federation concentrates on healthy eating as a key factor in the management of type-1-diabetes, the prevention of Type II diabetes, and other related complications. Diabetics are recommended to have foods with a low Glycemic Index (GI) to have good glycemic control. Millets are Long-term intake of high glycemic index and glycemic load foods may have metabolic and health consequences, including persistent hyperglycemia and hyper insulinemia, which can lead to insulin resistance and diabetes. **Methods:** A healthy individuals, comprising 15 male and 15 female subjects between the age group of 35-45 years were identified from the city of Coimbatore through purposive sampling. A pre-structured interview schedule was developed to collect background information for age, sex, type of family, educational qualification, marital status, family income, type of activity, and medical history from all the selected healthy individuals. Out of the 13 millets varieties, barnyard millet has the highest fiber content (12.6gm). 100% replacement of common recipes were replaced with barnyard millet was attempted. Hence Glycemic response of the recipes replaced with selected barnyard millet was further tested among a sub-sample of 30 newly detected Type II diabetic subjects (15 male and 15 female) drawn from the study population. **Result:** Among the recipes prepared Idli's replaced with barnyard millet was ranked first with the highest acceptability score of  $42.1 \pm 0.11$ , followed by kuzhipaniyaram, sevai, and appam. Lunch recipes replaced with barnyard millet like keeraiSadam, carrot rice, mango rice scored lesser compared to standard recipes and showed a significant difference in sensory attributes at a five percent level of significance. The glycemic index of snacks recipes replaced with barnyard millet was found to be low in karakollukattai (54) and medium in puff millet bhel (58). **Conclusion:** All recipes replaced with Barnyard millet showed lower glycaemic response when compared to standard recipes at 1% and 5% level of significance. Thus, hundred percent replacement of millets in polished and unpolished form can greatly reduce the glycemic index of cooked food and can be an excellent nutritious alternative for diabetic subjects to maintain their blood glucose level.

**Keywords:** Banyard millet, Glycemic index, 100%replacement

OP-2023-0165

**Abstract Title: RELIGIOUS FASTING AND ITS IMPACT ON METABOLIC HEALTH OF ADULT FEMALES**

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**Background:** Amidst the rising tide of global metabolic disorders, the exploration of religious fasting emerges as a pivotal intersection between cultural, spiritual, and health realms. The aim was to dissect its influence on metabolic indicators, intertwining traditional practices with contemporary health strategies, thereby crafting a pathway that harmoniously integrates cultural practices into health management and prevention, offering a dual benefit of spiritual and physical well-being. **Methods:** Engaging 90 adult females, segmented into non-fasting, weekly fasting, and seasonal fasting groups, the study meticulously assessed dietary intake via a 24-hour recall method and measured anthropometric and biochemical parameters. Physical activity was meticulously recorded, while comprehensive blood analyses were executed to illuminate the intricate metabolic relationships intertwining religious fasting, cardiovascular risks, and obesity. **Result:** The investigation elucidated a notable correlation between religious fasting and metabolic health, revealing a moderately active lifestyle amongst subjects. Individuals not engaging in fasting exhibited a heightened prevalence of being categorized as pre-obese and obese, as per Body Mass Index (BMI) classifications. During fasting episodes, a significant ( $p < 0.05$ ) diminution in food and nutrient intake was observed, albeit with carbohydrates and vitamin C maintaining adequacy. The fasting cohorts demonstrated an enhancement in metabolic markers, characterized by an increase in HDL-Cholesterol, a decrement in total cholesterol, optimization of VLDL-Cholesterol, and stabilization of blood glucose levels amidst fasting. While religious fasting, particularly of a seasonal nature, emerged as a potential facilitator for metabolic health benefits and a mitigator of specific risk factors, outcomes were dependent on individual dietary choices and intrinsic factors, thereby accentuating the imperative of maintaining dietary equilibrium and securing medical consultation in the context of fasting regimens. **Conclusion:** Religious fasting, especially seasonal, emerges as a powerful catalyst for metabolic health, although significantly swayed by personal dietary choices and intrinsic factors. The findings starkly highlight the crucial necessity of preserving dietary equilibrium during fasting and enforcing medical consultation, ensuring the secure harnessing of metabolic advantages through such traditional practices.

**Keywords:** Religious fasting, Metabolic health, Anthropometry

OP-2023-0169

**Abstract Title: Nutritional and Iron status in anemic women of reproductive age - An Observational study in Telangana**

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**Background:** Anemia is a global health concern, particularly for women of reproductive age, with potential intergenerational impacts if not tackled. This high prevalence of anemia is mainly due to dietary imbalances, as starchy cereal-based diets lack essential micronutrients, resulting in 'hidden hunger.' Our study explores anemia prevalence, nutritional status (including biomarkers and body composition), and dietary habits in reproductive-age women. **Methods:** We conducted an observational study involving women aged 17 to 22 years at a social/tribal welfare residential college in Telangana.

Participants with mild to moderate anaemia were included in the study. We collected venous blood samples to measure haemoglobin levels and assess micronutrients (Ferritin, Folate, and Vitamin B12) using an autoanalyzer. Additionally, we conducted a 3-day, 24-hour dietary assessment using a weighing method to analyze the institutional diet. The body composition of the participants was evaluated using the In-body 120 device. **Result:** A total of 2,619 individuals underwent screening, and 905 were identified as anaemic. Among these, 822 girls with mild to moderate anaemia were included in the study, and 792 of them were analyzed for their iron biomarkers. The mean levels of haemoglobin, ferritin, vitamin B12, and folate were  $10.4 \pm 1.08$  g/dl,  $6.06 \pm 8.18$  ng/ml,  $152.97 \pm 84.72$  pg/ml, and  $2.48 \pm 1.44$  ng/ml, respectively. Among all the subjects, 60.58% exhibited a deficiency in ferritin, while 76.32% and 74.06% showed low levels of vitamin B12 and folate, respectively. The institutional diet survey revealed that the mean daily intake of energy, fat, carbohydrates, and proteins was 2012 Kcal, 38g, 375g, and 57g, respectively. Calcium and iron intake averaged 400 mg/day and 14.2 mg/day, respectively. Of all the subjects, 53% had a normal BMI, 33% were underweight, and the remainder were overweight or obese. The mean values for body fat mass, skeletal muscle mass, and per cent body fat were  $14.8 \pm 5.2$  kg,  $16.7 \pm 2.2$  kg, and  $31.1 \pm 6.5\%$ , respectively. **Conclusion:** Anaemia was identified in 57.4% of the participants. Over 60% of the study subjects exhibited micronutrient deficiencies. The dietary intake appeared to be adequate in terms of macronutrient consumption. This data could be utilized to develop an intervention study aimed at addressing the problem of anaemia.

**Keywords:** Nutritional Status, Anemia, Ferritin, Folate

**OP-2023-0174**

**Abstract Title:** A Study on The Prevalence of Morbidity Pattern and its Association with Millet Consumption.

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**Background:** Millets have many nutritional benefits which has the potential to reduce the morbidity rate in the society. In addition, they are easy and economical to produce and more suited to be grown in our soil. Compared to regular cereals like rice and wheat, they require less water and environment friendly. Millet consumption improve gut dysbiosis, increase probiotic bacteria, reduce pathogenic bacteria. Millets are Gluten free, rich in fiber & antibiotics. To study the current Morbidity pattern of the people in Coimbatore and correlating them with the frequency and mode of millet consumption. **Methods:** The study was conducted in Coimbatore including all five zones namely North, South, East, West and Central zones. The samples for the study include the adults 18-45 years of age of Coimbatore. A well-structured interview schedule was framed to collect data on millet consumption, its frequency, mode of consumption, dietary pattern, clinical findings, co-morbidities and biochemical parameters were collected from the selected subjects. **Result:** The findings show that Finger millet and pearl millet are consumed more than other millets. With respect to the quantum, about 2kg of finger millet and 1 kg of pearl millet were consumed, on an average per week by each family. Majority of about 65% consumed millets in the form of dosa and remaining 35% of them consumed in any one of the forms such as porridge, chapati, rice, cakes, cookies, drinks, ready to cook foods. About 75% of the subjects interviewed, consider them as healthy and 25% of them consumed due to health issues. Some of these subjects consumed millets to lose weight as well. The morbidity pattern of the selected subjects revealed that diabetes mellitus was found to be the most common disorder affecting 59% male and 41% female subjects. Further hypertension was the second most common morbidity factor affecting 53% female and 47% males. **Conclusion:** The results reveal that the rate of morbidity is directly proportional to the quantum of consumption of millets, i.e., higher the consumption of millets, lower the rate of morbidity among the subjects. Hence increased consumption of millets leads to a healthier life and lower morbidity.

**Keywords:** Millets Consumption, health benefits, Morbidity

OP-2023-0175

**Abstract Title: A STUDY ON IMPACT OF MILLET CONSUMPTION ON PREVALENCE OF OBESITY AMONG SELECTED ADULTS OF COIMBATORE DISTRICT**

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**Background:** Unhealthy diets and a lack of physical activity may show up in people as diabetes, obesity, elevated blood Lipids, being the main risk factors for Non communicable diseases. Obesity is associated with increased prevalence of CVD risk factors. In developing countries, cereals typically occupy major portion of the nutritionally unbalanced plate, providing readily available carbohydrates. Reynolds (2020) opines that plant-based dietary approaches support optimal nutrient intake, healthy body weight, and reduced inflammatory status may be an effective protective force in the management of obesity and related diseases. The purpose of this study is to comprehend how millet consumption affects the prevalence of obesity and to educate selected individuals in Coimbatore on the importance of millet consumption and healthy eating habits for managing obesity. **Methods:** To carry out the study, 549 adults ranging from age group of 19 to 55 years were selected using random sampling technique as subjects from various regions of Coimbatore. An interview schedule was formulated including questions related to anthropometry and millet consumption pattern. Awareness materials, such as brochures were created both in English and regional language and disseminated to the population. **Result:** The results obtained from the study stated that out of the total population 39.2% are overweight, 13% are obese. A significant correlation between BMI and WHR of about 85% was seen. As WHR increases, BMI also increases proportionately. We observed that the most commonly consumed millet is finger millet (69.3%), followed by pearl millet (51.2%), sorghum (30.8), and corn (30.4%). The consumption of barnyard millet, Kodo millet, and Proso millet is very low. 52% of people consume millets because they consider them healthy, 21% because of health issues, and 4% for weight loss. **Conclusion:** According to findings of the study, there is a good impact on the community's knowledge and awareness on millet consumption. Despite the fact that half of study's participants are both overweight and obese, they increasingly consume millets because of complex carbohydrates present in millets that can help them in weight reduction. The community is shifting towards healthy eating practices and giving up unhealthy food habits.

**Keywords:** Millets, Obesity, Awareness

OP-2023-0181

**Abstract Title: An Observational study on the Knowledge and Practices of Adults about nutrition labels in purchasing packaged products**

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**Background:** Across the globe, the demand for packaged foods has increased. This could be due to modernisation, workload, taste preferences etc. On one side, packed foods reduce the workload of those who have dual roles. On the other side, misunderstanding the nutrition labels in the packed food can gradually lead to gaining weight, insulin resistance, elevated cholesterol levels and other metabolic diseases. Previous studies have shown that knowledge of nutrition labelling can lead to better practice while purchasing packaged products which could shift consumers to healthier food consumption patterns. In the light of the above observations, the present study has been taken up with the broad objective of assessing the knowledge and practices of adults about nutrition labels while purchasing

packaged products. **Methods:** The first part of this paper was presented at the 54th Annual Conference of the Nutrition Society of India. A survey was carried out using a questionnaire in a Google form across the country among adults between 25 years to 55 years. The sample size for the study was calculated using the single population proportion formula. For the knowledge assessment, the questions were Multiple choice questions (MCQs) type with one correct answer. For practice, the question was yes or no, where 'yes' carries a score of one and 'no' has zero scores. The Ethics Approval No. for the survey is IHEC-MMC NO.017/Project/2021-22. **Result:** The knowledge of the participants while purchasing products was assessed using specific claims seen on the nutrition labels. The familiarity of the participants with the claims such as "sugar-free", fat-free, and sodium-free were assessed. The mean knowledge score of the participants was 1 + 1.083. The knowledge scores does follow normality distribution, hence median and interquartile range was used. The mean practice score was 7.54 + 2.45. There was a significant difference in overall scores in using nutrition labels (P <0.001). **Conclusion:** From the findings of the present study, it was concluded that there is no significant difference between the qualifications of the participants with their practice scores in using nutrition labels. Hence, proper awareness of nutrition labelling has to be provided for adults concerning purchasing packaged foods.

**Keywords :** Nutrition Labelling, Knowledge, Practice, NCDs

**OP-2023-0183**

**Abstract Title: Effects of Lifestyle Practices on the Prevalence of Obesity among selected adults of Coimbatore District**

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**Background:** Understanding the intricate interactions between lifestyle and health is essential considering the growth in obesity around the world. Globally, more than 80% of the adolescent population is physically inactive. Evidences also showed the importance of physical exercise for the treatment of NCDs. The key to combat obesity is modifying one's lifestyle with a focus on the value of a nutritious diet and regular exercise. The purpose of this study is to determine the factors affecting the prevalence of obesity among the selected adults of Coimbatore district and to create awareness on the impact of healthy lifestyle in management of obesity. **Methods:** The study was conducted in 5 zones (south, west, north, east and central zones) of Coimbatore district of Tamil Nadu. A total of 549 subjects were selected by purposive random sampling method. The data on demographic profiles, anthropometric measurements, lifestyle and dietary patterns, of selected adults were collected using an interview schedule and the collected data was statistically analyzed using SPSS software. **Result:** The study revealed that the prevalence of obesity varied across different geographic zones and socioeconomic classes. 52% of the total population falls under the overweight and obese categories respectively. There is a significant correlation of 85% between BMI and WHR. Socioeconomic class had a significant impact on BMI and WHR, as lower-middle class is associated with higher BMI. Higher physical activity is correlated with lower BMI and body fat percentage. East and South zones with highest percentage of 38% were skipping meals, which was linked to poor dietary quality leading to health issues. **Conclusion:** The study investigates the intricate web of variable factors influencing the prevalence of obesity in Coimbatore population. The study's conclusion emphasizes on the importance of diet in relation to obesity and shows various food consumption patterns among various zones. Processed food consumption and meal skipping are considerate food habits that can result in consuming too many calories. Adequate sleep, hydration, and regular physical activity have been identified as the critical factors in obesity prevention. A targeted intervention and awareness campaign can help the community have a healthy future.

**Keywords:** Obesity, Lifestyle, Socioeconomic, Physical activity



OP-2023-0189

**Abstract Title: Consumption pattern of millets among children with ADHD symptoms in Chennai City**

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**Background:** Nutri-cereals sometimes referred to as millets, are excellent sources of nutrients. Traditionally, millets are grown as grain crops primarily on marginal farms in dry climates as small-seeded annual grasses. It is one of the staple diets of 59 million people in Asia and Africa. Millets are more climate change-resistant than other grains, as per research, and they also have vitamins, minerals, essential fatty acids, phytochemicals, and antioxidants. **Methods:** This study was conducted on children with ADHD symptoms to assess the consumption pattern of millets among 120 respondents from four different zones in Chennai city. An observational study was used in the assessment of general background information and to assess the consumption pattern of millets and the data was further statistically analysed by presenting the information through frequency, and percentages. **Result:** The findings revealed that 56.6% of respondents were between the ages of 7 to 9 years that 85 per cent of participants were unaware of sorghum, followed by little millet, pearl millet, kodo millet and barnyard and rarely finger millet and foxtail millet. The frequency of consumption of millets at home shows that 50.6% of respondents consumed millet very often, 25.50% regularly, 5.67% did not consume at all, and 13.17% occasionally and Sorghum was the most preferred millet by all age groups among children, followed by pearl millet, and proso millet was least preferred by children with ADHD symptoms **Conclusion:** Since, millets are gluten-free, it is beneficial for the children by reducing the symptoms of ADHD and if consumed regularly the various forms of cooking millets such as cookies, beverages, and main dishes.

**Keywords:** ADHD, Nutri-Cereals, millets, consumption, gluten-free

OP-2023-0196

**Abstract Title: Micronutrients during developmental years of Children**

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**Background:** A balanced diet, to meet nutritional requirements is essential in every stage of human life. However, during childhood it is double pronged to meet both developmental and maintenance needs. Adequate nutrition in children through their developmental years builds up the foundation for the overall wellbeing like nervous system for the cognitive development milestones, immunity to help protect from illness, circulatory system for a healthy blood supply, musculoskeletal system to build strong bones, teeth, ligaments to protect against injuries. **Methods:** An extensive literature search was done on PubMed platform browsing through 100+ published articles, from past 10 years to select systematic reviews/meta-analyses and individual randomized controlled trials (RCTs) of micronutrient supplementation. **Result:** While the vital macronutrients are proteins, carbohydrates and lipids, fibres and liquid intake are equally important. Micronutrients though required in smaller quantities, are very essential. Lack of even one of them can have detrimental consequences like impaired physical and cognitive growth, delayed maturation, deficiency diseases such as cretinism, goitre, and iron deficiency anaemia. Vitamin D, Folic acid, Vitamin B12 deficiencies being most prevalent. During the first 6 months of life, growth is rapid, and breast milk, in spite of relatively small amounts of some macro and micronutrient, fulfils growth and development in an optimal way. In children-preadolescent-adolescence

the need for micronutrients is met from the diet containing cereals, legumes, fruit, vegetables, eggs, milk and meat. But with the growth spurt and increased physical activity, the requirements for micronutrients also increase, particularly, calcium, iron, zinc and folate. With puberty onset, rapid increase in height and weight and the sexual maturation a proportional supply of macro-micronutrient is very important. Undernutrition delays sexual maturation, while overeating predisposes to metabolic disorders like obesity, diabetes and cardiovascular diseases. **Conclusion:** Every growth milestone in children has specific characteristics and nutritional needs. Hence the deficiency of even a single nutrient could delay growth or compromise specific organs and functions. A conscious effort for an inclusive and balanced diet comprising of varied food groups is inevitable to meet the demanding nutritional requirements for a healthy growth.

**Keywords:** Micronutrients, Children, Nutrition, Deficiency, Growth

**OP-2023-0203**

**Abstract Title: ANTHROPOMETRIC STATUS AND NUTRIENT ADEQUACY IN THE ELDERLY JENU-KURUBA TRIBE**

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**Background:** Nutrition plays a pivotal role in the well-being and quality of life of the elderly. As individuals age, their nutritional needs evolve, and dietary choices significantly influence their health. The most underprivileged demographic in India are tribal people. The tribal elderly are among those who frequently lack access to dietary resources. Proper nutrition in the tribal elderly is of paramount importance. This study aimed at assessing the anthropometric measurements, nutritional status and nutrient adequacy among elderly population of Jenu Kuruba tribe in Mysuru district. **Methods:** Community based cross sectional study was done with 201 elderly between the age group of 60-90 years of Jenu-kuruba tribal community. All data were recorded in a predesigned performa. Anthropometric measurements were recorded. BMI, Waist-hip ratio and Mid-upper arm muscle circumference were calculated. 24 hours dietary recall method used to assess dietary in-take of calories and proteins. Mean energy and protein intake measured and compared with RDA of Indian standards. **Result:** Out of the 201 tribal subjects included in the survey, 49.8% identified as female and 50.2% identified as male. Irrespective of gender, 39.8% of the participants were aged 70 years or younger, while 60.2% were above the age of 70. Furthermore, 72.6% of the participants were classified as underweight, with the remaining 27.4% falling within the normal BMI range. The remaining 27.4% of the sample is categorized as "Normal" based on their BMI. A significant association was seen between gender and muscle wasting ( $\chi^2=9.658$ ,  $p<0.001$ ) and waist hip ratio ( $\chi^2=201.00$ ,  $p<0.001$ ). The study revealed the nutrient adequacy of women to be as follows: Energy-21.94%, carbohydrates-49.62%, protein-21.57% and fat-36.95%. Meanwhile for men, energy 19.39%, carbohydrate-54.12%, protein-17.97% and fat-34.38%. Women had 9.39% and 20.81% iron and calcium micronutrient adequacy, whereas men had 7.87% and 20.20%, respectively. The comparison of dietary adequacy between men and women showed a substantial difference in protein consumption ( $p<0.05$ ). Age and gender significantly affected nutrient intake, with elderly individuals over 75 years having lower consumption of the considered nutrients ( $p<0.001$ ). **Conclusion:** Anthropometric status and Nutrient adequacy of Jenu-kuruba tribal elderly population is very poor. Immediate appropriate interventional programmes are needed for improving their nutritional status and nutrient adequacy.

**Keywords:** Micronutrient-adequacy, protein, calcium, waist-hip ratio

**OP-2023-0211**

**Abstract Title: Determinants of exclusive breastfeeding and its association with infectious diseases among children aged 6-24 months.**

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**Background:** Infectious diseases are considered to be the prominent cause of morbidity and hospitalization among infants and young children in developing countries. In the early stages of life, the practice of exclusive breastfeeding till six months, has a protective role against various infectious diseases. The aims of this study are to find out the determinants of exclusive-breastfeeding and its association with childhood infectious diseases. **Methods:** 1226 children were selected by considering 15% of total population through simple random sampling from Gaighata block of north-24-parganas. A self-structured questionnaire was used for the collection of data. Statistical analysis was done using SPSS 23.0. The bivariate logistic regression analysis have been used to determine the association between the risk factor and positive cases of infectious diseases. "Chi-square" test have been used to find-out the association between infections and different factors. p-value <0.05 was considered to be statistically significant. **Result:** Prevalence of asthma, diarrhea and dysentery along with overall prevalence of positive cases of infectious diseases, were significantly (<0.01) higher in non-exclusively breastfed (NEBF) children than exclusively breastfed (EBF) children. Non-exclusive breastfeeding till 6 months of age [AOR=4.41, 95%CI=(2.96, 6.57)] was found to be a major risk factor for the occurrence of infectious diseases among children. The prevalence of NEBF children was significantly (<0.01) higher in households having higher economic status and among mothers belonging to the families with higher education-levels than EBF children. Among the mothers of EBF children, the utilization of protected drinking water was significantly (<0.05) higher, while the use of separate containers and proper hand washing were significantly (<0.05) lower, than mothers of NEBF children. The incidence of positive cases of infectious diseases in the EBF group was significantly (<0.01) higher among mothers with education levels between 8-10th grades and households with poor economic conditions. Despite the implementation of improved hygienic practices in households, the prevalence of positive cases of infectious diseases was found to be significantly (<0.05) higher among NEBF than EBF children. **Conclusion:** This study infers that not only exclusive breastfeeding but also proper hygienic practices during weaning have a major impact on protecting children from infectious diseases as well as decreasing childhood morbidity and mortality.

**Keywords:** Exclusive-breastfeeding, hygienic practices, infectious diseases.

**OP-2023-0219**

**Abstract Title: Assessment of nutritional status of preschool children (3 to 6 years) in rural areas of Mulshi Taluka, Pune.**

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**Background:** Undernutrition in preschool children (3-6 years) remains an endemic public health challenge in developing countries including India. **Methods:** A community based cross sectional study was conducted in randomly selected 21 rural villages of Mulshi Taluka, Pune. Using proportion to population-based sampling method 289 preschool children (3-6 years) were selected for the study. Written informed consent from their parents was obtained. Anthropometric data was collected through measurements of height and weight of all children using calibrated instruments and WHO protocols. WHO Anthro (36-≤60 months) and Anthro Plus (>60-≤ 72 months) software was used to derive the child nutritional status (Z scores for weight-for-height [WHZ], height-for-age [HAZ] and weight-for-age [WAZ]



indicators). Blood samples of children were collected by trained phlebotomist and complete blood count analysis was done. **Result:** Among children between 36-≤60 months (n=183) 17.5% and 2.2% children were underweight (WAZ -2SD) and severely underweight (WAZ -3SD), respectively; 14.7% and 2.2% children were stunted (HAZ -2SD) and severely stunted (HAZ -3SD) respectively, 11% and 0.5% children were wasted and severely wasted, respectively. On the other hand, children between >60-≤72 months (n=106) 20.7% and 5.7% were underweight and severely underweight, respectively; 12.3% and 4.7% children were stunted and severely stunted respectively. In 5-6-year-old children, 11.4% had moderately lower BMI (Mean -0.85). The prevalence of anemia in 3-6-year-old preschool children was 30%. **Conclusion:** The findings suggest prevalence of moderate undernutrition amongst 3-6-year-old preschool children from rural areas of Mulshi Taluka, Pune.

**Keywords:** Undernutrition, preschool-children, nutritional status, anemia

#### OP-2023-0221

**Abstract Title: Impact of nutrition education on knowledge, attitude and practice about iodine deficiency disorder and association of urinary iodine, nutrient-intake, and bakery food consumption among pregnant mothers**

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**Background:** Iodine is vital for thyroid hormone production and a predominant determinant of both maternal and neonatal health. Pregnant women and newborns are most vulnerable to iodine deficiency, which may later lead to impairment of the thyroid gland, cognition, growth, and development. Iodine deficiency disorders (IDD) have been a global public health concern for many years, and while there have been improvements in the nutrition status of iodine in some regions, challenges persist due to a variety of factors like poverty, inadequate knowledge, poor attitude, practice of iodized salt consumption and Monitoring and Evaluation. Nutrition education and counseling (NEC) is a universally applied practical approach to improve maternal nutrition during pregnancy. Therefore the current research was aimed to study the impact of nutritional counseling intervention on iodine nutrition, dietary practices, and nutritional status among pregnant women **Methods:** A longitudinal cohort study including both cases (UIC >150 µg/L) and control (UIC <150 µg/L) (n=20 each), were selected based on inclusion and exclusion criteria. Nutritional counseling was provided for the cases (iodine insufficiency) at every visit (monthly) and assessed for anthropometric measurements, analyzed the biochemical parameters and dietary history (every trimester) was obtained. **Result:** The average age was found to be 22.65 ± 3.12 and 22.3 ± 2.41 years of both control and cases respectively. Gradual weight gain was observed in all the cases. The intake of both macro and micronutrients which has an impact on iodine metabolism, improved post nutritional counseling intervention due to which the other biochemical parameters appeared within the reference range among all the cases. Significant association (P<0.01) was observed for UIC and intake of bakery foods, provided the portion size made a huge difference. **Conclusion:** The Nutritional education and counseling intervention showed positive effects on the nutritional status of pregnant women, improvement in the knowledge, attitude and practice of using iodized salt. Thus, nutrition counseling must be an essential part of antenatal care for all pregnant women in the setting.

**Keywords:** Macro-micro nutrients, mUIC, Thyroid hormones

#### OP-2023-0230

**Abstract Title: Dietary diversity and socio-demographic factors of Non-communicable diseases among women (15-49) in India: Evidence from NFHS-5**

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**Background:** With the rising prevalence of non-communicable diseases (NCDs) in India, the importance of a diverse and nutritious diet cannot be overstated. This study is motivated by the urgent need to address the growing NCD burden faced by Indian women (15-49 years). The primary objective of this study is to assess dietary diversity patterns among Indian women and their significant association with high prevalent NCDs. **Methods:** We employed data from National Family and Health Survey (NFHS-5), analyzing a sample of 724,115 women. The independent variable, Dietary Diversity Scores, was computed by summing the weighted number of nine food groups scored one to four consumed by each individual (ranges from 0 to 36). The study focused on the highest prevalent self-reported diseases, namely thyroid disorders and hypertension among Indian women. Our analysis encompassed bivariate and logistic regression analyses, incorporating chi-squared tests, odds ratios (OR), and 95% confidence intervals (CI). **Result:** The prevalence of hypertension and thyroid disorder among women in India is 4.58% and 2.3%. The multivariate binary logistics regression model shows that dietary diversity score (DDS) is a significant predictor for the odds ratio of non-communicable diseases after controlling with other background characteristics. The odds of the occurrence of thyroid are higher (OR 1.7; 95% CL 1.3 to 2.1;  $p < 0.05$ ) for women who have high dietary diversity scores (DDS). In reference to the low DDS category, women with a high level of DDS are less likely to suffer from hypertension (OR 0.66; 95% CL 0.5 to 0.8;  $p < 0.05$ ). The odds of occurrence of hypertension are higher for married (OR 1.5; 95% CL 1.3 to 1.6;  $p < 0.05$ ) and separated/widowed (OR 1.95; 95% CL 1.6 to 2.29;  $p < 0.05$ ) women compared to unmarried. More than 35 years women are more likely to suffer from hypertension (OR 3.8; 95% CL 3.35 to 4.25;  $p < 0.05$ ), thyroid (OR 2.7; 95% CL 2.3 to 3.09;  $p < 0.05$ ) comparison to younger women. **Conclusion:** These findings highlight the complex nature of prevalent NCDs, driven by both diet and socio-demographic factors. Targeted interventions and public health policies must consider this interplay in order to effectively prevent and manage non-communicable diseases.

**Keywords:** Dietary Diversity Score, NCDs, Women

**OP-2023-0032**

**Abstract Title: THE ASSOCIATION OF TOTAL MEAT INTAKE WITH CARDIO-METABOLIC DISEASE RISK FACTORS AND MEASURES OF ATHEROSCLEROSIS IN AN URBANIZING COMMUNITY OF INDIA: A CROSS-SECTIONAL ANALYSIS FOR THE APCAPS COHORT**

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**Background:** Consumption of meat is a modifiable risk factor for cardio-metabolic diseases (CMDs). We examined whether consumption of meat is associated with risk factors of the CMDs and the measures of subclinical atherosclerosis in urbanizing-villages in southern India. We hypothesized that consumption of meat would be associated with the risk factors of the CMDs and the measures of subclinical atherosclerosis. **Methods:** We conducted a cross-sectional analysis of 6012 adults (52.3% male) participating in the Andhra Pradesh Children and Parents' Study. We assessed consumption of meat using a validated food-frequency-questionnaires. The main predictor 'total meat intake' was calculated as the sum of the chicken, red meat, and fish consumption. The risk factors for CMDs [systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), waist circumference (WC), fasting glucose, total cholesterol, homeostasis model assessment insulin resistance (HOMA-IR), total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol, triglycerides, and C-reactive protein] and measures of subclinical atherosclerosis [Carotid Intima-Media Thickness, Pulse Wave Velocity, and Augmentation Index] were assessed using standardized clinical procedures. Stratified by gender, the association of consumption

of meat with the risk factors of CMDs and measures of subclinical atherosclerosis examined using linear multilevel models with random intercept at the household level. **Result:** The median (IQR) consumption of meat was 17.79 grams/day (8.90, 30.26) in males and 8.90 grams/day (4.15, 18.82) in females. In males, a-10 gram increase in total meat consumption/1000 Kcal/day was associated with DBP, BMI, WC, total cholesterol, LDL-C, and triglycerides (log) with beta coefficients (95% CIs) of 0.71 mmHg (0.18, 1.24), 0.43 kg/m<sup>2</sup> (0.28 to 0.58), 10.65 mm (6.57 to 14.72), 3.39 mg/dL (1.81 to 4.97), 2.31 mg/dL (0.99 to 3.63), and 0.032 mg/dL (0.012 to 0.053), respectively. In females, a-10 gram increase in total meat consumption/1000 Kcal/day was associated with SBP, DBP, fasting glucose (log), HOMA-IR (log), total cholesterol, LDL-C, and triglycerides (log), with beta coefficients (95% CIs) of 1.04 mmHg (0.33, 1.75), 0.80 mmHg (0.21, 1.39), 0.012 mg/dL (0.003 to 0.021), 0.075 (0.029 to 0.121), 2.97 mg/dL (1.08 to 4.86), 2.36 mg/dL (0.79 to 3.93), and 0.034 mg/dL (0.010 to 0.058), respectively. **Conclusion:** Consumption of meat had a linear positive association with various CMDs risk factors among relatively Indian younger population who were consuming meat at lower levels compared to their European counterparts.

**Keywords:** Cardiovascular, India, Meat, Periurban, Risk-factors

**YS-2023-0018**

**Abstract Title: Anemia-Related Knowledge and Dietary Practices: Responses from Adolescents of Mulshi Taluka, Pune District**

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**Background:** Anemia is a global public health concern affecting individuals of all ages, particularly adolescents who are in a stage of rapid growth and development, making them more susceptible to iron deficiency Anemia. In India, the prevalence of Anemia among adolescents is high, with significant variations across regions, including Mulshi taluka in Pune district, where related literature is still limited on this topic. **Objective:** To assess Anemia-related knowledge and dietary practices in terms of consumption of iron-rich foods in adolescents aged between 14 to 17 years of Mulshi Taluka, Pune District. **Methods:** It is a cross-sectional study conducted among school-going adolescents aged 14 to 17 years. Data were collected from public schools in Mulshi taluka, Pune district. A total of 285 responses were obtained using a pre-tested structured questionnaire administered through one-on-one interviews. **Result:** The study revealed that more than half of the adolescents were familiar with Anemia (59.6%). However, a lower percentage considered it a health problem (45.6%). Only a few adolescents had taken IFA tablets within the past year (13%), while a higher percentage had consumed deworming tablets in the past six months (70.2%). Adolescents consumed roti or rice daily (90.2%) pulses (54.7%) and DGLV (73.7%) weekly. Fruits were consumed majorly weekly (46%) and occasionally (39.6%) whereas fried food and aerated drinks were regularly consumed. The finding revealed poor implementation of the NIPI program. **Conclusion:** The study highlighted a lack of Anemia-related knowledge and observed inadequate dietary practices among adolescents. Thus, comprehensive efforts are required to bridge the knowledge gaps, improve dietary practices, and strengthen program implementation to ensure the comprehensive health and well-being of adolescents in Mulshi Taluka.

**Keywords:** Anemia, Adolescents, Knowledge, Practices, Health

**YS-2023-0029**

**Abstract Title: Correlation of Central Obesity with Blood Glucose and Lipid Profile in Male and Female Adults**

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**Background:** Obesity has become a serious health concern. Lifestyle intervention, comprising of healthy diet, physical activity and cognitive behavioural therapy, is the key in managing obesity. The aim of the present study was to assess and evaluate the correlation between central obesity indices with blood glucose and lipid profile in male and female adults. **Methods:** 92 obese adults were selected using purposive random sampling. Anthropometric measurements namely height, weight, waist circumference and hip circumference were measured using standard measuring tools. Blood glucose and lipid profile were checked using clinical laboratory tests. Data was analysed statistically using t-test of significance and Pearson's correlation coefficient. **Result:** A positive relationship was found between BMI with WC ( $r=0.66$  and  $r=0.42$  in males and females respectively) and WHtR ( $r=0.69$  and  $r=0.65$  in males and females respectively) in both the genders. A highly positive correlation was seen between FBG levels and post prandial blood glucose levels in males ( $r=0.97$ ) and females ( $r=0.74$ ). A high positive correlation was observed between serum TC and serum LDL-C ( $r=0.82$ ) in females as compared to males ( $r=0.56$ ). Male adults reflected a moderately high positive correlation between serum TC and serum TG ( $r=0.43$ ) while, in females, it was found to be low positive ( $r=0.15$ ). Females were at higher risk for diseases as compared to males. **Conclusion:** All central obesity indices viz. WC, WHR, and WHtR values were found to be significantly higher in males as compared to females. The serum TG levels were also found to be significantly higher in males. All the three central obesity indices were found to show moderate to high positive correlation between each other in all the subjects, underlying the significance of these measurements in assessing obesity. Hence, it can be concluded that BMI alone cannot be considered as an effective tool in measuring obesity, and anthropometric measurements, like waist circumference (WC), waist hip ratio (WHR), and waist height ratio (WHtR) should be considered while measuring obesity.

**Keywords:** Obesity, BMI, WC, WHR, WHtR

## FOOD SCIENCE NUTRITION-1

PP-2023-0003

**Abstract Title:** Healthy Gut Friendly Pizza Base Formulation: An Alternative to Refined Flour Pizza Base

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**Background:** A healthy diet is essential for good health and nutrition as it protects against many chronic non communicable diseases. In spite of growing awareness amongst people, there is a constant rise in number of health-related issues in all age groups due to misleading information, ignorance, quacks, changing lifestyle, stress, and ambitious goals. It is indeed a challenge to come out with healthy, ready to eat or cook options which are pocket friendly and meet various nutritional requirements. Thus, a functional food product was developed to meet the market demands as people prefer healthy foods. **Methods:** The standardized product is a Pizza base made using flour of bajra, soya bean, oats, lotus seeds, pumpkin seeds, white sesame seeds, mixed herbs & groundnut oil. A sensory evaluation was carried out with 30 consumer panellists using a 5-point Hedonic scale & attributes tested were appearance, aroma, taste, texture, & overall acceptability. **Result:** The product was found to be acceptable and scored an average of four. The other aspects studied were packaging, nutritional labelling, budgeting and marketing. The product was packed in a polythene bag & sealed using a heat-sealing machine. Shelf life is 5 days but further studies are in process. **Conclusion:** The recipe being nutrient rich, can help with various conditions if consumed on regular basis. Development of this product provided an opportunity to replace refined pizza base with a healthy alternative.

**Keywords:** High fibre & protein, product development

PP-2023-0007

**Abstract Title:** Nutricereals & Immunity for Good Health: A Comparative Study Of COVID & Non COVID Persons Of Bhagalpur Town

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**Background:** Everyone wants to keep oneself healthy, and never wants to fall sick. Food plays an important role in maintaining health. Food has the ability to perform physical, mental, psychological, social welfare and cultural activities. Our health is like wealth, good health requires good nutritious food like Proteins, Carbohydrates, Minerals and Vitamins which are obtained from the diet including nutriceals. When a person properly takes all the nutrients as per need, then health is good. Along with nutritious food, it is also very important to have fresh air, potable water, personal hygiene, environment cleanliness, exercise, regular rest and sleep. Due to lockdown in Covid-19 various changes in the habits and lifestyles of the public at large occurred. It significantly reduced socialization. Physical distancing and self-isolation have also strongly impacted. People were made aware of nutraceuticals & nutriceal for boosting immunity. People started taking fresh fruits & proteinous food including nutriceals. Dietary pattern of human beings undergone drastic changes during Covid-19 pandemic. In December 2019 from Seafood Market of Wuhan, city of Hubei province (China) SARS-COV-2 transmitted from animals to human and spread to the rest of the world (Wang, C. et al, 2020). Due to the growing infection rates in China and international locations, the WHO Emergency Committee declared a Global Emergency on the 30th January, 2020 (Vela van, T P and Meyer, C.G. 2020). The first confirmed Covid-19 case was reported in India in the state of Kerala on 30 January, 2020. Now WHO has declared Covid no longer a global emergency on May 2023. **Methods:** This study aimed to investigate the immediate impact of the COVID-19 pandemic on eating habits and lifestyle changes among the people of Bhagalpur city aged 18th and above based on nutriceal and superfruits. The study comprised a structured questionnaire that inquired demographic information (age, gender); anthropometric data (reported weight and height); dietary habits information (adherence to the Mediterranean diet, daily intake of certain foods including nutriceals, their food frequency in the form of number of meals/day). Lifestyle habits information (grocery shopping, habit of smoking, sleep quality and physical activity were recorded and analysed. Pretested questionnaire were used for interviewing fifty each of Covid affected and non Covid persons on random basis in the ward of Bhagalpur town. their food intake especially of nutriceals and superfruits were recorded on recall basis. The information procured were computed and analysed. **Result:** 100 respondents including male as well as female residing in Bhagalpur comprised the survey. The majority (97%) of the respondents reported eating home cooked meals with nutriceals on a daily basis after covid-19 as compared to 67% before and 89% during. The quality of food intake was slightly higher after covid-19 period as compared to the before and during period. The quantity of food was higher before and during the covid-19 period as compared to after covid-19 period. Slight increased physical activity has been reported. Respondents turned to organic farming products or organic food has been reported. Purchasing fruits and vegetables, especially included citrus fruits as well as super fruits in daily life including sri anna i.e., nutriceals, millets & oats etc. Humanity faced global mass fatality, deprivation but arrival of variety of vaccines provided succor to it. Immunity boosting food were liberally included in respondents diet on daily basis. **Conclusion:** Dietary habits have ramified significantly during the covid-19 pandemic among residents of Bhagalpur city by inclusion of nutriceals immunity booster foods along with super fruits. Although some good habits related to sanitation, use of mask, avoidance of crowding increased significantly, which influenced the quality and the quantity of the food were not compromised. The work is based on respondents and will be expended in near future.

**Keywords:** COVID, Pandemic, Nutriceals, SARS, Superfruits

**PP-2023-0012**

**Abstract Title: Biochemical composition and antioxidant properties of Luffa cylindrica (Sponge gourd or dhundhul), an underutilized crop of India.**

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**Background:** In many countries across the globe, including India, Luffa cylindrica, also known as sponge gourd or dhundhul, is an extensively farmed vegetable. In addition to culinary usage, the potential health benefits have been observed owing to its nutritional and antioxidant properties. In order



to shed light on the possible health-promoting qualities of Luffa cylindrical, this study evaluates its biochemical composition and antioxidant activities. **Methods:** Fresh Luffa cylindrica samples were procured from the local vegetable market, washed carefully in running water, peeled, and subjected to further analysis. Proximate composition (moisture, ash, protein, fat) were monitored according to AOAC method. Essential minerals (calcium, iron, potassium, magnesium) were studied using AAS (Atomic absorption spectroscopy). Antioxidant activities were analyzed measuring the total phenolic content (TPC), as determined by the Folin-Ciocalteu technique. The 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and ferric reducing antioxidant power (FRAP) assay were also carried out. **Result:** The moisture (93.45%), protein (2.1%), fat (0.25%) and ash content (0.43%) were found in this study. Among all the studied minerals in the sample, potassium (198.48 mg) content was the highest and iron was recorded with the least (0.56 mg) with increasing nutritional value. The antioxidant activity were exhibited as promising effect on health viz., TPC (41.03 mg GAE/100g DW), DPPH (38.07%) and FRAP (53.95 micromol Fe+2/g DW). **Conclusion:** This underutilized vegetable is hydrating and low in calories due to its high moisture content. These results also demonstrate the potential of Luffa cylindrical as a healthy supplement to a balanced diet, increasing intake of both nutrients and antioxidants which can be effective for various non-communicable diseases. Its specific health advantages and uses in functional foods or nutraceuticals may be explored in further research. This vegetable could help people to follow healthier eating habits and nutritional guidelines.

**Keywords:** Underutilized vegetable, Biochemical composition, Antioxidant

#### PP-2023-0013

**Abstract Title: Advancing Dairy Analogues: Harnessing the Potential of Germinated Mung Bean (Vigna Radiate) Extract From Variety Sml-1827**

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**Background:** Mung beans (*Vigna radiata* L.) has a great potential in the production of dairy analogues which can prove to be a revolution in the field of vegan diets as protein from mung bean is much easier to digest as compared to other legumes and can be consumed in the form of grains, sprouts and flour. Yet, the research work done on this aspect is scanty. So, the present work focus on the scope and research gaps which need to be done for the development of plant based dairy analogues. **Methods:** Mung Bean (*Vigna radiate*) having variety of SML1827 was procured from Punjab Agricultural University, Ludhiana. Then the pulse was cleaned, undesirable material was discarded, and the raw material was given further treatment such as soaking (12 h), germination (48 h) followed by dehulling of seed coat only. Afterwards, seeds were treated for blanching process then mixed with water (1:6) followed by grinding (3X power). Then the obtained slurry was filtered and extract was stored in an air-tight container for further use. **Result:** The developed mung bean based dairy analogue has a milky like texture with a sweet beany flavor and contains less calories but high protein biological value (4%). Moreover, it is more acceptable in terms of sensory attributes like taste, color, aroma, texture and overall acceptability due to the sprouting process. **Conclusion:** The developed product could be a good plant-based dairy alternatives as it also contains good amount of nutrients, and it is also a better substitute for people with lactose intolerance. It could further be commercialized at market level due to easy processing and nutritional value as well. **Keywords:** blanching, germination, mung bean, protein

#### PP-2023-0014

**Abstract Title: Development of protein enriched proso and foxtail millet based spicy sticks**

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**Background:** Snack foods consumption in market was about 1483.14 billion USD in 2022 and expected to increase in future. Snacks are predominantly energy dense with high sugar, salt and other ingredients in their composition. Consumption of such foods is creating adverse effects on health and leads to lifestyle disorders. Keeping that in view, minor millet based protein dense baked snacks were developed to enhance nutritional profile and promote millet consumption. Minor millets like foxtail millet and proso millet has great nutritive value and hence they were used in development of spicy sticks. **Methods:** Millets based spicy sticks were prepared with different proportions of foxtail millet flour, proso millet flour and refined wheat flour; green gram powder, urad dhal powders were kept constant for all millet formulations. Among all millet formulations 40:40:20 (proso millet flour: foxtail millet flour: refined wheat flour) formulation was the best accepted one through sensory evaluation. The nutritional composition i.e., moisture (AOAC,2005), ash (AOAC,2005), protein (AOAC,2010), fat (AOAC,2005), carbohydrate (AOAC, 2006), energy (AOAC, 1980) and crude fiber (AOAC,1995), minerals like sodium, potassium, zinc, copper, iron, calcium (AOAC,2000) were estimated. **Result:** In millets based spicy sticks, the moisture content was 3.34%, ash content was 3.49%, crude fiber content was 0.89%, fat content was 6.88%, protein was 20.76g/100g, carbohydrate content was 65.52% and energy was 407 Kcal/100g. There was an increase of 87.49% of protein content in experimental sample when compared to control sample. The ingredients like proso millet, green gram dhal flour, urad dhal flour in sticks made it protein rich snack. The minerals like sodium, potassium, calcium, iron, zinc, copper and manganese content was 2.83mg/100g, 1.91mg/100g, 0.33mg/100g, 0.02mg/100g, 4.02mg/100g, 2.04mg/100g and 1.04mg/100g respectively. **Conclusion:** Millets based spicy sticks has high protein and crude fiber when compared with maida sticks. So it can be considered as healthy alternative for snacking to children.

**Keywords:** SpicySticks, Prosomillet, Foxtailmillet, Healthy snacks

**PP-2023-0017**

**Abstract Title: Development Of Noodles with Substitution of Pumpkin Seed Flour and Foxtail millet flour as healthy alternative**

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Pumpkin seeds have a long history of nutritional use and have been used as a remedy to treat Urinary tract infection, bladder infections, high blood pressure, high blood sugar and even kidney stones. The seeds are high in magnesium, which helps in regulating blood sugar levels, lowering the risk of diabetes. It is rich in antioxidants like flavonoids and phenolic acids, which can reduce inflammation and helps in protecting the cells from harmful free radicals. Modern science confirms that pumpkin seeds have an impressive benefits on health since they are rich source of protein, unsaturated fatty acids, vitamins and minerals that can reduce the risk of cancer .The noodles made with the pumpkin seed flour and foxtail millet flour has been a healthy alternative product for the noodles that are made from the processed flour .The Product is a calorie dense and can be served as a healthier breakfast substitute. Foxtail millet flour is added to enrich the quality of the product. The millet is rich in Vitamin B12 which is essential for maintaining a healthy heart and smooth functioning of the nervous system. The product including foxtail millet may improve the glycemic control and reduce cholesterol and fasting glucose in Type 2 Diabetes. The combination of both flour can be value added product and a better alternative. Since pumpkin seed flour is gluten free it can be even taken by the gluten sensitive persons. It can be concluded that the noodles substituted with pumpkin seed flour and foxtail millet flour showed the highest nutrient content when compared with the noodles that are made out of processed flour.

**PP-2023-0018**

**Abstract Title: Study of Selected Physico-Chemical and Nutritional Parameters of NucchuAmbli-a Traditional Jowar-based Fermented Food of North Karnataka**

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**Background:** The present century is confronted with challenges like global climatic variations, water scarcity, rising population, food prices and decrease in the arable land. In this context millets like jowar



are grains of choice due to their ability to grow with minimal water requirement and enhanced disease resistance. The present study relates to the examination of NuchhuAmbli, which is jowar based fermented traditional popular food of north Karnataka. **Methods:** NuchhuAmbli is prepared by fermenting broken jowar with curds in a conventional method and consumed as summer food in northern part of Karnataka. In this context, the study was undertaken to examine the physico-chemical (pH, titratable acidity, total soluble solids, electrical conductivity and moisture content) and nutritional parameters (total sugars (Anthrone method), reducing sugars (DNS method), proteins (Lowry's method), free amino acids (Ninhydrin method), free fatty acids( gravimetric method), ash content, crude fiber and peroxide values (acid value method) of fermented samples were examined for various time intervals of fermentation (0, 6 and 12 h ). **Result:** An increase in the free amino acids (16-23 µg/ml), free fatty acids (0.69 to 0.79 µg/ml) and electrical conductivity (1.3 to 2.7 µS.cm<sup>-1</sup>) was observed indicating proteolysis, lipolysis and fermentation of the food respectively. A decrease in the pH (5.2 to 3.0), moisture content, total sugars (4.1 mg/l to 3.1 mg/l) , reducing sugars ( 9.4 µg/ml to 7.1µg/ml) and protein (0.7 to 0.4 mg/ml), crude fiber (0.6 to 0.49%), ash content (0.48 to 0.37%),total soluble solids was observed with increase in fermentation time. No significant changes were reported in regard to titratable acidity and peroxide values. **Conclusion:** The study being a classical example of symbiotic food wherein jowar and curds serve as prebiotic and probiotics partners. gives insights into the physico-chemical changes occurring during microbial fermentation of NucchuAmbli and provides a scientific basis for the traditionally perceived health benefits to humans since ages. A further study into proximate analysis and microbial dynamics would throw more light on the functional attributes of the traditional fermented food.

**Keywords:** Nucchu-Ambli, Fermentation, Moisture-content, Electrical-conductivity, Reducing-sugars

**PP-2023-0019**

**Abstract Title: Formulation And Development Of Vegan Honey As An Alternative Of Honey**

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Vegans are based on plant and foods made from plants. Countries with most vegans are unites kingdom, Australia and Israel. Vegans do not eat foods that come from animals, including dairy products and eggs. As honey is produced by insects, honey is not vegan. Bees gather nectar from flowers, partially digest it, and then regurgitate it once back in their hives. Vegan honey is an alternate to honey for vegans, using pomegranate extract. Pomegranate species name Punica granatum, is mostly cultivated in middle east region, north and tropical Africa and Indian subcontinent. Pomegranate is rich in antioxidants, iron like honey and other vitamins, minerals. Pomegranate juice and other ingredients such as sugar, lime juice is added to give the consistency, appearance and tastes same like that of honey. Pomegranate juice is filtered in the process of making honey. Pomegranate has low glycemic index and it is useful for individuals with high glucose level. Also, pomegranate aids in reducing the insulin resistance in the body. Vegan honey made with pomegranate extract exhibits the same flavor and consistency of the honey collected by bees from nectars.

**PP-2023-0021**

**Abstract Title: Formulation development of chickpea muffins using barley as healthy alternative**

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Chickpea (*Cicer arietinum* L.) is the largest produced food legume in South Asia and the third largest produced food legume globally. Chickpea is an important source of protein for millions of people in the developing countries, particularly in South Asia, who are largely vegetarian. Chickpea can be a source with excellent nutritional value of vegetable protein produced at low cost. In addition to having high protein content (20-22%), chickpea is rich in fibre, minerals (phosphorus, calcium, magnesium, iron and zinc) and carotene. Its lipid fraction is high in unsaturated fatty acids. Chickpea muffin with barley is a unique and healthy take on the traditional muffins. This pastry is made with chickpea paste which is also known as Bengal gram, and Barley powder. Barley provides an additional source of nutrition as it is a good source of beta- glucan, many important vitamins, minerals and antioxidants. This chickpea muffin is a healthy alternative to traditional muffins as it is high in protein, fibre and low in fat. It is of

great option for those who are looking to incorporate more nutrient rich foods into their diet. Chickpea also have beneficial effects on critical human ailments like type-2 diabetes, some types of cancers, digestive diseases, obesity, and high blood pressure. Chickpea muffin not only proved to be highly effective but also a nutritious addition to the diet for all age.

**PP-2023-0022**

**Abstract Title: Formulation And Nutrient Analysis Of Graviola (Annona Muricata) Leaves And Millets Instant Soup Mix Powder For Cancer Patients**

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**Background:** Graviola (*Annona muricata*) is a small deciduous tropical evergreen fruit tree, belonging to Annonaceae family. *Annona muricata* commonly known as Soursop, Graviola, Guanabana, or Brazilian Paw-Paw. Presently Graviola is found growing in the Southern Sub-Tropical humid part of India like Karnataka, Tamil Nadu, Kerala, and Andhra Pradesh. Soursop is high in Vitamin-C. One whole Soursop fruit contains 215% of our recommended allowance of Vitamin-C. Soursop Fruits, Leaves and Seeds also possess an extraordinary nutrient value. Soursop Leaves which are recently gaining attention among Researchers, are rich in nutrients and are used as natural remedy for various Ailments. Soursop Leaves contains Antioxidants including Phytosterols, Tannins, Flavanoids, Saponins, Alkaloids, Coumarins, Terpenoids and several other active Phytochemicals. Its High Antioxidant compound in the Soursop Leaves proved best for the Cancer Prevention, so the Cancer Threat in the World can be minimized (Dyah Ayu Widyastuti et al.,2017). They also have Anti-Inflammatory, Antimicrobial, Antidiabetic, Antipyretic, Cardioprotective and Antiparasitic properties. In the present work, Ready-to-Cook (RTC) Instant Soup Mix Powder was developed by incorporating Soursop Leaves with selected Millets such as Barnyard millet and Kodo Millet to enhance the Soup Mix Powder Nutritionally, as they are Gluten free and has Low-Glycemic Index and are good source of Proteins, provides excellent source of Dietary Fiber with good amount of Soluble and Insoluble fractions. They also provide high levels of Energy and contains good amount of micronutrients like Calcium, Iron, Zinc. From the above ingredients the Soup Mix Powder will be formulated with different variations. From the above ingredients the Soup Mix Powder will be formulated with different variations. The prepared Soup mix powder will be incorporated in the Soup and lead to Organoleptic and Nutrient analysis and given to the Cancer Patients for the betterment of their treatment. As Soursop leaves is high in the Antioxidant capacity it is well established in the Treatment of Cancer and Prevention of Cancer. **Methods:** Phase I: Selection and Procurement of samples: The fresh Graviola leaves, Millets namely Barnyard millet and Koda millet along with the other vegetables and spices are purchased from the local market of Coimbatore. ii. Phase II: Processing of Samples: The Graviola leaves, Millets and other vegetables were cleaned, processed, and washed thoroughly. All the ingredients are sun dried for atleast 48 hours. All the dried ingredients along with the other ingredients are taken in the correct proportion and were roasted separately and ground well to make them into a powder. All the powder were packed and stored in the air tight container and used for further processing. iii. Phase III: Incorporation of the powder in the soup: The above prepared powder was used in the soup preparation. The prepared soup mix using the formulated soup powder is prepared with three variations along with the control. The control is made with the millet incorporation of 25% of Barnyard Millet and 25% of KodoMillet. Variation-I,II,III is made for 10% of Soursop leaves, Variation-I is included with 15% of Barnyard Millet and KodoMillet, Variation II is 20% of Barnyard Millet and KodoMillet, Variation-III is included with 25% of Barnyard and Kodo Millet. iv. Phase IV: Sensory evaluation of the prepared recipes: Sensory analysis of the prepared soup using the graviola leaves incorporated Instant Soup Mix Powder will be subjected to organoleptic analysis with 50 semitrained respondents and the acceptance for the formulated soup mix powder will be assessed. v. Phase V: Nutrient Analysis: Physicochemical characteristics: The physicochemical chemical characteristics are analysed such as; Moisture content Ash content vi. Phase VI: Analysis of therapeutic properties: Therapeutic properties of the product is analysed by using following. Qualitative analysis "phytochemical screening Anti- inflammatory Activity Anti-oxidant Activity" Estimation of phenols Anti - cancerous Activity vii. Phase VII: Data Analysis: The obtained data from the nutrient analysis and organoleptic analysis will be analyzed and finalized data's will be made for the further proceedings of the work.

**Keywords:** *Annona muricata*-Soursop, Graviola-Soursop

PP-2023-0023

**Abstract Title: Optimization and Quality Evaluation of Multi Millet Instant Soup Mix**

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**Background:** Small millets otherwise known as Wonder Cereals are rich in micronutrients, essential amino acids and vitamin B complex which are very rare in our staple diets. These millets have diversified food value but the consumption of these millets has declined for want of standardized processing techniques to compete with fine cereals. The present study aimed to develop instant multi millet soup mix and evaluate its nutritional quality and shelf-stability. **Methods:** Soup is the one of the traditional food which can be classified as an appetizer. The instant soup mix was formulated using multi millets such as Barnyard millet (*Echinochloafrumentaceae*), Little millet (*Panicum sumatrense*), Proso millet (*Panicum miliaceum*), Kodo Millet (*Paspalum scrobiculatum*), Corn flour, Rice flour, green gram flour, pepper, salt and dehydrated vegetable (carrot, peas). The selected millets were pre-processed, milled and blended in various proportions. Product optimization was done with different combination of ingredients and evaluated for various sensory parameters and acceptability on a 9 point Hedonic scale. The standardized instant soup mix was packed in metalized polyester polyethylene (MPE) laminated pouches. Nutritional characterization of the instant soup mix in terms of protein, minerals, starch, polyphenols and antioxidant activity were determined using standard methods. **Result:** Proximate analysis showed that the instant millet based soup mix was a good source of protein, fibre and ash. It contained 1.93% moisture; 5.12% fat; 11.48% protein; 10.15% ash and 3.06% fibre and 63.08% starch. Mineral analysis of the soup mix showed 17.51 mg/100 gm Iron, 141.25 mg/100g phosphorus and 78.63 mg/100 gm calcium. The composite millet based soup mix showed good antioxidant activity as assayed by DPPH and ABTS with IC50 at 25.35µg/ml and 45.63µg/ml respectively. The instant soup mix stored at RT for three months did not show any growth for total plate count and yeast and mould. **Conclusion:** The product scored excellent for overall sensory quality in terms of appearance, colour, flavour and taste. The millet based soup mix has good nutritive value and acts as a good appetizer.

**Keywords:** Instant soup mix, proximate analysis

PP-2023-0025

**Abstract Title: Nutritional composition and antioxidant activity of dehydrated raw banana (*Musa paradisiaca* L.) and its application in biscuits**

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**Background:** Raw banana chips were prepared by pre-treating of fresh raw banana chips with salt, citric acid blanching and potassium metabisulphate followed by solar drying. The chips were packed in PE pouches, stored at RT, evaluated its nutritional composition and organoleptic quality of fried chips and its acceptability in biscuits. **Methods:** The solar dried raw banana powder was obtained by grinding the dried chips and passing through 420µ sieve, which was used for nutritional investigation, total polyphenol content and antioxidant activity by using standard methods. Total dietary fibre was assayed using  $\beta$ -amylase, protease, amyloglucosidase and precipitated using absolute alcohol. Fried banana chips were evaluated for organoleptic quality and banana powder was applied in biscuits at 5-25% levels. **Result:** Solar drying of raw banana yielded  $10 \pm 2\%$  raw banana chips. Dried chips were found to contain 6.9% protein, 3.18% mineral matter and 68.31% starch. The dried chips were found to be rich in iron 6.49 mg/100g and possessed considerable amounts of calcium (126 mg/ 100 g) and phosphorous (104 mg/100 g) respectively. Solar dried raw banana chips possessed 17.62% total dietary fibre and good source of total polyphenols (44 mg /100 g) as gallic acid equivalents. The methanolic extract of raw banana chips exhibited 50% inhibition of DPPH and ABTS radicals at concentrations of 50 mg/ml and 6.5 mg/ml respectively. The rehydration of raw banana chips was conducted by soaking in water (1:3 w/v) for 45 min. at room temperature and the rehydration ratio was found to be 1:1.6 w/w. The fried chips were crisp, acceptable with an overall sensory score of 8.0 and the oil absorption in the fried chips was  $24 \pm 2\%$ . Similarly, the sensory score was 7.8 for banana chips after six months of

storage. Application of raw banana powder at 5-25% in the preparation of biscuits yielded acceptable products and the optimum level was found to be 15%. **Conclusion:** This study indicated that the preparation of raw banana chips with rich nutritional profile is a convenient process, which can find applications as deep fat fried chips, bakery and other culinary preparations.

**Keywords:** Raw banana, nutrition, activity, biscuits

**PP-2023-0026**

**Abstract Title: Nutraceutical Properties of Locally Available Underutilized Fruits of Meghalaya**

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**Background:** Fruits are regarded as the powerhouses of many nutrients and bioactive substances, particularly for their high levels of antioxidants. Nutraceuticals are compounds that are present in fruits that provide health benefits beyond their basic nutritional significance. Bioactive substances have exceptional antioxidant qualities and aid in preventing the spread of cancer cells. In addition to their fundamental nutritional worth, fruits and vegetables also include bioactive components that include carotenoids, lycopene, anthocyanin, flavonoids, phenolics and polyphenols, which have inherent health advantages. Orange, pineapple, banana, guava, peaches, pears, plums, strawberries, *Prunus nepalensis*, *Elaeagnus latifolia*, *Myrica esculenta*, *Myrica nagi*, *Docynia indica* and other underutilized fruits can all be grown in Meghalaya due to the region's favourable geoclimatic. **Methods:** The current review elucidates the nutraceutical properties of the locally available fruits in the state of Meghalaya which have been evaluated through various research studies. This review also describes the capability of the fruits to treat various kinds of diseases and illnesses since the parts of the plants of these fruits have been used as natural remedies to cure a specific disease or they are used as one of the ingredients in making herbal medicines to treat any ailments. **Result:** The underutilized fruits of Meghalaya not only have several health benefits, but they also have significant amounts of nutrients and bioactive substances like proteins, carbohydrates, ascorbic acid, flavonoids, phenolic acids, carotenoids, tannins, anthocyanins, glycosides, alkaloids, and many other antioxidants. Consuming these fruits will therefore contribute to improving consumers' nutritious intake, and this will only be achievable if these foods become more widely available. Commercialization of the underutilized fruits by developing food products from them would encourage their market integration and, as a result, improve the rural economy of Meghalaya. **Conclusion:** Therefore, more research must be done in the future to ensure the best possible use of these fruits and to promote the commercialization of the food products developed from them in the local markets with the aim of enhancing the economic standing of the rural people in Meghalaya, who are primarily fruit farmers and cultivators.

**Keywords:** nutraceuticals, underutilized, bioactive substances, commercialization

**PP-2023-0035**

**Abstract Title: Spirulina, a potential source of vitamin B12**

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**Background:** *Spirulina, Arthrospiraplantensis*, is considered to be rich in protein, vitamins, minerals, carotenoids, and antioxidants that can help protect cells from damage and being used as an essential health supplement lately. However, its composition with respect to its vitamin B12 content is not yet known. We measured the different forms of vitamin B12 in commercially available spirulina by Orbitrap based mass spectrometer. **Methods:** Freeze dried biomass (1g) of *Spirulina* was suspended in distilled water. Vitamin B12 was extracted by autoclaving at 121°C for 10 min. The homogenate was centrifuged at 1000 g for 10min. The cooled supernatant was adjusted to pH 6.0 and used for the B12 analysis was performed in a high-resolution analytical platform consisting of a Vanquish Flex Binary UHPLC coupled to a Q Exactive (LC-HRAM-MS, Thermo Scientific, Germany). Separation of the different forms of vitamin B12 (Hydroxo, Cyano, Ado and Methyl) was achieved by using a Hypersil Gold aQ column



(100x2.1x1.9 mm, Thermo Scientific, Germany). The mobile phase was delivered in a reversed-phase gradient elution at 0.3 mL/min, using water (eluent A) and acetonitrile (eluent B), both containing 0.1 % formic acid. The mass spectrometer was used in electrospray ionization (HESI-II) mode with positive polarity in the PRM (Parallel Reaction Monitoring) method. The data were acquired by using Thermo Scientific™ Xcalibur™ software (version 4.1.31.9). Doubly charged species for cyano-, methyl-, hydroxo (-OH)- and for adenosylcobalamin were used for quantification. The precursor and product masses monitored were 678.29098 (147.09164, 912.44135), 672.80149 (147.09164, 971.47383) and 664.78568 (147.09174, 912.44165) and 790.33645 (147.09165, 971.47968) for cyano-, methyl-, hydroxo- and adenosyl- respectively and 455.17859 (134.06004, 175.07263, 308.12527) for methotrexate as internal standard (IS). Standard curves were linear (range; 50-2000 pmol/L) with good reproducibility. The peak-area ratios of the respective cobalamins to the IS were plotted against their concentrations. The concentrations of unknown samples were calculated by the respective regression equations for individual vitamin B12 forms. Intra- and inter-assay CV were <6% and <8% respectively. **Result:** The concentrations of cyanocobalamin, methylcobalamin, hydroxocobalamin and adenosylcobalamin were 13pmol/L, 1970 pmol/L, 123 pmol/L and 5071pmol/L respectively. The availability of methyl and adenosylcobalamin showed significantly higher amounts such that they can suffice the daily requirements of 2.5 µg/day in vegetarian population. **Conclusion:** Spirulina can be used as a potential vegetarian source for vitamin B12. The spirulina based absorption studies would provide more insight in to its bioavailability in humans.

**Keywords:** Spirulina, B12, health, mass spectrometry

**PP-2023-0036**

**Abstract Title: Study on Snacks Formulated by Incorporating Barnyard Millet (Echinochloafrumentacea)**

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**Background:** Millets have the potential to contribute to food security and nutrition but still, these are underutilized crops. Barnyard millet (Echinochloafrumentacea) is an indigenous variety of millet in India with bounty of health benefits due to the abundance of dietary fibre, antioxidant and minerals like iron. The grains can be used as food and can be cooked similar to rice. The carbohydrate content is low and slowly digestible. This property makes the barnyard millet a natural designer food. **Methods:** The objective of the present investigation was to develop barnyard millet-based formulated snacks products and to determine their nutrient composition. Two formulated snacks products using barnyard millets viz., shev and chakli were developed. **Result:** Both the products were analysed for sensory evaluation and nutritional composition. **Conclusion:** Hence, barnyard millet offers great opportunities for diversified utilization and value addition in various traditional snacks products and its use can be promoted for health benefits.

**Keywords:** Barnyard Millets, Millets Products, Value

**PP-2023-0037**

**Abstract Title: Development of Pearl Millet Based Traditional Food Products**

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**Background:** Millets have a good nutritional profile along with good nutraceutical potential and thus, can be considered a great crop for combating food and nutritional security globally. Pearl millet (Cenchrus americanus) an energy packed grain and can be also called a superfood. The gluten-free

nature of protein, bioactive compounds with medicinal value, and high micronutrient density makes them an ideal for developing several functional and value-added food products. **Methods:** The present investigation was carried out to develop pearl millet-based formulated traditional food products and to determine their nutrient composition. Two formulated traditional products using pearl millet viz., Bajra Kharodi (Chunks) and Bajra Kharapara (Kapnya) were developed. **Result:** Both the products were analysed for sensory evaluation and nutritional composition. **Conclusion:** Present investigation provides a brief account for importance of pearl millet, formulation of traditional food products and promotion of health benefits to the society.

**Keywords:** Pearl Millets, Millets Products, Value

**PP-2023-0038**

**Abstract Title: Review On Effect of Hydrothermal and Non-Thermal Treatments on Quality and Storage of Pearl Millet Grain and Flour.**

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**Background:** The Pearl millet (*Pennisetum glaucum*) is a nutricereal and traditional crop and grown widely in Asian and African countries (Jukanti et al., 2016). It has the capability to survive under drought and high temperature conditions. The Pearl millet has high fat content when compared with other millets. Whole grain when stored for 3 months and dehulled grain on storage for 2 months, leads to the development of off-odours due to increase in lipase and lipoxygenase enzymes, peroxidase value, acid value. Hence, proper shelf life enhancing treatments are necessary for pearl millet to improve its keeping quality during storage. **Methods:** To study the effect of hydrothermal and non-thermal treatments on the storage and quality parameters of Pearl millet gain and flour. **Result:** The studies revealed that hydrothermal treatment (Parboiling) is done for grains i.e., soaked, steamed and dried, under carefully controlled conditions at 60, 70 & 80° C for 4 hours are optimum for improving millet yield with 88.21, 88.79 & 89.55% and the lower percentage of broken millet with 1.81; 1.79 and 1.82%. The improved milling efficiency by increasing milling millet yield and reduced broken percentage and nutrients losses during storage. The non-thermal treatment (Gamma radiation) was exposed on grains at doses 0.25, 0.5, 0.75, 1.0 and 2.0 kGy. The results revealed that gamma radiation up to 2kGy significantly reduced the fungal incidence, free fatty acids, phytic acid, tannins of grains and increased protein digestibility. **Conclusion:** It can be concluded that Parboiling soaking for 4 hours in 60 and 70°C and steaming for 15 mins and drying and gamma radiation using cobalt 60 radioactive source at 0.75kGy and 1.0kGy are optimum conditions for enhancing shelf-life of Pearl millet during storage.

**Keywords:** Pearlmillet, Hydrothermaltreatment, Parboiling, Nonthermaltreatment, Gammaradiation

**PP-2023-0041**

**Abstract Title: Development of Millets and Vegetables Based Weaning Food Mix for Infants and its Evaluation**

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**Background:** Weaning or the Complementary feeding practices plays a pivotal process in between the ingestion of milk, a special food, and foods from the family table. The World Health Organisation advises mothers to exclusively breastfeed their new-born children as it is the simplest, healthiest, and least expensive method of feeding, But, breast feeding is no longer sufficient to supply all energy and nutritional requirements after 6 months of age. Following that, breast milk must be supplemented by

addition of sufficient energy-dense foods to guarantee the children's growth and development. This research focuses on weaning food mix for infants using vegetables and millets. **Methods:** Procurement of raw materials like Beet root, yellow pumpkin, sweet potato, finger millet and kodo millet were processed, powdered and weaning mix were developed with different variation, and the accepted variations through sensory analysis were subjected to shelf life analysis, Evaluated for proximate composition, phytochemical analysis and estimate the cost calculation. **Result:** Beet root, yellow pumpkin and sweet potato, are well-known for their high nutrient content and potential health advantages. Millets, on other contrary conjunction, they are gluten-free, easily digested. The sensory analysis through the 9-point hedonic scale ranges between 7.5-8 was accepted (V1, V2, and V3) weaning food mix and had a balanced macronutrient and key micronutrients like vitamin A, vitamin C, and potassium. **Conclusion:** The developed millets vegetable invention weaning food mix is a viable technique for meeting infant nutritional demands throughout the weaning stage is important. The enriched weaning mix not only has important nutrients but also helps to diversify infant weaning food mix which will be helpful to improve early life of infants. By using a fresh approach to improving early-life health and development, this study adds to the growing body of information on infant feeding.

**Keywords :** Weaning, Energy-dense foods, Millets, Vegetable

**PP-2023-0042**

**Abstract Title: Microbiological quality assesment of street vended foods in Jorhat, Assam**

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**Background:** Food safety of street vended foods is an integral part to reduce the risk of adverse health outcomes amidst customers. The present investigation was undertaken with specific objective to assess the microbiological quality of street food samples of Jorhat, Assam. Presence of high microbial in collected food samples, hand and utensil swabs ranging from  $1 \times 10^3$  to  $172 \times 10^3$  cfu g<sup>-1</sup> or ml<sup>-1</sup>, clearly indicates poor vending and handling practices of the street food vendors, which may be due to their poor knowledge and attitude towards food safety. **Methods:** Present study was undertaken on the street vended foods which were either vended or stalled in the major streets, near colleges, schools and markets of Jorhat city of Assam. A total of 44 samples, 16 food samples, 4 panipuri water samples, 12 hand swabs and 12 utensil swabs were collected. The food samples collected were homogenised in mixer grinder (Kenstarclassique) and all the samples were kept in freezer of refrigerator (LG, Model number: GL- N292RDSY) till further estimations. Selective media (SRL Co.) were used for microbial analysis. All media used in the study were prepared as per standard method. **Result:** Six different microorganisms viz., *Pseudomonas aeruginosa*, *Bacillus cereus*, *Escherichia coli*, *Clostridium perfringens*, *Staphylococcus aureus* and *Salmonella* spp. were isolated from sample tested and confirmed by standard protocol. Among the collected food samples *B. cereus* was found highest in panipuri water, *P. aeruginosa* and *Salmonella* spp. was found highest in Chanachur, *C. perfringens* was found highest in Panipuri sample, *E. Coli* was found highest in aloo chaat and *Staphylococcus aureus* was found highest in papri chaat. All the food samples were high in microbial load this may be due to preparation of food long time before and also due to poor temperature control. **Conclusion:** The present investigation aims at determining the microbiological quality of street vended foods of Jorhat city. The collected food samples along with utensil swab and hand swab of the selected street food vendor showed high level of microbial load confirming the presence *Pseudomonas aeruginosa*, *Bacillus cereus*, *Escherichia coli*, *Clostridium perfringens*, *Staphylococcus aureus* and *Salmonella* spp. Food contamination is mainly due to poor water quality and hygiene during food preparation, preparation of food long before consumption, washing of utensils, poor personal hygiene, and crowded and dusty vending location.

**Keywords :** Street food, microbiological quality



## PP-2023-0043

**Abstract Title: Water chestnut flour as a partial flour replacement and evaluation of its effect on properties of eggless cake**

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**Background:** Healthier versions of commonly consumed foods are becoming increasingly popular. Water chestnut is an aquatic angiosperm of Trapaceae family. The kernels are dried and pounded to flour which is rich in macronutrients, minerals, vitamins, bioactive flavonoids and antioxidants. This research aims to develop eggless cakes with good sensory and antioxidant properties from underutilized water chestnut flour. Whole wheat flour (WWF) and water chestnut flour (WCF) blends were utilized to develop eggless cakes. The effect of WCF on the physical, textural, sensory, and antioxidant properties of cakes was evaluated. **Methods:** All the materials were procured from the local market. Nutritional, physical, and functional properties of WCF were analysed. Five blends of WWF and WCF were used to prepare eggless cakes. Antioxidant activity, physical characteristics, textural profile, and sensory properties of the formulated cakes were evaluated. **Result:** Water chestnut flour was found to have low fat, good mineral content viz. calcium, potassium, phosphorous, magnesium, iron, and zinc, high antioxidant content, and no gluten. WCF showed higher total phenol content (TPC) ( $4.13 \pm 0.47$  gGAE/1000 g) in comparison to WWF ( $3.41 \pm 0.11$  gGAE/1000 g) but slightly lower total flavonoid content (TFC) ( $1.64 \pm 0.39$  gRE/1000 g) than WWF ( $1.84 \pm 0.44$  gRE/1000 g), while the loss of TPC and TFC after baking was seen in cake developed from WWF (TPC~46.9% and TFC~36.4%). TPC and TFC of cakes increased with WCF incorporation. Physical characteristics of cake improved with the addition of WCF whereas hardness, gumminess, and chewiness of cake decreased with the incorporation of WCF. The sensory characteristics results indicated that cake developed with 30% WCF was most acceptable.

**Keywords:** Food, Baking, Nutrition, Cake, Antioxidants

## PP-2023-0045

**Abstract Title: Standardization And Nutritional Evaluation Of Millets Incorporated Fryums**

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**Background:** Minor millets can be gainfully substituted in value added foods belonging to the categories of traditional foods. In the present study, Barnyard millet (*Echinochloafrumentaceae*), Little millet (*Panicum sumatrense*), Proso millet (*Panicum miliaceum*) and Kodo Millet (*Paspalum scrobiculatum*) were used in the preparation of fryums. They are deep-fried or roasted or baked and served as an accompaniment along with meals. The present study aimed to develop multi millet based fryums and evaluate its nutritional quality and shelf-stability. **Methods:** Measured quantities of the multi millets were mixed and soaked for 10-12 hrs. Soaked grains were ground into fine paste of dosa batter consistency. The batter was poured into measured volume of boiling water with continuous stirring to avoid lump formation. It was cooked for 8-10 min followed by addition of salt and jeera. Spoonful of the cooked batter was poured on sheets and dried for 8-10 hrs. Product optimization was done after evaluating for various sensory parameters and acceptability on a 9 point Hedonic scale. The standardized fryums were packed in PP pouches for further studies. **Result:** The optimized fryums contained 2.09% moisture; 2.54% fat; 10.21% protein; 2.89% ash, 1.27% fibre and 21.28% starch. Mineral analysis showed 16.94 mg/100 gm Iron, 90.24 mg/100g phosphorus and 52.82 mg/100 gm calcium. It showed good antioxidant activity as assayed by DPPH and ABTS with IC 50 at 150.28µg/ml and 80.76µg/ml respectively. The microbial quality was good during storage without any growth for total plate count and yeast & mold. **Conclusion:** Minor millets can be utilized in the development of value-based products. Fryums are deep-fried and served as an accompaniment along with meals.

**Keywords:** millets, fryums, antioxidant-activity, proximate analysis

PP-2023-0046

**Abstract Title: Development of Instant Kheer Mix from ash gourd (*Benincasa Hisiida L.*) and evaluation of its nutritional composition**

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**Background:** Instant kheer mix (IKM) from ash gourd (*Benincasa Hispida L.*) was prepared, standardised and evaluated its quality. The matured ash guards (12.5 Kg) washed under running water, peeled, sliced, steamed, tray dried at  $50 \pm 2^\circ\text{C}$  and ground to yield ash guard powder (190g). **Methods:** Instant kheer mix was prepared by mixing standardised quantities of ash gourd powder (15%), rice flour (15%), dry fruits (10%), cardamom (2%) and sugar (58%). The IKM 100g each was packed in PET and MET/PET/PE pouches for evaluation of nutritional quality and storage stability at room temperature. Physico-chemical composition, antioxidant activity, moisture sorption studies, microbiological tests and sensory quality of IKM was done during three months storage. **Result:** The IKM was found to be rich in fiber (3.5%), total polyphenols (37mg/100g). The IKM was also found to be rich in mineral matter (2%), in which calcium, phosphorous and iron were noticed to an extent of 94, 61 and 15 mg/100g respectively. Inhibition of DPPH free radical by 50% was observed at a concentration of 45µg/ml and for ABTS radical was observed at a concentration of 8µg/ml. The results of moisture sorption isotherm of IKM indicated its initial moisture contents of 4.77%, which equilibrated at 43% RH. Similarly, the critical moisture content of 6.40% was observed, which equilibrated at 56% RH. The IKM was stable in 51% RH, when packed in MPE pouch at room temperature. The microbiological examination of IKM showed that the absent of total plate count, yeast and mold count even after 3 months of storage. **Conclusion:** The overall sensory quality of the cooked IKM was showed a score of 9.0 an initial month and after three months storage the score was found to be 8.2. The instant kheer mix is easy to processes, nutritious, shelf-stable, organoleptically accepted even after three months storage, can be easily commercialized.

**Keywords:** Ashguard, kheermix, shelf life

PP-2023-0048

**Abstract Title: Impact of high protein on the Rheological properties of crackers**

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**Background:** Crackers are favoured and prevalent throughout the world which is light and convenient. Traditionally, crackers are primarily made from starchy food ingredients and are known for their distinct characteristics such as savoury, dry, thin and crisp. However, Proteins are important polymers that play a role in textural attributes and nutrition of crackers and their addition will improve the hardness. Commercial crackers have been reported to contain around 7-8% protein, which is considered low, Hence this study aims to see the impact of different high protein isolates on the rheological properties of crackers. **Methods:** The study has been carried out with three different protein isolate combined with refined wheat flour with high proportion of protein. Pea protein isolate (PPI+ Refined wheat flour), soy protein isolate (SPI+ Refined wheat flour), Skim milk powder and whey protein isolate (SMWPI+ Refined wheat flour), Refined wheat flour as the control are the four combination which has been analysed for proximate analysis and farinograph studies. Proximate analysis and rheological experiments were done by AOAC (2019) methods. **Result:** The protein content in PPI+ Refined wheat flour, SPI+ Refined wheat flour, and SMWPI+ Refined wheat flour combinations was found to be 51%, 29.3% and 41%, respectively. The Farinograph study revealed that PPI + Refined wheat flour reveal protein had a stability time of 1.8 mins, which suggests a higher rate of breakdown and reduced dough-making strength compared to other combinations. Soy protein mix flour has shown to have better mixing tolerance index values, While SMWPI+ Refined wheat flour exhibits lower levels than control, PPI+ Refined wheat flour and SPI+ Refined wheat flour exhibit higher levels of water absorption as compared

to the control sample, indicating the existence of enhanced protein and damaged starch, both of which are beneficial for baking. **Conclusion:** The nutritional value of refined wheat flour was improved by the addition of high protein; however the Rheological properties of the flour combination were affected. Due to the reduced gluten level, this affects the sheeting of the dough and makes it challenging for producing crackers.

**Keywords:** High Protein, Crackers, Farinograph, Composition

#### PP-2023-0050

##### **Abstract Title: Standardization And Nutritional Evaluation of Composite Millet Based Instant Breakfast Mixes**

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**Background:** Rapid industrialization, urbanization and changing eating habits of people demand for ready-to-cook products. In the present study, common Indian traditional products such idli and upma instant mixes was prepared by supplementing composite millet semolina based on Barnyard millet (*Echinochloafrumentaceae*), Little millet (*Panicum sumatrense*), Proso millet (*Panicum miliaceum*) and Kodo Millet (*Paspalum scrobiculatum*). **Methods:** Instant upma and idli mixes were prepared by incorporating composite millet semolina. The selected millets were soaked, steamed and dried in a tray drier. The dried grains were pulverized and sieved in 36 BS sieve and blended in 15-25% levels with blackgram flour for idly mix along with fenugreek, salt, sodium bicarbonate and citric acid. Curd was added into the mix and kept aside for half an hour for conditioning. Equal proportions of millets were blended for upma mix. Roasted multi millet semolina was mixed with dried and roasted onion, ginger and green chilli, red chilli, groundnut, curry leaves, Bengalgram, blackgram, mustard and cumin. The prepared instant mixes were then evaluated for proximate composition, sensory characteristics and mineral composition. The sensory evaluation was conducted by preparing Idli and upma and served hot to the panellists. **Result:** The instant mixes possessed good protein (21.1 and 16.3%), fibre (1.4 and 2.1%) and lower fat (1.6 and 10%) contents in idly and upma mixes respectively. Both instant mixes were rich in phosphorous (106.9 and 135 mg/100 g). The products were microbiologically safe and sensory evaluation indicated high acceptability. **Conclusion:** The instant mixes of idly and upma were highly acceptable with good nutritional composition of protein, fibre and minerals. Regular consumption of the products made with composite millet semolina will help regulate the health and wellness of consumers.

**Keywords:** Millets, Instant mixes, nutrition, storage

#### PP-2023-0051

##### **Abstract Title: Organoleptic and nutritional evaluation of food products utilizing Biofortified and Non biofortified cereals**

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**Background:** Malnutrition is brought on by consuming an unbalanced diet that is low in nutritional value, which is particularly prevalent in underdeveloped and underprivileged nations. Biofortification is the process of enhancing the nutritional value of food crops utilizing a range of techniques including plant breeding agronomic methods and modern biotechnology methods. The act of growing crops to increase their nutritious content from the seed on is known as biofortification. This study compares the organoleptic qualities and nutritive evaluation of recipes prepared by making a composite flour utilizing biofortified cereal to those made with non-biofortified cereals. **Methods:** The biofortified varieties of cereals that were used in this study were Wheat (DBW 187) from prayagraj, Zinco Rice MS from IIRR, Hyderabad, Pusa HQPM5 Improved maize variety from ICAR, Pusa, New Delhi and Pearl Millet (

HHB299) from SKRAU, Bikaner, Rajasthan. In order to make the recipes, a composite flour (1:1:1:1) was used. Traditional Indian recipes Panjiri and Laddoo were prepared as both are well accepted and made in every household. 30 panel members used a 9-point hedonic rating scale to evaluate the products. **Result:** The Paushtik Biofortified Multigrain Panjiri showed better overall acceptability with a mean score of  $8.28 \pm 0.63$  as compared to Paushtik Multigrain Panjiri whose mean score was  $8.15 \pm 0.90$ . The Paushtik Biofortified Multigrain Laddoo showed better overall acceptability of  $8.4 \pm 0.62$  as compared to Paushtik Multigrain Laddoo whose mean score was  $8.0 \pm 0.71$ .

**PP-2023-0052**

**Abstract Title: Antioxidant Activity and Polyphenol Content in Green Teas Infused with Edible Flowers**

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**Background:** Edible flowers are attaining renewed interest as they are rich in phytochemical components and opulent sources of natural antioxidants including flavonoids, anthocyanins, and many other phenolic compounds. Since ancient days they have been used for culinary and curative purposes. When these flowers are combined with teas in various proportions, different interactions may occur showing various effects that may be synergistic, antagonistic, and additive. The present study aimed to determine the functional properties of edible flowers infused with green teas. **Methods:** The total phenolic content was determined by using the Folin-Ciocalteu reagent while, the antioxidant capacities were measured by DPPH, ABTS, and FRAP assays. Polyphenols and antioxidant activity of edible flowers extracted in water and methanol were determined. Further, edible flowers and green tea combinations in different ratios were analysed for synergy and antagonism. **Result:** Total polyphenols in water extract values were much higher than the methanol extract. Among all the flowers pomegranate showed the highest polyphenols (201 mg GAE/g DW) followed by rose (123 mg GAE/g DW). Similarly, substantial amounts of antioxidants were observed in pomegranate and rose by FRAP and DPPH assay. In addition, the ABTS assay determined the highest antioxidants in lavender (IC<sub>50</sub> 3.18 mg/ml) followed by chamomile (IC<sub>50</sub> 3.48 mg/ml). Green tea is accounted to possess high polyphenols (133 mg GAE/g DW) and antioxidant activity (DPPH - IC<sub>50</sub> 0.22 mg/ml; ABTS - IC<sub>50</sub> 0.18 mg/ml; FRAP - 1008 mM equ of FeSO<sub>4</sub>/g DW). Among different concentrations and combinations tested, green tea infused with flowers in a ratio of 3:1 showed the highest antioxidant activity. Synergy and additive effects have been observed in the combination with the lowest flower concentration and on the far side highest concentration showed a decreased pattern in the results. **Conclusion:** It was inferred that flowers infused with tea in different concentrations clearly showed changes in the active phenolic constituents. These differences in activity may be due to the chemical composition of extracts, reactivity or polymerization, and also the conformation of components.

**Keywords:** Edible-flowers, green tea, antioxidant-activity, synergy.

**PP-2023-0054**

**Abstract Title: Formulation and Evaluation of Lactobacillus plantarum-Enriched Synbiotic Grape Drink for Gut Health Promotion**

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Probiotics and prebiotics have emerged as key players in the field of functional foods, offering the potential to promote both digestive health and overall well-being. Probiotics, which are live beneficial microorganisms, and prebiotics, which are non-digestible compounds that serve as food for these microorganisms, have gained recognition for their roles in supporting a balanced gut microbiota and potentially conferring a range of health benefits. When these probiotics and prebiotics are combined they create a synergistic relationship known as “synbiotics”, where the two components work together to optimize gut health. The development of synbiotic beverages represents an innovative approach to harnessing the advantages of both probiotics and prebiotics within a single product. This study focuses

on the development and evaluation of a novel probiotic drink enriched with *Lactobacillus plantarum*, a strain known for its robustness and health-promoting properties. The aim of this project was to formulate a synbiotic grape-based beverage, combining the probiotic benefits of *L. plantarum* with the prebiotic components naturally present in grapes. The project involved the isolation and confirmation of *L. plantarum* from a reliable source, followed by its incorporation into the grape beverage. These microorganisms, when ingested in adequate amounts, can positively interact with the host's intestinal flora, helping to restore microbial balance and mitigate digestive issues. Grapes, renowned for their natural sweetness and high polyphenol content, have been selected as the base for this synbiotic beverage. The choice of grapes as the primary ingredient offers several advantages. They are a rich source of dietary fiber and polyphenols, including resveratrol, known for their antioxidant properties. This makes grapes an ideal candidate for the development of a synbiotic beverage, as they not only provide prebiotic components to nourish probiotic strains but also contribute to the beverage's overall antioxidant capacity. Thus in this study, we delve into the formulation and assessment of a synbiotic grape-based beverage, aiming to unlock its potential as a functional beverage that combines the benefits of probiotics, prebiotics, and antioxidants for enhanced gut health and well-being.

**PP-2023-0055**

**Abstract Title: Development of Value Added Food Products from Finger Millets (Eleusine Coracana)**

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**Background:** Millets are a group of highly variable small-seeded grasses widely grown around the world as cereals crops or grains for fodder and human foods. Millets are important crops in the semi and tropical of Asia and Africa with 99% of millets products in developing countries. There is variety of millets available in India such as foxtail millets (kangni), sorghum millet (jawar), little millet (kutki), kodo millet (kodra) and pearl millet (bajara). Ragi is commonly known as finger millet in southern part of India. Along with any other food this is one of the most nutritious food and one which is easy to digest. It is rich in calcium and protein and also has good amount of iron and other minerals. It has least amount of fat and rich in carbohydrates of around 80%. Ragi has high amount of calcium, is one of the important ingredients of our body and daily need is around 350 mg. there are traces of iron and rest of other minerals are very small. **Methods:** The present study was undertaken to develop value added products from finger millets (Eleusine Coracana). The Cookies was developed using different levels of incorporation 20,30, 40 and 50 percent in the form of Ragi flour. To conduct organoleptic evaluation of the products using standard 9-point hedonic scale, and calculate the nutritive value of the products with highest acceptability score. **Result:** The result showed that the Finger millet (Eleusine Coracana) is one of the rich sources of nutrients compared to other cereals. It contains dietary fibre, calcium, phosphorus. It is also a rich source of Minerals (Calcium, Phosphorus and iron) and Vitamins. The products incorporated with finger Millets had higher acceptability score and its nutrient composition in terms of Calcium, Phosphorus, fibre and Iron high as compared to the control products. **Conclusion:** The study concluded that Ragi is beneficial for health. It improves the calcium and iron.

**Keywords:** Keywords: Finger millets, product development, nutrient content.

**PP-2023-0057**

**Abstract Title: 3D Food Printing: A New Revolution in Nutricereals for Nutrition Sustainability**

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Millets which are termed as nutricereals are small-seeded annual cereal grains and are low in phytic acid and rich in dietary fibre, iron, calcium, and B vitamins. Millets are nutritionally beneficial, but their utilization is limited in our country. Thus, for the health-conscious genre of the present world, millets are



perhaps an addition to the proliferating list of healthy foods owing to their nutritional superiority. Three-dimensional (3D) printing is an emerging technology with numerous applications in the development of novel foods to meet personalized and special dietary needs. Foods can be customized in shape, colour, texture, flavour or nutrition. It has been used to produce foods from cereals and millets such as cookies, pasta, chocolates, sugar products, dairy products and meat and fish products. 3D food printing technology is very novel in Indian market. The technology allows for a significant influence on the world economy, offers customers the chance to eat healthy, freshly prepared meals, develops novel dining experiences, and allows them to customize their diets. It is an emerging technology that supports product innovation, on-demand production, and customization. In addition to offering health advantages in a single serving of food, 3D Food Printing with nutritious cereals opens up new revolution for technology platforms that are beneficial for the nutrition sustainability.

**Keywords:** 3D Food Printer, Nutrient cereals, Nutrition Sustainability

**PP-2023-0058**

**Abstract Title: Development of Pearl Millet (*Pennisetum glaucum*) based weaning mix enriched with pumpkin (*Cucurbita pepo*) flour**

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**Background:** Weaning is a period of transition for the infant throughout which the diet changes in terms of consistency and food source. From a liquid milk based diet, the child is gradually introduced to semi-solid foods. Pearl Millet (PLM) is commonly called as Bajra. It is profoundly nutritious which is rich in micronutrients such as iron, zinc, magnesium, copper, manganese, potassium and phosphorous.

**Methods:** Six formulations (PLM1 to PLM7) were made by varying proportions of Pumpkin flour (0%, 5%, 10%, 15%, 20%, 25% and 30%) and concentration of germinated Pearl millet flour was constant. The developed weaning food was analyzed for its organoleptic properties by semi trained panelists [n=30], and that selected variation was subjected to analysis of nutrition composition. **Result:** As per the results obtained 10%(PLM3) weaning mix was found to be most acceptable in terms of sensory aspects and this variation found to be superior in terms of nutritional composition with increased levels of micronutrients such as Beta-carotene, phosphorous and calcium on par with the control.

**Conclusion:** The Pearl millet is nutrient-rich grain which is packed with essential minerals which are crucial for healthy growth and development of infants, and by incorporating pumpkin flour the product was enriched with Beta-carotene. Thus the Pearl millet and pumpkin flour incorporated complementary weaning mix was superior in terms of nutritional quality when compared to the control and it is gluten free.

**Keywords:** Pumpkin flour, Beta-carotene, complementary food

**PP-2023-0061**

**Abstract Title: Evaluation of nutritional composition and antioxidant potential of underutilised Indian-origin *Cleome gynandra* seeds at different growth stages.**

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**Background:** The aim of the study is to evaluate the nutritional composition and radical scavenging potential of seeds of *C. gynandra* at three different growth stages in order to determine the optimal maturity level at which the nutritional and antioxidant levels are high. *C. gynandra* syn. *Cleome pentaphylla* L.; *Gynandropsis gynandra* belongs to the family Cleomaceae. *C. gynandra* an underutilized weed, found to offer nutritional and health benefits attributed to its bioactive compounds, as well as macro and micronutrients. **Methods:** The seed samples were collected from the fruit at three different maturity stages. Proximates, water-soluble vitamins (Vitamin B3, B5, B6, and C), carotenoids (lutein, zeaxanthin,  $\beta$ -carotene, and  $\beta$ -cryptoxanthin and total carotenoid), phytosterols (campesterol, stigmasterol, and  $\beta$ -sitosterol), fatty acids, total phenolic content, and antioxidant activity (DPPH, ABTS and FRAP) were analyzed using AOAC (2005) (HPLC, GC-FID, UV-VIS) methods. **Result:** The results

showed that there is no significant difference observed in the levels of available carbohydrates, protein, and total fat with respect to three different maturity stages. However, the levels of water-soluble vitamins,  $\beta$ -carotene, and total carotenoids exhibited significant differences across different growth stages. The individual fatty acid content showed little significant difference among the three stages. Overall, seeds from three maturity stages exhibited good antioxidant activity. Notably, stage three samples displayed significant antioxidant activity and total phenolic content than the others. On the other hand, seeds harvested in the first stage of plant growth showed good nutritional content. **Conclusion:** The seeds exhibited higher nutritional content in the early stage of plant growth compared to the remaining two stages. Despite the high nutritional profile of *C. gynandra* seeds, they remain underutilized in many regions of the country due to a lack of awareness. Hence, it is essential to create awareness about the nutritional benefits of *C. gynandra* seeds to promote their production and consumption.

**Keywords:** Cleomegynandra, Nutritional value, Antioxidant

**PP-2023-0067**

**Abstract Title: Standardization, Sensory Evaluation and Shelf-Life of products developed using Foxtail Millet**

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**Background:** The search for nutrient-dense and environmentally friendly food options has significantly increased the use of alternative grains in food product development in recent years. Ancient cereal foxtail millet has gained popularity because of its flexibility and high nutritional value. Foxtail millet among the others, is an underutilized millet with a great nutrient profile. 2023 being the international year of millets, this study aims to develop products using the millet as the primary ingredient. **Methods:** The study included selection and standardization of feasible recipes as the primary step. Once the recipes were standardized, a total of five products were developed. A sensory evaluation was conducted with a panel size of 30 semi trained members. Attributes like appearance, aroma, palatability, texture and over acceptance was marked using a hedonic scale. The evaluation data were subjected to a statistical one-way t-test to determine the acceptance of the foxtail millet-based product in comparison to the control product which was commercially available in the current market. **Result:** The results indicated that the foxtail millet-based products could potentially serve as a healthier alternative to the existing market offerings. However, one of the five products did not perform as well as the control. Additionally, the study investigated the shelf life of the most favored versions of each product using tests for lipid peroxidation and free fatty acid analysis. **Conclusion:** In conclusion, products made from foxtail millet offer a promising route toward developing nourishing and sustainable dietary solutions. While sensory evaluation techniques offer insights into consumer preferences, standardization standards are necessary to maintain consistency and quality in these items. The variety of things – from baked foods to drinks displays the versatility of foxtail millet. The continuous investigation of foxtail millet-based products holds significant promise for innovation and influence as the food sector works to satisfy the needs of environmentally and health-conscious consumers.

**PP-2023-0068**

**Abstract Title: Development of low-cost Protein and Fibre rich product by using local available Millets and Dhals**

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**Background:** Millets are coarse grains with high nutritional value. Millets are rich source of fibre, carbohydrates and micronutrients such as Calcium, Zinc, Iron, Vitamin B complex. Dhals (spilt pulses) are source of Protein, Vitamins and minerals. Millets and Dhals are good combination of Protein and fibre. For vegetarians it serves the purpose of protein powder in low cost. **Methods:** Jowar (Sorghum),



Ragi (Finger Millet), Foxtail millet (*Setaria italica*), little millet (*Panicum sumatrense*), Green Gram Dhal, Red Gram Dhal, Bengal Gram Dhal, Black gram Dhal, Flax seeds are cleaned and roasted separately by using iron tawa and ladle until seeds turn brown and aromatic then grains and dhals are cooled and milled in to flour or powder. This millet mix can be stored in airtight container for 2 months. Upon orders, powder is prepared and sold, we use this in preparation of therapeutic diets and distribute in community outreach activities. **Result:** The product is subjected to sensory evaluation in which Health mix evaluated for its characteristic qualities by panel of members. Porridge (Ganji) is prepared using millet powder and pinch of salt is added to the Ganji. Accept preference test was conducted by using Verbal Hedonic Scale consists of nine-point scale with phrases such as like extremely to dislike extremely. 90% of members like extremely, 5 % like very much and another 5% slightly liked Hence overall the product was acceptable. **Conclusion:** The two properties of this millet mix powder make it unique is 1. Low glycaemic index 2. Gluten free Hence this mix can be used in Diabetes (Type II) , Obesity and to prevent other non-communicable diseases.

**Keywords:** Millet health mix, low glycaemic index , Gluten free

**PP-2023-0070**

**Abstract Title: Preparation and characterization of cardanol incorporated PLA films for food packaging applications**

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**Background:** Polylactic acid (PLA) is an important class of bioplastic that has the potential to be used for food packaging applications. However, to be used for food packaging applications, the structural, mechanical, and functional properties of PLA should be improved by blending with fillers and additives **Methods:** The present study aimed to use green industrial raw materials of cardanol which is refined from natural cashew nut shell oil (CNSL). The effect of cardanol (0.5, 1, 1.5 and 2 mL) on structural, morphological, mechanical, and thermo-mechanical properties of PLA films was evaluated. **Result:** FTIR analysis showed that The presence of CA can be confirmed by the appearance and increased intensity of the bands at 3300, 2900, and 1590  $\text{cm}^{-1}$ , attributed to the asymmetric stretching of phenolic O–H bond and of alkyl C–H bonds and the stretching of the aromatic C=C bonds. The surface morphology analysis CA dispersed uniformly in PLA films. The tensile properties of PLA films evidenced that the cardanol significantly increased flexibility of PLA films. Storage modulus values of cardanol-modified PLA films were less due to increased plasticity. **Conclusion:** Antioxidant activities were measured by DPPH radical scavenging activity, and the results are presented that PLA films incorporated with CA demonstrated good antioxidant activity, up to 24%, which is significantly higher than that of the neat PLA because of the strong antioxidant ability of the phenolic group of CA to capture DPPH radicals. The shelf life of mango is enhanced to 15 days with compared to neat PLA.

**Keywords:** polylactic acid, cardanol, films

**PP-2023-0071**

**Abstract Title: Starch-Based Films to Develop the Edible and Biodegradable in Food Packaging**

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**Background:** The growing concerns about environmental pollution and plastic waste have led to an increasing demand for sustainable and eco-friendly packaging materials. The creation of edible packaging materials derived from starch, a plentiful and biodegradable resource, falls under one of these techniques. A carbohydrate termed starch, which can be discovered in foods like potatoes, corn and rice, has drawn a lot of attention because of its potential for use in packaging that is environmentally

friendly. This study seeks to find out whether it is feasible to use starch-based materials as edible packaging, which not only addresses environmental concerns but also may have positive effects on waste reduction and food preservation. **Methods:** Starch Sourcing: Procurement of raw materials like starch sources, including corn and cassava, were chosen. Extraction: The chosen source is used to extract starch, and contaminants are removed using techniques like grinding, washing, and centrifugation. Blending with Additives: The extracted starch is blended with food-grade additives such as plasticizers, antioxidants, and antimicrobial agents to improve its mechanical properties and prolong its shelf life. Film Formation: The starch-based mixture is then processed to form packaging films using casting techniques. Characterization and Testing: The resulting films are characterized for various properties like tensile strength, elongation at break, and thickness, and were determine standard testing procedures. Sensory evaluation was conducted to ensure the packaging materials were acceptable in terms of taste, texture, and appearance. **Result:** Promising outcomes resulted from the invention of edible packaging derived from starch. The starch-based packaging cleared mechanical testing, since it has sufficient tensile strength and elongation at break, making it acceptable for several kinds of food products. According to sensory assessments, the edible packaging had an excellent flavour, texture, and appearance, making it a good option for consumers. **Conclusion:** The creation of starch-based edible packaging materials is an immense step in the direction of resolving the environmental issues brought on by plastic packaging. This study has shown that packaging made of starch is a sustainable option that not only biodegrades but also improves food preservation. The utilization of edible packaging made of starch has the potential to reduce plastic waste, promote sustainability, and reduce the industry's total ecological imprint while giving consumers an easy-to-use and eco-friendly packaging option for their packaging the food products.

**Keywords:** Biodegradable, edible films, starch-based films

PP-2023-0076

**Abstract Title: Evaluation of Nutritional Quality Characteristics of Selected Uncultivated Green Leafy Vegetables (UCGLVs) of Nalgonda District, Telangana State, India**

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**Background:** Uncultivated plants are an integral part of food systems in Telangana. The word “uncultivated” is used in a more general way to denote the greens from land that are not cultivated such as plant, creeper, etc., but available as partner crop in a cultivated field. There is a renewed attention to promote uncultivated species of green leafy vegetables used in traditional food system. Nowadays transfer of knowledge from generation to generation about uncultivated leafy vegetables/underutilised was decreased and all are turned to use cultivated leafy vegetables. Another reason for underutilisation may be due to insufficient, poor-quality data on the nutritive value of many UCGLVs and its contribution to dietary intakes was also unknown. Hence, the present study was aimed to investigate the nutritional quality of selected UCGLVs grown in Telangana state, India. **Methods:** Based on the survey, the present study identified 22 UCGLVs species belongs to 19 genera and 14 families. Among the identified plants, most commonly used four traditional green leafy vegetables (*Aerva lanata*, *Celosia argentea*, *Corchorus olitorius* and *Leucas aspera*) were selected for the further study. **Result:** The results of the study showed that *Aerva lanata* scored highest for ash (4.14%), protein (4.34%), crude fiber (3.18%), total carotenoids (5152.03µg/100g), calcium (427.30mg/100g) content whereas, fat (0.96%), carbohydrate (15.64%), energy (85.18kcal/100g), copper (0.59mg/100g), phenols (514.98 mg GAE/100g), tannins (257.75mg TAE/100g), oxalates (2668.85mg/100g) of *Corchorus olitorius* was significantly ( $p \leq 0.01$ ) high when compared to other leaves. *Celosia argentea* found high moisture (85.04%), zinc (1.31mg/100g), magnesium (289.53mg/100g), flavonoids (125.65mgRE/100g) content. The fat (0.98%), crude fiber (3.27%), vitamin C (103.85mg), beta carotene (313.69 µg/100g), iron (8.04mg/100g) of *Leucas aspera* was significantly high (0.01). **Conclusion:** Traditional uncultivated green leafy vegetables are the good source of nutrients like protein, crude fiber, mineral and antioxidant activity. Worldwide inclusion of UCGLVs in traditional diets has long been practiced in communities. Integrating indigenous leafy vegetables into diet is one of the best strategies to combat micronutrient deficiencies and helps to achieve micronutrient security.

**Keywords:** Nutritional quality, Telangana, UCGLVs

PP-2023-0078

**Abstract Title: Development and Nutritional Evaluation of Finger Millet Malt-Based Convenience Mix**

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**Background:** Finger millet is an indispensable traditional climate smart crop of Jharkhand, which has the potential to address the problem of malnutrition on a sustainable basis. However, despite its nutritional and health potential, it is on the verge of extinction. The revival of finger millet in the daily diet of people requires diversification of the products suiting to the changing needs of the consumers. Rapid industrialization and urbanization and changes in the eating habits of Indian people led to a very high demand for convenience mix. Therefore, an attempt was made to develop a low-cost finger millet malt-based burfi mix and evaluate the nutritional quality of the mix. **Methods:** Two types of burfi mix were developed by using ragi malt, wheat and germinated green gram supplemented with milk powder, groundnut, etc. Developed burfi were subjected to sensory evaluation on a 9-point Hedonic scale and analyzed for proximate composition, Ca, iron, phosphorus, Cu, Zn, and beta-carotene by standard methods. **Result:** The results of the study showed that *Aerva lanata* scored highest for ash (4.14%), protein (4.34%), crude fiber (3.18%), total carotenoids (5152.03µg/100g), calcium (427.30mg/100g) content whereas, fat (0.96%), carbohydrate (15.64%), energy (85.18kcal/100g), copper (0.59mg/100g), phenols (514.98 mg GAE/100g), tannins (257.75mg TAE/100g), oxalates (2668.85mg/100g) of *Corchorus oltorius* was significantly ( $p \leq 0.01$ ) high when compared to other leaves. *Celosia argentea* found high moisture (85.04%), zinc (1.31mg/100g), magnesium (289.53mg/100g), flavonoids (125.65mgRE/100g) content. The fat (0.98%), crude fiber (3.27%), vitamin C (103.85mg), beta carotene (313.69µg/100g), iron (8.04mg/100g) of *Leucas aspera* was significantly high ( $p \leq 0.01$ ). **Conclusion:** Finger millet malt can be successfully utilized for the preparation of burfi mix with superior nutritional composition and can be exploited for commercial ventures.

**Keywords:** Convenience mix, Burfi mix, malting, finger millet, nutritional quality

PP-2023-0079

**Abstract Title: Pre-drying Strategies for minimizing Oil uptake in Banana chips**

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**Background:** Banana chips are one of the most common South Indian snack products. It is a deep oil fried product and over consumption leads to several health disorders like obesity, cardiovascular diseases, etc. Several measures to lower the oil-uptake during processing of banana chips have been carried out but are impractical on a scalable level. The objective of this study was to see the effect of a pre-drying technique on the oil uptake of banana chips. **Methods:** Unripe mature stage of variety of bananas were chosen for preparing banana chips. The bananas were sliced to 1.5 mm in thickness and coconut oil was used for frying. The slices were dried at 40, 50 and 60°C for 10, 20, 30 and 40 min before frying. All groups of chips were fried at 180°C for 4 min. The % fat and moisture of the chips of all the groups was estimated as per AOAC methods. Sensory evaluation of each group was done by a group of semi-trained panelists using a 9-point hedonic scale. The morphological changes of the chips on drying at different time and temperatures were observed microscopically. **Result:** According to our study, the oil uptake reduces with increasing time and temperature. The banana chips fried after drying at 50°C for 10 min showed least oil uptake of 17.82 % and moisture content of 14.31% with an acceptable sensory response. This is a 6 % reduction in oil up-take compared to chips without pre-drying. Although, the chips dried for longer durations and higher temperature showed lower oil uptake, they were not acceptable as they showed curling and browning at the edges. **Conclusion:** The results obtained suggest that drying can successfully lower the oil uptake of banana chips on frying, without changing its traditional flavor. Drying is an inexpensive method and does not require extensive infrastructural upgradations. It can also lower the consumption of oil for processing thereby increasing

the yield. Thus, pre-drying is a method that can be easily adopted by manufacturers in order to lower the oil uptake in banana chip production.

**Keywords:** Oil uptake, Drying, Banana chips

**PP-2023-0083**

**Abstract Title: Development of Value-Added Bakery Products (Rusk) Incorporation of Finger Millet**

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**Background:** In India, bakery products have become popular among cross sections of population due to increased demand for convenience foods. The use of composite flours in bakery products improve the nutritional quality, reduce imports of wheat thereby improving the foreign exchange reserve, utilize indigenously grown cereals, reduce the cost of products and bring in varieties with different texture and flavor. **Objectives:** This study aims to formulate the incorporation of ragi flour for the best sensory quality and to maximize the utilization of ragi flour as an effective substitute for maida in the preparation of various bakery products. **Methods:** Ragi was purchased at the local market. It was cleaned, washed, and dried for one day. After it was ground into a fine powder, it was further used to formulate ragi rusk with varying levels of 25% and 50% respectively. Finally, the formulated sample has been analyzed for overall acceptability, sensory characteristics and microbial analysis. **Result:** The sensory parameters like color, taste, flavor, consistency and appearance were evaluated. The overall mean acceptability for different formulation incorporated with and 50% are given as follows, the initial mean value for of 25% and 50% was 4.6 and it was decreased to 4.5, 3.8 and 3.4 during 10th, 20th day and 30th, day and 4.9, 4.7 and 4.2 during 10th, 20th day and 30th, day of storage respectively. The bacterial count 25% and 50% was BDL till 10th day of storage. It was decreased to  $2 \times 10^{-6}/g$  and  $5 \times 10^{-6}$  during 20th day and 30th day of storage respectively. Some of the bacterial colony were isolated and studied, few of them were found to be bacillus spp., E. coli and other different types of bacteria. The fungal count 25% and 50% was BDL till 10th day of storage. It was increased to  $2 \times 10^{-3}/g$  and  $3 \times 10^{-3}$  during 20th day and 30th day of storage respectively. **Conclusion:** This rusk will be beneficial for diabetic, cardiovascular and osteoporosis patients as it was low in energy and good source of calcium.

**Keywords:** Finger millet, value addition, Rusk.

**PP-2023-0084**

**Abstract Title: Developed and Standardization of Millets Kulfi Ice**

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**Background:** Kulfi frozen dairy dessert it is traditional Indian ice cream and is made from millets, a rich source of fiber, minerals, Vitamin B complex, and phytochemicals. To prepare the millets milk, develop the Finger millets, Koda millets, Foxtail millets, Pearl millets kulfi ice, to analysis the nutritive, microbial content and self life, cost, of the product. **Methods:** Millets kulfi ice was prepared millets, cow's milk, sugar, cashew nuts and cardamom from Thoothukudi market. The main ingredients from millets grains were processed into milk form using a mixie, grounding, and filtering. Sugar, cashew nuts, and cardamom were ground, and cow's milk was added. 2.5kg millet, 1.5 kg sugar, 200gm cashew nuts, 100gm cardamom powder, 50ml milk, keep it in to a room temperature for about 5 to 10 mins. Then transfer it in to kulfi tray. Then keep it in to refrigerator -18. The product was tested for shelf-life, nutrient content, microbial content, cost, and organoleptic evaluation. The kufi ice popularized to 50 adolescents in Thoothukudi. **Result:** Mixed millets kulfi ice has high calories 314 kcal, finger millet have low calories 288.4 kcal. Mixed millets has high protein 8.10g, Koda have protein 6.57 g. Total fat was high in mixed millets 14.4 g, in finger millet 12.3 Calcium was high in mixed millets 311mg, in pearl millet 218 mg. Iron was high in mixed millets 6.3 mg, in koda 0.45 mg. Fiber was high in koda millet 6.6 mg, in pearl millet 1.8 mg. The analysis of microorganism absent. The examined once in 15 days and it was evaluated

organoleptically. The cost of each koda kulfi ice was Rs.20, pearl kulfi ice Rs.20, finger millet kulfi ice Rs.25, foxtail kulfi ice Rs.25 and mixed millets kulfi ice Rs.30. Sensory analysis (94%), with finger millets kulfi ice got the high score. **Conclusion:** Millets kulfi ice are healthy for all age group people.

**Keywords:** Millet, Kulfi ice, Analysis

PP-2023-0090

**Abstract Title: Nutri Dense Edible Cutlery: A Sustainable, Vegan, And Allergen-Friendly Alternative to Plastic**

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**Background:** Amidst growing global concerns about plastic pollution and the increasing demand for sustainable alternatives, this research explores the innovative Nutri Dense Edible Cutlery. It addresses the urgent need for eco-friendly and health-conscious options, uniting sustainability and nutrition. Our primary goal is to develop and standardize edible cutlery, harnessing natural, nutrient-dense ingredients for sustainability. We also aim to assess its sensory acceptability, estimate nutrient composition to highlight potential health benefits, and study its shelf life for long-term viability. Additionally, we'll commence budgeting and packaging using food-grade materials in preparation for market release.

**Methods:** In developing Nutri Dense Edible Cutlery, raw materials were thoughtfully selected based on their availability and common household usage, ensuring high nutritional value and sustainability. Additionally, the ingredients were chosen to be lactose and gluten-free, catering to a wide range of dietary preferences. The ingredient list includes: Besan flour or Chickpea flour Sorghum or Jowar flour Red rice flour or Matta rice flour Beetroot powder Coconut flour Sprouted horse gram flour Flax seeds powder Dry dates powder Spices Sunflower oil The production process involved weighing the ingredients, kneading them into dough with the appropriate water content, rolling the mixture into flat spreads, and cutting them into spoon-shaped molds. The cutlery was then baked at 100°C for 45 minutes. A control sample was also developed for physical property testing and comparison. Prior to the preparation of Nutri Dense Edible Cutlery, certain ingredients such as Beetroot powder, Flax seeds powder, Coconut flour, and Sprouted horse gram flour required specific preparations: Beetroot powder was prepared using a dehydration process. Coconut flour was created by naturally isolating pulp and milk and dehydrating it through dry roasting. Horse gram flour was made through sprouting, drying, dry roasting, and blending. Flax seeds powder was produced by dry roasting and finely blending the seeds. These preparation methods were carried out at the Nutrition and Dietetics food lab, BCWCC, with the aim of preserving the nutritional value, reducing costs, and keeping the product as natural as possible.

**Result:** Among the three variations (S1, S2, S3), S3 emerged as the most accepted variant, exhibiting superior nutritional content, including energy, carbohydrates, protein, calcium, potassium, and dietary fiber compared to the control. Additionally, it displayed a remarkable foam capacity of 10%, substantially higher than the control's 1.92%. Both S3 and the control exhibited similar pH levels and thickness, but S3 demonstrated a significant increase in break strength, making it more suitable for diverse culinary applications. Additionally, the microbiological and biodegradability tests confirm that the product meets safety and sustainability standards, making it a promising option for eco-friendly and sustainable use.

**Conclusion:** The developed Nutri Dense Edible Cutlery, with its nutritional benefits, sensory acceptability, and impressive physical properties, represents a sustainable and innovative choice. It addresses the growing demand for environmentally friendly alternatives to single-use plastics while also promoting health-conscious dining experiences. Moreover, it is gluten-free, lactose-free, and made for vegans, catering to diverse dietary needs and preferences. It offers a practical solution for individuals, businesses, and policymakers concerned about plastic pollution and aims to provide an inclusive dining experience for various dietary restrictions.

**Keywords:** Sustainability, Edible cutlery, Vegan, Nutritious



PP-2023-0091

**Abstract Title: Sustainable Solutions for Food Waste Reduction: pH Sensing Edible Coating on Vegetables for Enhanced Shelf Life and Quality**

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**Background:** The study addresses the pressing issue of food waste and quality preservation in the agricultural sector. It focuses on the development and evaluation of a pH sensing edible coating enriched with anthocyanins extracted from onion peel waste. This innovative approach aims to extend the shelf life of vegetables and reduce post-harvest losses while simultaneously valorizing food waste.

**Methods:** The research begins with the collection and cleaning of onion peel waste, which serves as a valuable source of anthocyanins. These anthocyanins are extracted using food-grade solvents, and the optimal extraction conditions are determined through a systematic optimization process. Simultaneously, the pH sensing edible coating is formulated and incorporates the extracted anthocyanins. pH-sensitive materials compatible with food applications are chosen to ensure precise pH monitoring. Coated vegetables are subjected to controlled storage conditions, while real-time pH changes within the coating are monitored using integrated pH sensors. In parallel, various quality attributes of the vegetables are assessed over time. **Result:** The integration of these anthocyanins into the edible coating exhibited a significant impact on the preservation of vegetable quality during storage. Real-time pH monitoring within the coating revealed its ability to actively respond to pH changes as vegetables aged, thereby enhancing shelf life. Furthermore, the study highlights the economic feasibility of this innovative approach, with cost-effectiveness considerations favoring the utilization of onion peel waste as a valuable resource. It underscores the potential of the pH sensing edible coating, complemented by anthocyanins from food waste, as a sustainable and effective strategy for reducing food waste and enhancing the shelf life and quality of vegetables, thus contributing to a more responsible and environmentally conscious food industry. **Conclusion:** The results of this study demonstrate the viability of pH sensing edible coatings enriched with anthocyanins as a sustainable solution for food waste reduction and quality preservation. The integration of pH sensing technology offers real-time monitoring capabilities, enabling timely interventions to maintain optimal pH levels and extend the shelf life of vegetables. By addressing the dual challenges of food waste and quality preservation, the pH sensing edible coating with anthocyanins paves the way for a more sustainable and responsible future in food production and consumption.

**Keywords:** Anthocyanins, Sustainable, Preservation, Onion Peel

PP-2023-0092

**Abstract Title: 'A systematic Review of Calcium Content and Bioavailability in Finger Millet: Implications for Human Nutrition'**

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**Background:** Finger millet also known as ragi in India and Nepal, is a grain that mainly has a stem consisting of spikes or fingers and the grains are very small in size and shape. They are nutritious because they are rich in nutrients such as fiber, polyphenols and many other minerals. But most of all, finger millet is rich in calcium. Calcium is essential for bone and bone development in children to adults, and in the later stages of life, osteoporosis occurs due to calcium and vitamin D deficiency. Calcium content Finger millet promotes the benefits potential benefit in preventing osteoporosis in adults.

**Methods:** The main objective of this study was to find out the remarkable properties of calcium present in finger millet from different systematic studies. Studies conducted on millet have shown that it can control diabetes, cardiovascular diseases, obesity and help prevent iron deficiency anemia. A systematic study and meta-analysis was performed to investigate the relationship between calcium bioavailability and its absorption compared to other millet products. Many articles related to the

presence of calcium in finger millet were reviewed and after much deliberation, the work of (Anitha.et.al 2021) was considered the main article for the systematic review. The inclusion and exclusion criteria as well as the method of analyzing their work served as a guide for this systematic review. **Result:** The results obtained from the systematic review the studies concluded that finger millet contains calcium provides high bioavailability and thus contributes higher calcium content than any other food. **Conclusion:** This is of great significance as it especially beneficial for children, pregnant and lactating women and the elderly. calcium bioavailability can be improved by processing techniques such as sprouting, soaking and fermentation. Further research and promotion of the benefits of finger millet calcium could strengthen its role in improving global food security and public health issues.

**Keywords:** Calcium, osteoporosis, meta-analysis, bioavailability, supplementation

**PP-2023-0097**

**Abstract Title : Nutritional Quality of Milk and Rice Sample Cooked in the Glazed and Unglazed Traditional Earthen Cookware**

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**Background:** Food safety and quality are the important aspects in the maintenance of health and nutrition. Modern cookware may release the toxic elements (base material) into the cooked food. Ancient people used the traditional cookware which is made out of mostly stone and clay which has lot of benefits in nutrition and cooking quality of food. The main objective of the study is to analyse the nutritional quality of milk and rice, cooked in the traditional earthen cookware. **Methods:** The two types of glazed and unglazed cookware used separately for boiling of milk (kalayam) and cooking of rice (manchatti). The weight of the cookware was measured by using weighing scale. The pH (calorimetric method), moisture (IS:16072) was determined. The nutritional quality of the milk and rice sample was analysed through quantitative values of macronutrients [carbohydrate (IS:1656) protein and fat by (AOAC,21st edition)]; micronutrients [calcium, phosphorus, sodium, potassium (IS:1479,12760) iron, zinc (FSSAI,2016) and magnesium (IS:5949)] and the toxic metals [aluminium, mercury, lead (FSSAI,2016)]. **Result:** The 250ml of milk is boiled in glazed (663.50gms) and unglazed kalayam (573gms) pot, reached its boiling temperature at 99.9°C and 98.9°C (8minutes) respectively. The phosphorus and sodium content of the milk (8.10 mg, 20mg) was slightly increased to 11.46mg and 23 mg in the unglazed pot. The potassium (15mg) content was present only in the milk sample of unglazed pot. The calcium content (250mg) of the boiled milk found to be 210mg in unglazed than in glazed pot (180mg). The glazed and unglazed manchatti weighed about 808.5gms and 878.5gms was used for cooking the rice sample (250 gms). The rice cooked in unglazed reached its doneness at 100.0°C (23min) and at 102.2°C (26 min) in glazed pot. The trace amount of iron, phosphorus and sodium (0.04, 0, 3.57 mg) rice sample was found to be increased in the cooked sample collected from glazed (0.64, 8.60, 4.53mg) than in the unglazed (0.21mg ;0.37 mg and 3.63mg) pot. **Conclusion:** It was concluded from the study that the milk and rice samples cooked in the earthen cookware showed increased and decreased mineral content along with the below detectable levels of the toxic metals.

**Keywords:** kalayam, manchatti, rice, milk, minerals.

**PP-2023-0104**

**Abstract Title: Miracle Grains: health benefits and prevention of lifestyle disease with sustainable nutrition**

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**Background:** Millets are a group of small-seeded grasses. The cultivation of millets generally has a lower environmental footprint in terms of water usage and greenhouse gas emissions and improve



climate action. We can foster Sustainable Cities and Communities and reduce the ecological footprint of food consumption. Millets is highly nutritious protein, fiber, key vitamins, and minerals and several health. **Methods:** Relevant matter regarding the topic was collected from 6 Pubmed, 3 Scopus and other journal sites and Followed by critical analysis/meta analysis was done. And the information regarding the millets nutrition. Millets are highly nutritious and environment-friendly to prevent acute and chronic disease. **Result:** Millets are miracle grain that has abundant in essential nutrients such as vitamins (especially B vitamins like niacin and B6), minerals (like iron, magnesium, and phosphorus), and dietary fiber. It has phytochemicals that has positive effect on human health by lowering the cholesterol and phytates in the body. Lifestyle disease that potentially can be prevented by changes in diet, environment, and lifestyle, such as heart disease, stroke, obesity, and osteoporosis etc. Millet's health benefits components of phenolic compounds which can help protect the body from oxidative stress and may play a role in reducing the risk of chronic diseases. There are different types of millets as like Jowar (sorghum), Bajra (pearl millet), ragi (finger millet), Jhangora (barnyard millet), Barri (Proso or common millet), Kangni (foxtail), Kodra (Kodo millet) It contains a high amount of lecithin and is an excellent for strengthening the nervous system. Millets generally have a low glycaemic index (GI) and known to be heart-healthy grains. Millets are naturally gluten-free, making them a suitable grain alternative for individuals with celiac disease. finger millet (ragi), are rich in calcium and can contribute to prevention of conditions like osteoporosis. These nutrient can help boost the immune system. **Conclusion :** Millets are highly nutritious, non-glutinous and non-acid forming foods. Millets are the least allergenic and most digestible grains. There is a need to educate people about the health and nutritional benefits of millets to increase the consumption of millets and millet-based products to save people from health and malnutrition related issues.

**Keywords:** Miracle, Grain, health, benefits, nutrition

PP-2023-0107

#### **Abstract Title: Quality Analysis of Millets based Biscuit for Fasting**

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**Background:** Millets is known for its health benefits as it is nutritionally superior to conventional food grains. Biscuit is item of snacks which are popular in India and are often served at festive or any time generally. There are negligible studies based on fasting products. Hence, an attempt was made to develop millet based biscuit for fasting there storage study was carried out. The amaranth, buckwheat and barnyard millet were used to prepare biscuits. **Methods:** 100g flour developed using barnyard millet, amaranth and buckwheat in the ratio 20:40:40 found best for product development. Further best developed flour was analysed for its proximate composition and found that it contained 4.8 percent moisture, 6.9 percent crude protein, 8.3 percent crude fat, 9.9 percent crude fibre, 0.01 percent ash, 46.3 percent total carbohydrate and total energy was estimated to 791 kcal/100g respectively. **Result:** Product was calculated for sensory parameters to acceptability and shelf life during storage period up to 60th days. Scores obtained for sensory parameter i. e. appearance, colour, flavour, texture, taste and overall acceptability were, 9, 8.8, 9, 8.9, 8.8, and 8.8, biscuit felt in to the category of "liked extremely". As the storage period advanced, the changes which occur in sensory attribute noted that biscuit scored (9, 8.8, 8.9, 9, 8.8 and 8.8) at 0 day, (8.7, 8.7, 8.7, 8.8, 8.6 and 8.7) for 15 days, (8.6, 8, 8.3, 8.2, 8.7 and 8.2) for 30 days, (7.7, 7.7, 7.9, 7.7, 7.7 and 7.3) for 45 days, (6.2, 6.5, 6.6, 6.6, 7.1 and 6.3) for 60th days which equally defines that the overall acceptability of biscuit was best found up to 30 days only, due to changes in the flavour and taste indicates that there was significant decrease in the scores for sensory parameters as the storage period advanced. **Conclusion:** It can be concluded that the development and standardization of millet based biscuits had high sensory and nutritional features. Development and standardization of millet based snacks products development as they are nutrient dense. Developed product was acceptable by the panel members therefore, millet based foods may be commercialized for getting beneficial impact on health to reduce the life style based diseases.

**Keywords:** Millets, fasting, biscuit, acceptability, diseases

PP-2023-0121

**Abstract Title: A Comparative Analysis of Nutritional and Anti-Nutritional Factors in Different Varieties of Millets**

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**Background:** As we are currently in the International Year of Millet, there is a significant focus on raising awareness and promoting the consumption of millet. Therefore, it is essential to know about the different varieties of millets, their nutritional benefits, as well as any potential antinutritional factors before incorporating them into our diets, making informed choices based on our specific dietary requirements.

**Methods:** A comprehensive data analysis was conducted, which encompassed 15 different studies. From the reviews, a comparative study was done and was analyzed based on the nutritional and antinutritional factors of millets. **Result:** The studies highlighted the Sorghum's excellent nutrition and low carbon footprint and demonstrated superior water efficiency along with proso millet making them suitable for cultivation in water-scarce regions and giving higher yields compared to other millets. Proso millet stands out for its high energy content (341kcal), finger millet for its calcium richness (350mg), and pearl millet for its iron content (8mg). Bajra and little millet are higher in fat, whereas ragi has the lowest fat content (1.5g). Pearl millet contains vitamin E (2 mg/100 g) due to its substantial oil content, along with vitamin A. It contains magnesium(137mg), which alleviates respiratory problems. Little millet is rich in B-complex vitamins, fiber and minerals. Foxtail millet releases glucose without disrupting metabolism, thus lowering the risk of heart disease. Foxtail millet serves as a natural pest repellent in storage conditions for pulses like green gram. Sorghum wax is rich in policosanols, aiding in cholesterol reduction. Millets have a higher presence of anti-nutritional elements compared to wheat and rice. Finger millet contains compounds like polyphenols, tannins (0.61%), phytates (0.48%), trypsin inhibitors, and oxalates. These elements may hinder the absorption of micronutrients and protein digestion. Pearl millet contains goitrogenic compounds derived from phenolic flavonoids, like C-glycosyl flavones, which can lead to unpleasant odors in the flour during storage. **Conclusion:** It is essential to have knowledge about the different varieties of millet and choose them wisely according to the nutritional benefits it provides and the antinutritional properties it carries instead of consuming without awareness.

**Keywords:** Millet, Nutritional, Anti-nutritional, Comparative study.

PP-2023-0126

**Abstract Title: From plate to health: Enhancing pasta with fish protein**

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**Background:** Pasta is a popular and versatile food made from durum wheat semolina and is staple in many cuisines around the world. Pasta is primarily made of carbohydrates, consuming large portions of pasta dishes can lead to excessive calorie and increase in blood sugar levels. Pasta can be an effective vehicle for incorporating bioactive ingredients and enhancing the nutritional value of a meal. Pasta can be an effective and convenient vehicle for incorporating bioactive ingredients. The work focused on enrichment of protein in pasta by incorporation fish powder. Croaker Fish (*Micropogonias undulatus*) powder is used as a protein source for partial replacement of semolina to increase the protein concentration and improve the nutritional profile of pasta. **Methods:** Pasta was prepared by replacing semolina with croaker fish powder with different concentrations (5, 10, 15, 20 and 25%). Proximate analysis, cooking quality, starch content, In vitro protein digestibility, texture and sensory profile were evaluated. **Result:** Sensory and consumer acceptance study of the pasta prepared up to 15% fish powder was acceptable. However, final product with pasta masala was acceptable up to 25%. Compared to control (48.55%), enriched pasta showed increase from 75.35% to 95.57% in In-vitro protein digestibility as the % fish powder increased from 5 to 25% respectively. **Conclusion:** This work underscores the potential of pasta as a platform for enhancing its nutritional value and introduces an innovative approach to increasing protein content. By incorporating fish powder, it not only broadens

the nutritional profile but also offers a new avenue for exploring the utilization of bioactive ingredients in this widely consumed food, promoting its adaptability to meet diverse dietary needs and preferences.

**Keywords:** protein rich Pasta, Fish protein.

**PP-2023-0140**

**Abstract Title: Development of Antioxidant Effervescent Tablet from Mulberry Fruit Extract**

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**Background:** Mulberry fruit is a rich source of antioxidants and provides low calories. Mulberry Fruit possesses several pharmacological properties, but due to a lack of research, it is underutilized. Effervescent tablets are one of the alternative techniques for oral dosage. Patients For those who are having difficulty swallowing tablets, effervescent technology can be used. It has more benefits compared to conventional tablets. **Methods:** Effervescent tablets from mulberry fruit were formulated using three formulas, each with a different percentage of the effervescent mix. The effervescent tablets were evaluated for various characteristics in terms of granule flowability, moisture content, dissolution time, foam volume, total phenolic, total flavonoid, and antioxidant activity. **Result:** Mulberry fruit extract effervescent tablets developed in this study showed good flow characteristics, uniform particle size distribution, and fulfilled quality requirements. Formulation 3 showed good flow characteristics compared to other formulations. dissolving time: 3 minutes, 10 seconds; foam time: 2 minutes, 55 seconds; antioxidant activity: IC50 value 26.47mg/L required to inhibit free radical formation. Total phenolic content is 28.96 mg GAE/100 g, and total flavonoid content is 11.84 mg QE/100 g. **Conclusion:** Based on the results, Formulation 3 was selected as a good effervescent tablet with good color, high antioxidant activity, and phenolic compounds that can be used as a 'ready-to-drink' product.

**Keywords:** Ready to drink, antioxidant, mulberry

**PP-2023-0142**

**Abstract Title: Complex formation between Amorphophallus paeoniifolius starch and stearic acid: effect of enzymatic debranching for starch**

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**Background:** Amorphophalluspaeoniifolius (elephant foot yam, EFY) is an under-utilized tuber crop widely known as 'King of Tuber Crops' due to its high yield of starch. Starch forms an inclusion complex with diverse hydrophobic bioactive compounds, and the complexation is governed by various factors. Starch modification by enzymatic treatment may enhance the availability of linear starch with promising chain length that could enhance starch-inclusion complexation. The primary objective of the study is to explore the complexation yield, structural, and quality characteristics of starch complexes with stearic acid when a pullulanase treatment was applied to starch isolated from A. paeoniifolius. **Methods:** Initially, defatted native EFY-starch matrix was autoclaved (121°C; 30 min), and then enzymatically debranched at different degrees using Pullulanase (40U/g starch) for 6, 12, & 24 h at 60°C). The debranched starches were utilized as complexed forming agents for stearic acid and the complexation was executed at 90°C for 12 h. After complexation, sample suspensions were centrifuged (25,000g, 4°C for 30 min) and the subsequent precipitates were isolated. The starch/stearic acid complexes were characterized using conventional techniques. **Result:** Results demonstrated that the debranching process significantly improved the recovery yield (52.35%) and percent ratio of stearic acid (83.31%) in the complexes to its initial amount. SEM images proved that surface of the starch granules became rough and irregular. Gel-permeation chromatogram proven that amylopectin degraded to smaller molecules upon debranching from 6 to 24 h. XRD pattern of the amylose-stearic acid complexes shown a mixture of the B-type and V6-type patterns, with 2θ peaks at 7.6°, 13.1°, 17.2°, 20°, 21.6°, and 23.4°.

DSC thermogram revealed that amylose-stearic acid complexes contain three distinct peaks: the melting of the free stearic acid (at around 67°C), amylose-lipid complexes (from 97 to 115°C) and retrograded amylose (between 120 and 130°C), respectively. **Conclusion:** Overall, debranched EFY-starch can be used as a carrier of functional fatty acids for the purpose of improving their stability and bioavailability.

**Keywords:** Amorphophalluspaeoniifolius; Starch; Inclusion complex

**PP-2023-0145**

**Abstract Title: Nava Dhanyam Abhishyandi: Exploring Digestive Dynamics of Newly Harvested Grains and Pulses in Ayurveda**

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**Background:** Ayurveda places significant emphasis on dietary choices and their effects on overall health. "Nava Dhyana Abhishyandi" represents a unique perspective within Ayurveda, suggesting that newly harvested grains and pulses possess qualities that make them heavier and more challenging to digest compared to their aged counterparts. The higher moisture content in newly harvested grains and pulses can result in a denser texture, potentially impacting digestibility. Additionally, the enzymatic composition of these fresh harvests may require the digestive system to exert more effort in breaking down complex compounds, making them heavier to digest. The fiber content, often varying with age, can affect gastrointestinal processes, leading to feelings of heaviness and bloating. In Ayurveda, it's often recommended to prepare grains and pulses in a way that enhances digestibility, such as soaking, sprouting, or fermenting them before consumption. These samskaras (methods) can help reduce the potential heaviness associated with newly harvested grains and pulses and make them more digestible.

**Methods:** This study involved a comprehensive exploration of the properties and characteristics of grains and pulses, both newly harvested and aged. Samples were obtained and analyzed to assess their moisture content, enzymatic composition, fiber content, and starch composition. The research also encompassed a review of traditional Ayurvedic practices to elucidate the rationale behind the perceived heavier and harder-to-digest nature of "Nava Dhyana Abhishyandi." Additionally, traditional preparation methods, including soaking, sprouting, and fermenting, were examined to determine their impact on enhancing digestibility. **Result:** The analysis revealed that newly harvested grains and pulses possess higher moisture content, denser texture, distinct enzymatic composition, and altered fiber and starch composition compared to their aged counterparts. These properties contribute to increased heaviness and difficulty in digestion. Furthermore, traditional preparation methods were found to be effective in mitigating these qualities, making these freshly harvested grains and pulses more amenable to digestion. **Conclusion:** In conclusion, delving into the digestive dynamics of "Nava Dhyana Abhishyandi" sheds light on the importance of considering the age and quality of grains and pulses in our diets. By embracing Ayurvedic principles and appropriate preparation techniques, individuals can optimize their dietary choices to promote better digestion and overall well-being.

**Keywords:** Abhishyanda, Navadhanya, Ayurveda, digestive-dynamics, samskara

**PP-2023-0146**

**Abstract Title: Antibacterial packaging film from watermelon rind**

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Antimicrobial Food Packaging takes an interdisciplinary approach to provide a complete and robust understanding of packaging from some of the most well-known international experts. This practical reference provides basic information and practical applications for the potential uses of various films in food packaging, describes the different types of microbial targets (fungal, bacteria, etc.), and focuses on the applicability of techniques to industry. Tactics on the monitoring of microbial activity that use antimicrobial packaging detection of food borne pathogens, the use of biosensors, and testing

antimicrobial susceptibility are also included, along with food safety and good manufacturing practices. Purpose Raw materials a) Chitosan b) Essential oils c) Water d) Watermelon rind extract or powder e) Antimicrobial peptides f) Natural polysaccharide like starch g) Preservatives h) Neem gum extract Stages involved: Step 1: Selection and preparation of chitosan-based polymer Step 2: Select the antimicrobial peptides, Watermelon rind and neem gum extract. Step 3: Incorporation of antimicrobial peptide, watermelon rind and neem gum extract into chitosan based polymer by blending and extrusion. Step 4: Characterization and testing to test efficiency-antimicrobial activity test Step 5: Shelf-life testing to test effectiveness of antimicrobial packaging material. Step 6: Package designing.

**Keywords:** Antibacterial, shelf- life, packaging, watermelon,neem

**PP-2023-0147**

**Abstract Title: Development of Banana Grits Using Ripe Nendran Banana and Preparation of Breakfast Cereal for Celiac Disease Condition & Invitro Analysation of the Gluten Content**

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**Background:** Banana grits is a dehydrated banana of any variety that is rich in resistant starch and can also be used as an alternative for wheat, hence those who are intolerant to wheat can use these grits to prepare upma, kheer, etc. this can also be added into cakes, cookies to enhance the taste and the nutritional value. **Methods:** The ripe nendran banana is finely chopped and dehydrated and made into grits using grit maker. The grits can be used as an alternate for Celiac disease as Breakfast cereal grains as it is less in gluten content. **Result:** Gluten analysis for the developed breakfast cereal was carried out indicating the absence of gluten in the product. Proximate analysis is done to analyze the macronutrient and micronutrient composition of the developed product. **Conclusion:** The novel product can be consumed as an alternate instead of high sugar cereal packs. It also provides good amount of energy, potassium and other essential nutrients. Hence it can be supplemented for Celiac disease patients.

**Keywords:** Banana grits, dehydration, Celiac Disease

**PP-2023-0148**

**Abstract title: Instant millet soup and pulao mix**

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The millets like pearl millet (*pennisetum glaucum*), finger millet (*eleusine coracana*), foxtail millet (*setariaitalica*), maize (*zea mays*), sorghum (*sorghum bicolor*) and oats (*avena sativa*), kodo millet and little millet were selected for soup and pulav mix formulation. Vegetables such as carrot, potato, onion, peas, garlic and ginger and herbs like basil (*tulsi*), curry, green coriander, mint, and bay leaves were collected from local market. Other seasoning ingredients such as dehydrated onion flakes and garlic flakes, coriander powder, black pepper powder, cumin powder and black salt was purchased from local supermarket and used for the present study. The herbs increase the antioxidant quality of the soup and mix. The millets were pre-treated, milled, and mixed in different proportions to make t0, t1, and t2. The samples were tested for their sensory qualities, composition, and shelf life. The results showed that the mix was highly acceptable with a big difference when compared to other formulations. Plus, it didn't show any pathogenic organisms when stored for two months in a laminated pouch under normal room conditions. It's so easy to make that you can call it a convenient, healthy soup mix.



**PP-2023-0149**

**Abstract Title: Millet Smoothie Mix**

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**Background:** Millet smoothie mix is a nutritious and versatile ingredient that can be used to create delicious and wholesome smoothies. Millet is a gluten-free whole grain that is rich in essential nutrients, including fiber, vitamins, and minerals. Here's a simple recipe for a millet smoothie mix that you can use as a base for various smoothie combinations. **Methods:** Ingredients: 1. 1/2 cup millet (cooked and cooled) 2. 2 cups of your choice of milk (dairy or non-dairy) 3. 1 ripe banana 4. 1/2 cup of fresh or frozen fruit (e.g., berries, mango, pineapple) 5. 1 tablespoon honey or maple syrup (optional, for sweetness) 6. 1/2 teaspoon vanilla extract (optional) 7. Ice cubes (optional, for a colder smoothie). **Result:** Instructions: 1. Cook Millet: Rinse the millet in cold water and cook it according to the package instructions. Once cooked, let it cool to room temperature. 2. Prepare Your Ingredients: Gather the milk, banana, fruit, sweetener, and any optional ingredients. 3. Blend Millet: In a blender, add the cooked and cooled millet along with a portion of your chosen milk. Blend until you get a smooth millet base. 4. Add Banana and Fruit: Add the ripe banana, your choice of fresh or frozen fruit, and the remaining milk to the blender. 5. Optional Sweetener and Flavoring: If you desire additional sweetness, add honey or maple syrup, and if you want extra flavor, include vanilla extract. 6. Blend Until Smooth: Blend all the ingredients until you achieve a smooth and creamy consistency. If you prefer a thicker smoothie, you can add more millet or less milk. 7. Adjust Consistency: If the smoothie is too thick, you can add more milk. If it's too thin, you can add extra fruit or millet to thicken it up. 8. Serve: Pour the millet smoothie mix into glasses and garnish with additional fruit, a sprinkle of millet, or a drizzle of honey, if desired. Add ice cubes for a colder drink. 9. Variations: You can customize your millet smoothie by adding other ingredients like yogurt, nut butter, chia seeds, spinach for added nutrients, or a dash of cinnamon for extra flavor. **Conclusion:** This millet smoothie mix serves as a nutritious base that you can adapt to your taste preferences by changing the fruit or flavorings. It's a great way to incorporate the benefits of millet into your diet while enjoying a refreshing and healthy beverage.

**PP-2023-0150**

**Abstract Title: Detox capsule**

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**Background:** This detox capsule is a form of natural medicine which is made of natural ingredients such as vegetables, fruits, and nuts. It basically helps those who want to lose weight in a natural way rather than using a medicine which may contain some chemicals and lead to side effects to the body. This detoxer is also made for those people who suffer from various health conditions such as diabetics, hypertension etc. **Methods:** Natural vegetables, preservatives, gelatin base. **Result:** detox capsules made with natural ingredients. **Conclusion:** The detox capsules are made for those people who want to lose weight/ cure health conditions using natural ingredients but couldn't manage to prepare by themselves due to their working pattern. This capsule is prepared using vegetables, fruits etc. no artificial flavors or colors are used. The main aim is to make a detox capsule without any side effects and safe to consume.

**Keywords:** Detox capsule, natural ingredients

**PP-2023-0152**

**Abstract Title: Green Synthesis of Silver Nanoparticles from Alternanthera sessilis Leaves**

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**Background:** Nanoparticles are widely used in agriculture, food packaging, and the medicine industry. Food packaging and agriculture are increasingly utilizing nanoparticles, such as silver, due to their low toxicity levels. The synthesis of these nanoparticles, derived from biological materials, is known as green synthesis of silver nanoparticles. Nanotechnology involves manipulating matter within the 1-100 nm range, with silver particles exhibiting antimicrobial properties and low toxicity levels. Biogenic nanoparticles, derived from biological materials, are a promising solution for food packaging and agriculture. **Methods:** *Alternanthera sessilis*, a plant known for its medicinal and food applications, is used in the green synthesis of silver nanoparticles. The process involves the reduction of silver (Ag) in AgNO<sub>3</sub> into Ago, forming nanosized biomolecules with silver ions. The 1mM of silver nitrate solution is used, and the resulting nanoparticles exhibit both silver and biomolecule properties. Sample A (fresh leaves) and Sample B (dry leaves) are two types of samples taken. The leaves are ground using a mortar and pestle and boiled in a conical flask with 100 ml of distilled water for 20 minutes. The extract is then filtered and added to a separate flask. The extract and AgNO<sub>3</sub> are added in a 1:1 ratio, and the solution is then centrifuged for 20 minutes. The process ensures the extraction of essential nutrients from the leaves. **Result:** The obtained nanoparticles have been examined and studied by UV-Vis spectrometry. The result shows an absorption between 200 and 450 nm, which indicates the presence of a silver nanoparticle. The study of synthesized silver nanoparticles revealed a high peak in sample B compared to sample A. This high peak indicates the presence of silver nanoparticles, which can easily penetrate through microbial biofilms and be easily incorporated into packaging materials. **Conclusion:** Plastic packages are nonbiodegradable but have advantages like water resistance and repellent properties. These properties can be enhanced in edible and active packaging by adding nanoparticles with antimicrobial properties, which can enhance the quality, health protection, and safety of these packaging materials. These packages extend the shelf life of fruits and vegetables by absorbing and decomposing ethylene, enhancing their biodegradability and value-added.

**Keywords:** Silver-Nanoparticles, *Alternanthera sessilis*, Green-Synthesis, Biod

OP-2023-0004

**Abstract Title: Pearl millet and Kenaf leaf (*Hibiscus cannabinus*) powder enriched Nutri cookies: A synergistic approach towards health and nutrition**

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**Background:** Pearl millet (*Pennisetum glaucum*), known as bajra, is a vital millet crop cultivated extensively in India and Africa. Its rich nutrient profile, encompassing dietary fiber, iron, and protein, confers numerous health benefits. The high dietary fiber content aids in managing constipation, regulating blood sugar, and providing essential amino acids. Millets, regarded as nutriceals, are abundant in essential nutrients, gluten-free, health-promoting properties. These attributes position pearl millet as a valuable resource against malnutrition, for immunity support and overall well-being. Kenaf (*Hibiscus cannabinus*) from the Malvaceae family, commonly known as Deccan hemp and Java jute, is a warm-season annual fiber crop thriving primarily in India, China, and Bangladesh. With successful cultivation, Kenaf holds promise for fiber production. Cookies, globally consumed low-moisture foods with extended shelf life, are a significant dietary component. **Methods:** Pre heat oven at 190 deg C. Dry roast pearl millet flour, wheat flour and 2g kenaf leaf powder. Add jaggary, salt and ¼ cup ghee little by little as you keep mixing in a rubbing way. Divide into equal sized balls, flatten slightly. Arrange in a tray lined with butter paper and dust it with flour. Flatten the divided balls to cookies. Bake for 14- 15 minutes. Once done, cool down and serve. **Result:** This study aimed to innovate and standardize Nutri cookies by incorporating Kenaf leaf powder into pearl millet flour. Among the tested variations Nutri cookies containing 2% Kenaf leaf powder and pearl millet flour received the highest sensory scores. Comprehensive nutrient analyses were undertaken to meticulously assess the developed food products. The nutritional value of Nutri cookies as follows moisture 9.45 carbohydrates 66.93 protein 9.47 and dietary fiber 13.29.



OP-2023-0006

**Abstract Title: Characterization of marine topse (Polynemusparadiseus) fish oil and exploring its impact on high fat diet induced BALB/c mice model to combat obesity**

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**Background:** In view of the negative effects of marketed medicines, we extracted and studied topse fish oil in this study and investigated its effect on obesity. Topse, scientifically known as Polynemusparadiseus, is a common fish found in the West Bengal region's maritime environment. The Indian Council of Medical Research (ICMR) has only established proximate analysis reports for this fish; there is a shortage of knowledge connected to biological activity, so we concentrated on that gap and wish to establish some biological activities of topse fish oil. **Methods:** Inbred twenty-four male albino BALB/c mice (4–5-week-old males) with an average weight of  $21.2 \pm 2.1$  g experienced 1 week of acclimatization with a standard chow diet and were randomly divided into four groups such as control group, normal chow feeding (protein with 20% kcal, carbohydrate with 70% kcal, fat with 10% kcal); obese control, high-fat diet feeding (protein with 20% kcal, carbohydrate with 35% kcal, fat from lard with 45% kcal); T-I and T-II group received 20 $\mu$ l and 40 $\mu$ l crude oil /100 g body weight / day by gavage along with high fat diet. To evaluate the antiobesity effects of fish oil, we investigated the effect of P. paradiseus oil on the WAT weight, blood glucose, and insulin levels on BALB-C high fat diet induces obese mice. **Result:** The physicochemical properties of P. paradiseus fish oil indicate that the oil is edible for human consumption. When the fish oil was applied to high-fat diet-induced obese mice, it showed significant reduction of body weight, BMI, and serum lipid profiles compared to the high-fat diet induced obese control group. The levels of obesity and inflammatory related adipocytokines were moderately reduced in fish oil treated high-fat diet-induced obese mice than control obese mice. **Conclusion:** In conclusion, the Topse fish oil was enriched with essential fatty acids and it could be used as an anti-obese food supplement.

**Keywords:** Obesity, fish, lipid profiles, adipokines

OP-2023-0007

**Abstract Title: The Metabolic Matrix: Re-formulation of ultra-processed foods to nourish the gut and safeguard the body's organs such as liver and Brain**

**Dr. Archana Ainapure**, Director, Symbiosis Skills and Professional University, Pune, [archanaainapure41@gmail.com](mailto:archanaainapure41@gmail.com)

**Background:** It has been proven that ultra-processed food is a metabolic disruptor that increases adiposity, lowers mitochondrial efficiency, promotes insulin resistance, alters growth, and increases morbidity and death in humans. Companies that sell consumer packaged goods (CPG) are starting to realize the negative effects of the food they sell, and they have started using substitution techniques to reduce salt, sugar, and fat. However, the negative effects of ultra-processed meals are much more complex than any one factor could possibly be, and they are not lessened by such straightforward alternatives. **Methods:** The researcher has collaborated with Bahrain Dairy companies in the Middle East to conduct a thorough scientific analysis of their entire commercial food and beverage portfolio. To determine the specific nature of each product's contents, an analysis of the macronutrients, micronutrients, additives, and toxins included in each of their products, as well as how processing affects health, was conducted. The author established a Scientific Advisory Team (SAT) and created a three-layered Metabolic Matrix based on three scientific tenets: (1) safeguard the liver (2) nourish the gut and (3) support the brain. **Result:** The Metabolic Matrix classifies each product and offers metrics, criteria, and suggestions for formulation or modification. Real-time consultation with the Executive and Operations teams was vital to see these procedures through to fruition. This scientific exercise has enabled the company to lay the groundwork for improving the health, well-being, and sustainability of their entire product line while maintaining flavor, economic, and fiscal viability. **Conclusion:** This process is easily transferrable, and the researcher is sharing this effort and its approaches as a proof of concept. The key aim of this work is not only to make ultra-processed food healthier but also to urge

other food companies to implement similar analysis and reformulation of their product lines to improve the metabolic health and well-being of consumers worldwide.

**OP-2023-0008**

**Abstract Title: Pearl Millet: A healthy nutriceal**

**Mr. Ayantika Bhakta**, Student, Maulana Abul Kalam Azad University of Technology WB, [ayantikabhakta2000@gmail.com](mailto:ayantikabhakta2000@gmail.com); Dr. Sonia Kundu, Assistant Professor & Head, Maulana Abul Kalam Azad University of Technology

**Background:** Pearl millet (*Pennisetum glaucum*) is a resilient and nutritious cereal crop that plays a vital role in food security, particularly in arid and semi-arid regions. This scientific study highlights the health benefits associated with pearl millet consumption and outlines potential avenues for improvement through research. Pearl millet is a rich source of essential nutrients, including carbohydrates, dietary fiber, protein, vitamins (especially B-complex vitamins), and minerals (such as iron and magnesium). Its gluten-free nature makes it suitable for individuals with celiac disease and those seeking alternative grains. Additionally, pearl millet contains bioactive compounds like phenolic antioxidants, phytosterols, and flavonoids, which have been linked to various health benefits, including antioxidant, anti-inflammatory, and anti-diabetic properties. **Result:** Research can focus on enhancing pearl millet's nutritional profile through genetic breeding programs aimed at increasing its micronutrient content, protein quality, and resistance to biotic and abiotic stressors. Furthermore, exploring innovative processing techniques can help preserve its nutrient content while improving its palatability and versatility in food preparation. Pearl millet's health benefits extend to its potential role in managing diet-related chronic diseases, such as diabetes and obesity. Investigating its impact on glycemic control and satiety can provide valuable insights for developing functional foods and dietary recommendations. Furthermore, expanding consumer awareness and market demand for pearl millet-based products can create economic opportunities for farmers and agribusinesses, thereby contributing to rural development. **Conclusion:** Pearl millet is a nutrient-rich cereal with significant health benefits. Through research, its nutritional content, processing methods and cultivation practices can be improved to further enhance its role in promoting food security, nutrition, and sustainable agriculture, ultimately benefiting both consumers and producers.

**Keywords:** Pearl millet, Diabetes, Obesity, Antioxidant

**OP-2023-0014**

**Abstract Title: Probiotication of Heiyai fruit Juice by *Limosilactobacillus fermentum* strain BTFSNMs**

**Babina Chanu Khomdram**, PhD Scholar, Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore, [babinachanukhohmdram242@gmail.com](mailto:babinachanukhohmdram242@gmail.com); Dr. A Thirumani Devi, Professor, Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore; Dr. R Ragunathan, Director, Centre for Bioscience & Nanoscience Research, Coimbatore

**Background:** Growing lactic acid bacteria in fruit juices for health benefits and increasing nutritional and sensory qualities is becoming more popular in recent years. Consumer desire for non-dairy food products has increased in recent years, particularly among vegan and lactose intolerant people. The potential health benefits of probiotics have been illustrated by many studies. However, most functional foods containing probiotics are from dairy sources. **Methods:** This research was undertaken to determine the suitability of underutilized fruit HEIYAI or *Elaeagnus conferta* from Manipur as a raw material for production of probiotic by a novel lactic acid bacteria *Limosilactobacillus fermentum* BTFSN. We formulated 3 juice variations of different sucrose concentrations i.e., 0% ,3% and 6% and the probiotic strain were added to reach a concentration of 10<sup>9</sup> CFU/ml. Different methods were taken to analyze the suitability and acceptability of the juice i.e., pH, Total Acid, monosaccharides analysis using HPLC method, viable cell count and a sensory evaluation using hedonic scale. **Result:** Strain BTFSN was shown to be able to survive well in fruit juices. This ability was signified by a drop in fruit sugar, pH decreases and increase acidity. The optimal fermentation time was 24 hours, with a viable cell count of 10<sup>10</sup> CFU/ml, pH 3.77, and total acid of 0.33%. Although the addition of sucrose at 0%, 3%, and 6%

showed that different sucrose concentrations were statistically insignificant to the viable cell count, pH, and total acid, the sample with a 6% sucrose level was the most preferred by the panelists hence, deemed as the best formulation. Furthermore, the optimal formulation sample was stored at 4°C for 30 days, and the result indicated that the viable cell count did not present a significant difference. Lactobacillus viability was found to remain well above 8 log CFU/ml for four weeks. Overall acceptability of probiotic heiyai beverage was 8.49. **Conclusion:** This, in conclusion, shows Limosilactobacillus fermentum BTFSN poses good probiotic properties and heiyai fruit juice is suitable as a medium of delivery for probiotic and as a healthy beverage to promote better health and nutrition, especially for those who are allergic or intolerant to products made from milk

**Keywords:** Fruit. Probiotics. Fermentation. Limosilactobacillus Fermentum. Heiyai

#### OP-2023-0018

**Abstract Title: Evaluation of major bioactive compounds and antioxidant activity of wild rice (Zizania latifolia) and its value-added cookies**

**Dr. OKRAM ABEMSANA DEVI DEVI**, Lecturer, Education, Imphal; [okramabemsana@gmail.com](mailto:okramabemsana@gmail.com); Dr. Mridula Saikia Barooah, Professor; Dr. Mamoni Das, Professor; Dr. Manashi Das Purukayastha, Assistant Professor; Dr. Premila Devi, Assistant Professor, Assam Agricultural University, Jorhat

**Background:** Wild rice (*Zizania latifolia*), an abundant underutilised aquatic cereal grain in Manipur, has attracted attention due to its bioactive compositions and antioxidant qualities. **Methods:** The objectives of the study were to quantify the major bioactive compounds and antioxidant capacity using three assays, i.e., DPPH, FRAP, and CUPRAC. Five different types of value-added cookies incorporating *Zizania latifolia* rhizome powdered (ZLP), including control (100% wheat flour), ST1 (85WF:5ZLP:SF10), ST2 (80WF:10ZLP:SF10), ST3 (75WF:15ZLP:10SF), and ST4 (70WF:20ZLP:10SF), were also formulated to carry out the nutritional value and antioxidant activity. **Result:** The rhizome extract of *Zizania latifolia* showed significant antioxidant scavenging activity of DPPH ( $82.36 \pm 0.12 \mu\text{mol TE/g}$ ), FRAP ( $68.65 \pm 0.02 \mu\text{mol TE/g}$ ), and CUPRAC ( $75.77 \pm 0.06 \mu\text{mol TE/g}$ ), respectively, due to the strong bioactive compositions of phenol, flavonoids, anthocyanins, terpinoid, protein, etc. The total antioxidant content and nutritional compositions of value-added cookies incorporating *Zizania latifolia* rhizome powdered (ZLP) were shown to be increased in all treatments when compared to the control sample, with ST4 (70WF: 20ZLP: 10SF) having the greatest levels. **Conclusion:** Thus, *Zizania latifolia* powder (ZLP)-infused value-added cookies can therefore be utilised as functional or nutraceutical food products as well as dietary supplements. **Keywords:** Bioactive compounds, antioxidant, wild rice, value-added cookies.

#### OP-2023-0020

**Abstract Title: Potential of Millets as Nutri-cereal: an overview**

**Ms. Satakshi Mishra**, Ph.D Scholar, Institute of Medical Sciences, BHU, Varanasi, [shatakshi.ald12@gmail.com](mailto:shatakshi.ald12@gmail.com); Dr. Rashmi Gupta, Associate Professor, Institute of Medical Sciences BHU, Varanasi, Varanasi

**Background:** In the present scenario with changing of food habits, escalating population and due to this unrestricted use of natural resources, all these things reducing the resources to provide nutritious food to all. Natural food resources are very fast depleting and it need to explore new alternative for nutritious food. In world beside staple rice (*Oryza sativa*) and wheat (*Triticumaestivum*) many other options are available there which are underutilized crops. One of the major underutilized crops with nutri-cereal properties is Millets. Having great potential to replace staple crops millets are highly nutritive, gluten-free, non acid forming crops. It is known that millets are highly nutritive, their consumption is still very confined to traditional uses and poor population due to lack of awareness of its nutritional values. Millets became more outmoded due to inconvenience of preparation, lack of food subsidies and processing technologies. Millets called nutri-cereal because it is rich in carbohydrates, energy, dietary fibres, essential fatty acids, proteins, vitamin-B and minerals such as iron, calcium, magnesium, zinc and potassium which helps to prevent from post- translational diseases such as cancer, diabetes, celiac disease, and cardiovascular disease etc. Millets helps in controlling blood sugar

level, blood pressure and thyroid still consumption is limited. Millets are sustainable drought-resistant and capable of surviving a wide range of climate conditions. Despite of numerous health benefits and agro-economic potential, millets have lost their popularity due to coarse nature and underutilized in developed countries. **Methods:** Here I have reviewed millets for their nutri-cereal quality, more than 50 research articles has studied. **Result:** People should adopt millets in their platter because food-scientist and nutritionists are characterizing and valorizing millets to enhance their use for food due to its amazing health benefits, sustainability to any weather conditions and agro-economic potential. **Conclusion:** Now a day's millets with combination of staple food crops develop food alternative which has become emerging area for food industries. Consumption of millets can help to foster immunity and health of malnourished children and adolescent and thus it will provide strength to fight against malnutrition and it is also beneficial in many diseases above mentioned.

**Keywords:** nutri-cereals, malnutrition

#### OP 2023-0022

##### **Abstract Title: A STUDY ON NUTRIENT COMPOSITION AND ANTI OXIDANT PROPERTIES OF INDIGENOUS WILD EDIBLE FRONDS OF DIPLAZIUM ESCULENTUM**

**Ms. Pooja Ambati**, Senior Research Fellow, Andhra University, Visakhapatnam, [poojaambati186@gmail.com](mailto:poojaambati186@gmail.com); Dr. Rajeswari Maddali, Assistant Professor; Dr. Lakshmi Velaga, Associate Professor; Ms. Sireesha Senapathi, Young Professional, Andhra University, Visakhapatnam

**Background:** Tribal communities are highly vulnerable to food insecurity and malnutrition due to geographical isolation, illiteracy, lack of access to sufficient nutritious food and other socio-cultural factors. A plethora of leafy vegetables are found and traditionally eaten on seasonal basis by local people. However, they are unaware of the nutritional and medicinal properties of those foods. The objective of the current study is to find out the nutrient composition and antioxidant potential of *Diplazium esculentum* traditionally used by the indigenous people of Araku valley region of Andhra Pradesh. **Methods:** Wild edible leaves of *Diplazium esculentum* were collected from the study area. The sample was deposited for identification and authenticity (Voucher No. AUV 25510) by the experts of the Department of Botany, Andhra University, Visakhapatnam. Collected plant material was thoroughly washed, shade dried, grounded well into a fine powder and stored in air tight containers at room temperature. Proximate composition, minerals and vitamin C content was analysed using standard protocols. Anti-oxidant potential was evaluated by the methods such as 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging effect, metal chelating activity, reducing power and total phenolic content (TPC). **Result:** Results obtained from proximate analysis revealed that the moisture, ash, protein, fat and fiber content were  $71.2 \pm 0.05$ ,  $6.6 \pm 1.04$ ,  $9.87 \pm 0.02$ ,  $4.9 \pm 0.1$  and  $4.6 \pm 1.03$  respectively per 100g of dry sample. Sodium and potassium contents were found to be  $40.3 \pm 0.75$ mg and  $2240 \pm 0.72$  mg respectively per 100g of dry sample. Iron, calcium and phosphorous content was  $62.4 \pm 0.5$ mg,  $1297 \pm 0.91$ mg and  $32.5 \pm 0.3$ mg respectively per 100g of dry sample. The vitamin C content of the sample was  $21.87 \pm 0.64$  mg/100g. The IC<sub>50</sub> values of plant extract are 0.50 and 23.47 mg/ml for DPPH and metal chelating activity respectively. The reducing power of the extracts of the plants increased with increasing concentration. The TPC estimated was found to be  $55.97 \pm 0.13$  mg gallic acid equivalents per 100g of plant material. **Conclusion:** It is concluded from the study that *Diplazium esculentum* can be promoted as a significant source of nutritional and anti-oxidant food supplement. Educating the local people regarding the sustainable utilization of this plant will help in improving the nutritional status of the community. **Keywords:** Food insecurity, Indigenous, anti-oxidant, IC<sub>50</sub>

#### OP-2023-0031

##### **Abstract Title: Characterisation of Ergocalciferol and bioactive compounds in sundried finger millet (*Eleusine coracana*) and Oyster mushroom (*Pleurotus ostreatus*): A comparative study**

**Ms. NONGMAITHEM BABITA DEVI**, Research Scholar, Department of Food Science and N, Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore [beitanong@gmail.com](mailto:beitanong@gmail.com); Prof. Chinnappan A. Kalpana, Professor, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore

**Background:** Vitamin D deficiency is widespread globally and it is essential to promote the use of vitamin D rich food sources wisely. Finger millet is a calcium rich nutriceal which contains high amounts of vitamins, dietary fibers, minerals and phenolic compounds and is also rich in ergocalciferol. Oyster mushrooms are rich in ergosterol (precursor of vitamin D2) which is converted into ergocalciferol (vitamin D2) using natural or artificial ultraviolet rays. The main objectives of the study are to quantify vitamin D2 from sundry finger millet and oyster mushroom and to identify other bioactive compounds.

**Methods:** Vitamin D2 was extracted from sun dried and powdered samples: finger millet (*Eleusine coracana*) and oyster mushroom (*Pleurotus ostreatus*) using ethanol by Ultrasonic Assisted Extraction (UAE). The dried contents after vaporization, were diluted with the same solvent and investigated vitamin D2 by High Performance Liquid Chromatography (HPLC) using vitamin D2 standard. Bioactive compounds were identified using Fourier Transform Infrared (FTIR) spectroscopy. **Result:** The study revealed that the vitamin D2 content of finger millet was almost equivalent with that of oyster mushrooms. But loss of vitamin D2 was observed in both samples after purification. **Conclusion:** Hence, the study concluded that finger millet and oyster mushroom powdered can be incorporated to food items or to enrich nutrient contents of foods without further purification and a prospective application of finger millet and oyster mushroom to overcome vitamin D deficiency.

**Keywords:** finger millet, mushroom, ergocalciferol, nutriceal

OP-2023-0033

**Abstract Title: DEVELOPMENT AND EVALUATION OF NUTRIBAR USING FUNCTIONAL INGREDIENTS**

**Ms. Syeda Misba Mahmood Rahiman**, Student, Bishop Cotton Women's Christian College, Bangalore; [syedamisba@hotmail.com](mailto:syedamisba@hotmail.com); Dr. Mary Jenefer Sharmila. P, Professor, Bishop Cotton Women's Christian College, Bangalore

**Background:** The primary focus of this study was utilization of high waste ingredients like date seeds, a high waste product despite its dense nutrient content and functional properties. Additionally, other functional ingredients like sweet potato powder, watermelon seeds powder, and pumpkin seeds were incorporated to enhance the nutritional profile of the NutriBar. The aim was to create a nutrient-rich snack that could serve as a replacement for less nutritious options. The development of the NutriBar was motivated by the goal of providing a snack that could contribute to daily nutritional requirements, offering essential nutrients such as energy, protein, vitamins, minerals, and fiber. **Methods:** Its preparation method included sun drying, baking/roasting, grinding into powders of date seeds, sweet potato and watermelon seeds. It was further mixed with ghee, jaggery and kept for setting in a Mould, after 2 hours it was stored in airtight container. To ensure its acceptability, a panel of 40 semi-trained panelist evaluated 3 variations of NutriBar and assessed their sensory attributes, including appearance, texture, colour, aroma, taste, and overall acceptability, using a 9-point hedonic scale. Through calculating the average mean of overall acceptability, the best scored NutriBar was chosen. An attractive and suitable packaging and labelling was designed and developed for the NutriBar. The packaging consists of Flexible Plastic Wrappers, which is lightweight, cost-effective, and offer good barrier properties to protect the bars from moisture and air. **Result:** The statistical analysis showed that there was a significant difference in texture and colour between the three variations but there wasn't a significant difference in appearance, taste, aroma, and overall acceptability even when the proportion of date seeds and sweet potatoes was increased from 10g to 20g. This means that the NutriBar retained its taste even after adding more of nutritious ingredients. **Conclusion:** Through sensory evaluation, nutritional analysis, and shelf-life testing, NutriBar emerged as a promising ready-to-eat snack, addressing both the utilization of food waste and the demand for healthier snacking alternatives. Its balanced nutritional content positions it as a convenient and beneficial option for individuals of all age groups, promoting overall health and well-being with its antioxidant-rich properties.

**Keywords:** NutriBar, Functional ingredients, Sensory, Shelf-life



OP-2023-0035

**Abstract Title: A Study on Oyster Mushroom Cultivated on Different Substrates and their Approach to Human Health**

**Ms. Dipika Das**, Assistant Professor, Prabhat Kumar College, Contai, [dipikadas1985@gmail.com](mailto:dipikadas1985@gmail.com); Dr. Aveek Samanta, Assistant Professor, Prabhat Kumar College, Contai; Dr. Goutam Dutta, Assistant Professor, Prabhat Kumar College, Contai

**Background:** Unavailability of paddy straw due to incineration is a problem to cultivate mushroom. To get more nutritious mushroom with other physiological benefits, non-conventional bed has been used for cultivation. In the present study, paddy straw (PS), banana leaf midrib (BL), sugarcane trash (SCT) and some medicinal plant (neem, basak and gurmar) enriched bed (MDPB) have been used for cultivation of *Pleurotus sajor-caju*. The biological efficacy (BE), physical, functional and nutritional characters of mushroom have been studied. TLC separation has been done to identify the possible insertion of bio-compounds from MDPB to mushroom. **Methods:** The BL and SCT were prepared as bed materials by repeatable wash-dry process. For MDPB, homogenized plant leaves were used. Some physical (grad, radius of gill, length of pileus), functional (moisture content, water solubility and absorption, swelling capacity, dehydration, rehydration and shrinkage ratio, rehydration co-efficient, bulk and true density and porosity) and nutritional (total carbohydrate, protein and fat, crude fiber, Vit A, C, B2, B3, B5, Na, K, Fe, P, Se) characters of cultivated mushroom has been measured. Hexane: Ethyl Acetate: Acetic Acid = 6:4:0.1 are used as solvent in TLC. For statistical analysis, PS has been considered as control. **Result:** Among all, the BL bed shows the highest BE. The maximum beneficial physical characters have been found in BL mushroom. Moisture content, water solubility, water absorption, swelling capacity have been found maximum in STC mushroom. Among the MDPB mushrooms, basak enriched mushrooms show the highest dehydration, rehydration and shrinkage ratio, and rehydration co-efficient. The significantly low carbohydrate with high protein content mushroom has been found in all the non-conventional bed mushroom. Vit C, B2, Na, P and Zn was significantly higher in BL, STC and three MDPB mushroom. But the Fe and Se shows the opposite trends. In TLC, extra bands in MDPB mushrooms have been found. **Conclusion:** BL may be taken into account as better non-conventional bed with environmental remediation. MDPB mushrooms can be the better choice for its nutritional benefit with possibility of getting bioactive compounds from medicinal plants which may have physiological benefits. Further study is needed to specify those bioactive compounds present in MDPB mushrooms.

**Keywords:** Mushroom, Nonconventional-bed, Nutrients, TLC

# FREE COMMUNICATIONS - POSTER PRESENTATIONS

## SESSION: 3

26<sup>th</sup> November 2023

9:30am – 11:00am

### • FOOD SCIENCE NUTRITION-2

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
<b>FOOD SCIENCE NUTRITION-2</b>						
1.	OP-2023-0037	Ms.Parul Yadav	KMC Language University, Lucknow, Uttar Pradesh	Lucknow	parul842y@gmail.com	Determination the ORAC (Oxygen Radical Absorbance Capacity) value and proximate analysis of Quinoa and Ragi Seeds: A super Millets
2.	OP-2023-0039	Dr.Prerana Shere	MIT School of food technology	Pune	sherepd@gmail.com	Effect of white wheat flour replacement by moist steamed millets malt on Starch Hydrolysis and Estimated Glycaemic Index of Pizza Base
3.	OP-2023-0041	Ms.LAILA BANU J	JAMAL MOHAMED COLLEGE	TIRUCHIR APPALLI	lailabanuj@gmail.com	INCORPORATION OF TRADITIONAL RICE (KARUPPU KAVUNI) AS PRO AND PRE BIOTIC RECIPES IN OUR DAILY DIET
4.	OP-2023-0045	Ms.SWARNI KA BANSAL	DR. RAJENDRA PRASAD CENTRAL AGRICULTURAL UNIVERSITY	Dehradun	bansalswarnika@gmail.com	SPAGHETTI INCORPORATED WITH BROCCOLI WASTE POWDER: BEST OUT OF WASTE
5.	OP-2023-0048	Dr.Nisha	Malla Reddy University, Hyderabad	Hyderabad	nishaduttajsr@gmail.com	DRUMSTICK LEAVES: A POTENTIAL SOURCE OF NUTRIENTS, ANTIOXIDANTS AND PRESERVATIVE FOR READY TO EAT FOODS
6.	OP-2023-0051	Ms.DEEVEN A JEMIMA	Women's Chrisitan College	Chennai	deevenajemi@gmail.com	ANTIOXIDANT AND NUTRITIONAL ANALYSIS OF A PINEAPPLE PEEL AND COCONUT JAGGERY FEMENTED BEVERAGE
7.	OP-2023-0053	Ms.SUMI M S	ICMR - NATIONAL INSTITUTE OF NUTRITION	HYDERABAD	sumims24@gmail.com	A study on the proximate composition of newly cultivated varieties and local varieties of green gram ( <i>Vigna radiata</i> (L.) Wilczek)
8.	OP-2023-0054	Ms.RIDDHI VERMA	Professor Jayashankar Telangana State Agricultural	HYDERABAD	riddhi.verma101299@gmail.com	ENRICHMENT OF PROSO COOKIES WITH OYSTER MUSHROOM: A HEALTHY WAY OF SNACKING
9.	OP-2023-0057	Ms.Samudrala Anuvada Sree	GITAM (Deemed to be University)	Visakhapatnam	anuvada2092@gmail.com	Evaluation of Metabolite profiling and In vitro analysis of ethanolic leaf extract of <i>Costus pictus</i>
10.	OP-2023-0062	Ms.Kaila Nova Henna Jemimah	CSIR- CFTRI	Mysore	njems768@gmail.com	Advancing Novel Meat Alternatives- Formulating Combinations of Legumes and Tender Jackfruit
11.	OP-2023-0064	Dr.Arrivukkarasan S	Annamalai University	Chidambaram	arrivu79dr@gmail.com	OPTIMIZATION AND EXTENSION OF SHELF-LIFE OF CHAPATI USING SELECTED NATURAL



S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
						PLANT EXTRACTS AS PRESERVATIVES
12.	OP-2023-0071	Ms.Tulasi Gupta	BHU,VARANASI	VARANASI	tulasigupta2@gmail.com	NUTRICEREALS, HEALTH AND DISEASES-UNDER SINGLE UMBRELLA
13.	OP-2023-0076	Dr.K. Srilekha	PJTSAU	Hyderabad	srilekhafsn@gmail.com	Enzymatic method of resistant starch development in browntop millet and its impact on carbohydrate profile
14.	OP-2023-0079	Dr.T. Kamalaja	PJTSAU	Hyderabad	kamalaja2038@gmail.com	Resistant starch and amylose content of PJTSAU university rice fine grain varieties
15.	OP-2023-0081	Ms.Kamatchi Alias Rajalechumi A	Pondicherry University	Pondicherry	kamspu2019@gmail.com	Characterization of the cooking, antioxidant, digestibility, and in vivo glycaemic properties of pigmented and non-pigmented traditional rice landraces
16.	OP-2023-0082	Ms.ANJALI K U	PONDICHERRY UNIVERSITY	PUDUCHERRY	anjaliunnikrishna@gmail.com	PRODUCTION AND CHARACTERISATION OF THE TYPE III RESISTANT STARCH BY REPEATED AUTOCLAVING METHOD FROM TRADITIONAL RICE LANDRACES
17.	OP-2023-0085	Ms.Mrunmayee Joglekar		Nagpur	mrnmayee.paranjape@gmail.com	Assessment of Organically Grown and Conventionally Available Cereals, Millets
18.	OP-2023-0087	Ms.Pratiksha Mehta	Symbiosis Institute of Health Sciences, Symbiosis	Pune	pratikshamehta08@gmail.com	Hemp Milk Innovation as a Nutritious Beverage: Formulation and Flavor Exploration for India's Palate
19.	OP-2023-0088	Ms.ALEENA GURRALA	yuvraja's College(Autonomous), University of Mysore	mysuru	aleenagurralla5@gmail.com	Development of Punugulu by partial replacement of rice with the Browntop Millet ( Brachiaria ramosa)
20.	OP-2023-0089	Ms.Afeefa Naveed	Yuvarajas college, University of Mysore	Mysuru	afeefan45@gmail.com	Development of waffles with incorporation of Barnyard (Echinochloa frumentacea) and Kodo Millet (Paspalum scrobiculatum)
21.	OP-2023-0090	Ms.SHIVANI KUMARI	Punjab Agricultural University	Ludhiana	shivani-1982007@pau.edu	Exploring the Physicochemical and Bioactive Properties of Hull-Less Pumpkin Seed-Enriched Pasta for Enhanced Nutritional Value
22.	OP-2023-0093	Ms.Gagana B P	Department of Food Science & Nutrition, Amrita Vishwa Vidhyapeetham	Coimbatore	gaganaprabhu438@gmail.com	STANDARDISATION OF GRAPESEED INCORPORATED MILLET DOSA
23.	OP-2023-0094	Ms.B Bhavana	Yuvaraja's College Mysore Autonomous	Mysore	bhavanabhami321@gmail.com	FORMULATION AND EVALUATION OF PLANT DRINK MIX UTILIZING GUAVA LEAVES (Psidium guajava L. ) AND KIWI FRUIT(Actinidia deliciosa)
24.	OP-2023-0098	Ms.Varsha S	Yuvaraja's College	Mysuru	varshashettymys@gmail.com	Development and evaluationof Savory Vegetable Cake using Foxtail Millet rava (Setaria italica)

S. No	Abstract ID	Presenter name	Affiliation	City	Email	Title of presentation
			(Autonomous) Mysuru			
25.	OP-2023-0100	Ms.Rakshitha S	Yuvaraja's college, Mysuru		kalyanigowda111@gmail.com	DEVELOPMENT OF VALUE-ADDED PRODUCT FROM CURRY LEAVES POWDER
26.	OP-2023-0102	Ms.RAMYASI VASELVI M	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	manorani87@gmail.com	Assessment of Farming Situations and Life Style Practices of Muthuvar Tribes of Theni District, Tamil Nadu
27.	OP-2023-0104	Ms.Swathika	PONDICHERRY UNIVERSITY	PUDUCHERRY	swathikasky07@gmail.com	Characterization of Physicochemical, Functional, and Antioxidant Properties of Locally Grown Pigmented Rice Varieties
28.	OP-2023-0111	Ms.zahara alishams	MPUAT	Udaipur	zahara227@gmail.com	Effect of storage period on the physicochemical properties of an Inulin-fortified pearl-millet Rab
29.	OP-2023-0112	Ms.Ravneet Kaur	PUNJAB AGRICULTURAL UNIVERSITY	LUDHIANA	gillravneet624@gmail.com	Nutritional profiling and therapeutic potential of bee pollen as functional food
30.	OP-2023-0114	Ms.VINODHINI. J	Avinashilingam Institute for Home Science & Higher Education for Women	coimbatore	vinu.samskruthi@gmail.com	Finger millet based homemade soluble food folds
31.	OP-2023-0115	Ms.Apoorva D S	Yuvaraja's science college	Pandavapura	apoorvagowda208@gmail.com	DEVELOPMENT OF BROWN RAGI FLOUR (Eleusine coracana) BASED MUFFINS ENRICHED WITH OATS
32.	OP-2023-0116	Ms.Darshini K P	Yuvaraja's College (Autonomous) Mysuru	Mysuru	darshinikprakash@gmail.com	DEVELOPMENT OF MULTI MILLET KICHADI FROM KODO MILLET (paspalum scrobiculatum) AND BARNYARD MILLET (echinocloa frumentacea) AND EVALUTION OF IT NUTRIONAL QUALITY
33.	OP-2023-0118	Ms.D Bernice Ekhe	Punjab Agricultural University	Ludhiana	bernicedeember@gmail.com	Nutritional profiling and antioxidant potential of bee pollen metabiotic drink
34.	OP-2023-0119	Ms.Anusha N	Yuvaraja's college (autonomous) University of mysore	Mysore	anushanagaraj13@gmail.com	Development of Pathrode with the incorporation of Pearl Millet (Pennisetum glaucum)
35.	OP-2023-0120	Ms.Aaliya B	Pondicherry University	Puducherry	aaliyab2647@gmail.com	Effect of microwave treatment on the complexation of talipot starch with quercetin
36.	OP-2023-0122	Ms.Plachikkattu Parambil Akhila	Pondicherry University	Puducherry	akhilapp2018@gmail.com	In vitro digestibility, structural characteristics, and physicochemical properties of Hausa potato (Plectranthus rotundifolius) starch modified by annealing (ANN) after autoclave-retrogradation

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37.	OP-2023-0123	Ms.Vinutha C	Yuvaraja college Mysore	Mysore	vinutha.cmysore@gmail.com	Development of Pearl Millet (Pennisetum glaucum) based cookie enriched with dried fruits
38.	OP-2023-0124	Ms.Divya A C	Yuvaraja's College Mysore	Mysore	2001divya@gmail.com	Preparation of Multi-Millet Cake Pre-Mix to Reduce the Glycemic Load
39.	OP-2023-0126	Ms.Madhura A S	Yuvaraj college Mysore	Mysore	madhura305as@gmail.com	PROCESS OPTIMIZATION OF OSMODEHYDRATED MANGO-GINGER CANDY AND ITS NUTRITIONAL, FUNCTIONAL AND QUALITY EVALUATION (CRUCUMC AMADA)
40.	OP-2023-0128	Ms.Vedashree PK	Yuvaraja's college (Autonomous) mysuru	Hassan	vedashreepk2001@gmail.com	DEVELOPMENT OF PATOLIS FROM KODO MILLET (Paspalum scrobiculatum) AND EVALUATION OF ITS NUTRITIONAL QUALITY
41.	OP-2023-0133	Ms.Ms. Samreen Kazmi	Gitam University, Visakhapatnam, Andhra Pradesh	Vizag	samreenkazmimd@gmail.com	Silver nanoparticles elicited physiological and biochemical modifications in rice plants to control fluoride stress in Nalgonda region of Telangana
42.	OP-2023-0134	Dr.Shivalingsarj Desai	KLE Technological University, Hubballi.	Hubballi	desaisv@kletech.ac.in	Effect of Microbial Fermentation on Anti-Nutrients Composition, Sensory Description and Consumer Hedonic Perception of Nucchu Ambli- a Sorghum-based Traditional Fermented Food
43.	OP-2023-0136	Ms.JINASHREE H A JAIN	Yuvaraja's college mysuru Karnataka	Mysuru	jinashreeha3917@gmail.com	KODO MILLET AS FUNCTIONAL INGREDIENT IN DEVELOPMENT OF BESAN BARFI
44.	OP-2023-0137	Ms.SRI VARSHA K. V	Yuvaraja's college	Mysuru	srivarshakv701@gmail.com	DEVELOPMENT OF SORGHUM ROTI ENRICHED WITH OATS AND EVALUATING ITS NUTRITIONAL VALUE
45.	OP-2023-0146	Ms.bhoomika M S	Yuvaraja's college (autonomus) University of mysore	Mysore	bhoomishetty477@gmail.com	Development of Masala Roti from Barnyard Millet (Echinochloa esculenta)
46.	OP-2023-0160	Dr.SANTHOSH RANI.NANCHARI	National Institute of Nutrition	hyderabad	santhoshi.genetics1@gmail.com	Role of Ginger compounds in anti proliferative/anti cancer and anti angiogenesis mechanisms of breast cancer cell lines through 3-D culture approaches
47.	OP-2023-0164	Ms.D.Tinu	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	dtinucbe@gmail.com	Development and Evaluation of Plant Based Milk Alternatives for Sustainable Nutrition
48.	OP-2023-0166	Mr.Adarsh C A	Dos in food science and nutrition, university of Mysore	mysuru	adarshca100@gmail.com	NUTRIENT, ANTINUTRIENT PROFILE AND DIGESTIBILITY OF COMMERCIAL MILLET BASED BAKED PRODUCTS
49.	OP-2023-0167	Ms.B.M.Srushti	University of Mysore	Mysuru	srushtibm02@gmail.com	NUTRIENTS, ANTI-NUTRIENT PROFILE, PROTEIN DIGESTIBILITY IN

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						COMMERCIALY AVAILABLE MILLET-BASED INFANT FOODS
50.	OP-2023-0168	Ms.Chandana H V	Dos in food science and nutrition, University of Mysore	mysuru	sahityashreechandana@gmail.com	EFFECT OF SOAKING AND GERMINATION ON ANTINUTRIENTS AND ANTIOXIDANT PROFILE OF SELECTED MINOR MILLETS
51.	OP-2023-0170	Ms.ATHIRAM	Amrita Vishwa Vidyapeetham University	Coimbatore	m_athira@cb.students.amrita.edu	Comparison of Drying Characteristics of Tomatoes with Sustainable Different Drying Systems
52.	OP-2023-0171	Ms.J Swarna Lakshmi	ICMR- National Institute of Nutrition	Hyderabad	xlntswarna@gmail.com	Impact of cooked millet diet on haemoglobin and body composition among anemic women of reproductive age (17-22 years)
53.	OP-2023-0192	Mr.Mohammed Zain	DOS Food science and Nutrition, University of Mysore	Arsikere	mohammedzainask@gmail.com	A study on the nutritional composition and antioxidant properties of granola bar using germinated and malted finger millet .
54.	OP-2023-0193	Mr.Bhadram Kalyan Chekraverthy	JSS College of Pharmacy Ooty	Ooty	kalyan.b222@gmail.com	Simultaneous Estimation of Pro-vitamin A (Beta Carotene), Vitamin A (Retinol), and Anthocyanins (Peonidin and Cyanidin) in Biofortified Sweet Potato Varieties Using Liquid Chromatography and Mass Spec
55.	OP-2023-0199	Ms.Ananya Roy	West Bengal State University	Barasat North 24 Parganas	ananyaroy799@gmail.com	Studies on the physiochemical analysis and sensory quality of functional shrikhand prepared from Soyamilk
56.	OP-2023-0201	Ms.MALATHI.M	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	malathimahalingam20@gmail.com	Green Synthesis And Characterization Of Zinc Oxide Nanoparticles From Rosa Damascena
57.	OP-2023-0206	Ms.Preeti Deshmukh	FoodNest	Pune	preeti.a.deshmukh@gmail.com	Assessment of quality attributes and shelf life of machine processed malt versus traditionally prepared malt
58.	OP-2023-0208	Ms.Sudipa Dalui	NSHM Knowledge Campus, Durgapur	Durgapur	sudipadalui09@gmail.com	A Study on Preparation and Evaluation of Value Added Product of Giloy
59.	OP-2023-0214	Ms.DEEPTIMAYEE MAHAPATRA	Assam Agricultural University	Jorhat	deeptimayee mahapatra2@gmail.com	Phytochemical analysis of Trianthema portulacastrum Linn.( Puruni Saaga) a nutritious leafy vegetable of Odisha
60.	OP-2023-0215	Ms.Priyanka Bhattacharya	Assam Agricultural University	Jorhat	priyankabhattacharya9494@gmail.com	DETERMINATION OF DIETARY FIBRE PROPERTIES OF EXTRACTED DIETARY FIBRE FROM MUSA BULBASIANA COLLA (BHEEM KOL)
61.	OP-2023-0222	Ms.Shreyas Elma Mathew	ICMR - National Institute of Nutrition	Hyderabad	shreyaelma@gmail.com	Nutritional analysis of thirty-one varieties of chickpea (Cicer arietinum) developed through various breeding techniques for selected agronomic traits

<b>S. No</b>	<b>Abstract ID</b>	<b>Presenter name</b>	<b>Affiliation</b>	<b>City</b>	<b>Email</b>	<b>Title of presentation</b>
62.	OP-2023-0224	Ms.J. Mahalakshmi	The Standard Fireworks Rajaratnam College for Women	Sivakasi	mahalakshmi - nd@sfrcollege.edu.in	Development of Vegan cupcakes by incorporation of flaxseed gel and lady's finger gel and analyzing its sensory characteristics.
63.	OP-2023-0228	Dr.SAMJA SABU	St. Teresa's College (Autonomous)	Cochin	samsnutrition2018@gmail.com	Innovative Products with incorporation of Kodomillet and Jackfruit Seed Powder
64.	OP-2023-0232	Ms.Shifa. A	Avinashilingam Institute for Home Science & Higher Education for Women	Coimbatore	22pfn023@avinuity.ac.in	GREEN SYNTHESIS AND CHARACTERIZATION OF ZINC NANOPARTICLES USING PUNICA GRANATUM PEEL EXTRACT, PHYTOCHEMICAL SCREENING
65.	OP-2023-0234	Ms.Jeevitha N	Avinashilingam Institute for Home Science and Higher Education for women	Sivagangai	njeevitha2002@gmail.com	Synthesis and Characterization of Zinc Oxide Nanoparticles from Clitoria ternatea Flower Aqueous Extract and Testing its Potential as a Food Additive
66.	YS-2023-0011	Ms.Vishali V	Avinashilingam Institute for Home Science & Higher Education for Women	Tiruvannamalai	vishalilekha97@gmail.com	FORMULATION OF BLENDED OILS AND THEIR QUANTUM OF OIL ABSORPTION IN DIFFERENT COOKING METHODS
67.	YS-2023-0028	Ms.Bindu Bhajantri	Karnataka State Akkamahadevi Women's University	Vijayapura	bindurbhajantri@gmail.com	DEVELOPMENT AND ORGANOLEPTIC EVALUATION OF THE VALUEADDED PRODUCTS USING PROCESSED GARDENCRESS SEED POWDER (Lepidium sativum)

OP-2023-0037

**Abstract Title: Determination the ORAC (Oxygen Radical Absorbance Capacity) value and proximate analysis of Quinoa and Ragi Seeds: A super Millets**

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**Background:** Currently, a revolution has erupted, leading to numerous findings about the nutritional qualities of the food that we eat our diets. Antioxidant activity which promises to help in numerous maladies and common health as well. As far as ORAC (Oxygen Radical Absorbance Capacity) is concerned technique which measures the antioxidant capacity of different foods. Foods with the higher ORAC scores have greater antioxidant capacity and more neutralize harmful free radical. The purpose of present review paper is to describe the high ORAC value foods role in different health issues. The objective of my study is estimate the ORAC value of two millets named Quinoa (*Chenopodium quinoa* Willd.) and Ragi (*Eleusine coracana*). **Methods:** For estimation of Orac value all chemicals and reagents such as Trolox (6-Hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid), ascorbic acid, 2,2'-azobis(2-amidino-propane) dihydrochloride (AAPH), Fluorescein (FL) (Na salt) and Randomly Methylated  $\beta$ -Cyclodextrin, fluorescent microplate readers (FLUOstar Galaxy, and FLUOstar Optima, BMG Labtechnologies, Duraham, NC). Fluorescence filters with an excitation wavelength of 485 nm and an emission wavelength of 520 nm were used in both instruments. The 96 well FLUOTRAC 200 black microplates (part # 655076) were purchased from Greiner America, Inc (Lake Mary, FL), and 48 well microplates (Falcon No. 3230) were purchased from VWR (St. Louis, MO). Clear polystyrene 96-well plates (Nunc) were purchased from Fisher Scientific, Atlanta, GA, Trolox (500  $\mu$ M), etc. (Prior, et. Al, 2003). **Result:** To assess the anti-oxidant potential of quinoa powder, ORAC value is calculated as per reported method. ORAC value ( $\mu$ molASAg-1) for quinoa powder was found to be  $221521.25 \pm 1475$ . Ragi Flour is basically a powder food, obtained from Ragi grain contains high protein and mineral. Here, the ORAC value is also calculated for ragi powder. ORAC value ( $\mu$ molASAg-1) for ragi powder was found to be  $164579.46 \pm 2597$ . **Conclusion:** Several berries, fruits, nuts, seeds, vegetables and spices have been found high ORAC value. Spices and herbs are high ORAC score but millets also having good orac value and now days millets are good source of antioxidants. The higher ORAC value foods are reduced the chances of different health problems.

**Keywords:** Antioxidants, millets, free radicals.

OP-2023-0039

**Abstract Title: Effect of white wheat flour replacement by moist steamed millets malt on Starch Hydrolysis and Estimated Glycaemic Index of Pizza Base**

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**Background:** The bakery goods including leavened and unleavened are blamed for high Glycaemic Index (GI) and it's low fibre and minerals content. While millets are renowned for their high levels of fiber, minerals, and low GI. Thus, earnest attempts were undertaken with the goal of substituting millets, such as finger, foxtail, and barnyard millets, for white wheat flour (WWF), in the making of pizza base. **Methods:** Initially the millets were malted to increase the dietary fibre content followed by moist steaming (at 1210 C for 15 min) and cooling cycles (3 to 4) to develop the resistant starch (RS3) content in millets. Later, WWF was replaced with moist steamed millets (MSM) malt at a rate of 0 to 30%, and a sample containing 27% (FPB8) MSM malt was accepted based on sensory evaluation. The estimated glycaemic index (EGI) of pizza base and the effect of the FPB8 were further examined. **Result:** The results revealed that the starch hydrolysis was less in the fortified samples ( $61.89 \pm 0.32$  and  $78.10 \pm 0.10$ ) than control ( $64.66 \pm 0.57$  and  $83.80 \pm 0.52$ ) at 30 min and at 180 min respectively. The total starch content was too reduced from  $73.25 \pm 0.04\%$  (control) to  $71.35 \pm 0.15\%$  (FPB8) with a change in Rapidly Digestible Starch (RDS), Slowly Digestible Starch (SDS) and Resistant Starch (RS) from  $47.90 \pm 0.15\%$  (control) to  $44.27 \pm 0.12\%$  (FPB8),  $23.22 \pm 0.05\%$  (control) to  $24.24 \pm 0.03\%$  (FPB8) and from  $2.41 \pm 0.01\%$  (control) to  $4.34 \pm 0.01\%$  (FPB8) respectively. The Hydrolysis Index (HI) for control and FPB8 was measured at  $45.06 \pm 0.12$  and  $31.74 \pm 0.02$  respectively, demonstrating unmistakably how MSM malt

greatly affected the HI of pizza base. The EGI of pizza base exhibits a comparable effect to that of HI, with the results showing a significant impact on the EGI, with a drop from  $64.45 \pm 0.07$  (control) to  $57.14 \pm 0.01$  (FPB8). **Conclusion:** Therefore it is concluded that the replacement of WWF with MSM malt could be done to a certain level (27%) without much affecting sensorial qualities of pizza base. Moreover, it altered the starch fraction with an increase in SDS and RS content which had ultimate effect on HI and EGI in a positive manner.

**Keywords:** Millet, Glycaemic Index, pizza base

#### OP-2023-0041

##### **Abstract Title: INCORPORATION OF TRADITIONAL RICE (KARUPPU KAVUNI) AS PRO AND PRE BIOTIC RECIPES IN OUR DAILY DIET**

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**Background:** Black rice also known as Forbidden rice or “Karuppukavuniarisi” in Tamil Nadu is one of the traditional varieties of rice which recently became popular but unfortunately not included in our daily diet. It is rich in Anthocyanin, Antioxidants, Fibre, Polysaccharides, Protein, Vitamins and Minerals. It helps in weight loss, protect from conditions like Cancer, Alzheimer’s disease, Heart disease, lowers blood sugar levels, reduce inflammation etc. This rice can be eaten as fermented form to get its fullest nutrition. It acts as prebiotics that helps growth of gut microbiota. Fermenting the rice may also allow the growth of Lactobacillus, Bifidobacterium and many good bacteria which synthesis vitamin K, B complexes and many metabolites in our body. Overall this improves digestion and strengthens the immune system. This study aims to include Fermented rice recipes like Porridge, Kanji, Smoothie, Nabeedh. **Methods:** Black rice whole and flour, carrot, beetroot, dates, water, Banana, country sugar, blender, vessels, stove. **METHOD:** To prepare Porridge, soak rice for 6 – 8 hours, cook the rice with the soaked water in mud pot for 20 minutes. After rice gets cooked well keep the porridge in room temperature for 4 to 12 hours depending on environment. Before having the porridge add curd and salt. For smoothie, take Black rice flour and soak for 2 hours, cook the soaked rice flour in a pan for 15 minutes and allow it to cool. Blend banana, curd, Country sugar, soaked nuts and mix it with the cooked flour. For kanji, take soaked rice water add chopped carrot, beetroot, mustard seed powder, salt in glass bottle and allow it to ferment for 3 days. For nabeedh add dates to soaked rice water and allow it to ferment for 6 hours. **Result:** After sensory evaluation, Smoothie and Nabeedh taste very good. Porridge tastes bland but goes well with the sourness of soaked vegetables in Kanji. Soaked water in kanji tastes tangy and refreshing. **Conclusion:** Therefore the aim of this study is to include our traditional rice as pre & probiotic recipes in our daily diet. Hence all the recipes were easy to prepare with minimum ingredients and tastes good. **Keywords:** Karuppukavuni, Pre&Probiotics, Bifidobacterium, ferment.

#### OP-2023-0045

##### **Abstract Title: SPAGHETTI INCORPORATED WITH BROCCOLI WASTE POWDER: BEST OUT OF WASTE**

**Ms. SWARNIKA BANSAL**, Student, Dr. Rajendra Prasad, Central Agricultural University, Dehradun, [bansalswarnika@gmail.com](mailto:bansalswarnika@gmail.com); **Dr. Kumari Sunita**, Assistant cum Scientist; **Dr. Usha Singh**, Professor cum Chief Scientist, Dr. Rajendra Prasad, Central Agricultural University, Samstipur

**Background:** The research aimed to improve the nutritional value of spaghetti by incorporating waste parts such as stems and stalks of broccoli. Broccoli a cruciferous vegetable is rich in various nutrients like vitamins, minerals, secondary metabolites, and fibre, but about 70% of broccoli gets wasted as leaves and stalks. Cruciferous vegetables are known to be effective in the prevention of cancer, diabetes and many more health complications. Spaghetti (noodles) is a commodity that is highly liked by all individuals but is deficient in micronutrients and fibre. **Methods:** To overcome this problem first the waste parts of broccoli were turned into powder and then incorporated into refined wheat flour in different proportions that are 5, 10 and 15 percent by weight and coded as B1, B2 and B3 respectively. The amount of salt and oil were constant in all the formulations that is 0.5g and 0.5 ml respectively. The



spaghetti made was then evaluated against the Control made with 100 per cent refined wheat flour. **Result:** For organoleptic characteristics, the spaghetti incorporated with 10 per cent broccoli waste powder emerged to be superior, having an overall acceptability of extremely liked. The hardness (63.77N) and time taken to fracture (1.43 sec) were highest for spaghetti incorporated with 15% of broccoli waste powder(B3). B3 had the highest percentage of moisture (6.78g), protein (13.44g), ash (3.83g), fat (15g) and fibre (2.62g); whereas control had the highest amount of carbohydrate (80.24g) and energy (374kcal). Vitamin C and calcium were also highest in B3 amounting to 1.56mg and 22.27mg respectively. **Conclusion:** It can be concluded that broccoli waste powder made from the stalks and leaves of broccoli can be effectively turned into powdered form and then incorporated up to 10 per cent in spaghetti from organoleptic and physico-chemical standards.

**Keywords:** Broccoli, spaghetti, waste

#### OP-2023-0048

**Abstract Title: DRUMSTICK LEAVES: A POTENTIAL SOURCE OF NUTRIENTS, ANTIOXIDANTS AND PRESERVATIVE FOR READY TO EAT FOODS**

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**Background:** Drumstick plant is indigenous to many Asian countries, and is abundant and cheap food source and contains high amount of polyphenolic content. According to National Research Council there are 13 species of drumstick plant out of which only two species are indigenous to India namely, *Moringa concanensis* and *Moringa oleifera*. The former is found rarely, but the latter is found in foot hills of Himalayan region and in north western, eastern and southern parts of the country. Several researches have revealed the wide potentiality both nutritionally as well as the antioxidant capacity of various parts of drumsticks. **Methods:** In the present investigation nutritional and antioxidant potential of the drumstick leaves in selected ready to eat foods was assessed. Drumstick leaves were freshly plucked from the plants grown in horticultural farm of Rajasthan College of Agriculture, MPUAT, Udaipur. After several trials with various ready to eat products, at different levels viz. 5, 10, 15 and 20 per cent were added and ready to eat foods were formulated and standardized. **Result:** Sensory evaluation studies showed that the scores obtained by selected RTE food products prepared by adding dried drumstick leaves powder were liked by the panelists as well as nutritionally the value increased. DLP incorporated biscuits were found to be good source of nutrients. Drumstick leaves powder was highly effective as an antioxidant in reducing the per-oxidative changes and production of free fatty acids. Products were well accepted even by the end of storage period. **Conclusion:** The results of the present study concludes drumstick leaves, which is still in the category of underutilized, have great antioxidant and nutrient potential and can be easily used within organoleptically acceptable limits for the nutritionally enriching various ready to eat food products and help in combating several deficiency diseases.

**Keywords:** Drumstick leaves, antioxidants, preservative, RTEfoods

#### OP-2023-0051

**Abstract Title: ANTIOXIDANT AND NUTRITIONAL ANALYSIS OF A PINEAPPLE PEEL AND COCONUT JAGGERY FEMMENTED BEVERAGE**

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**Background:** Pineapple is an important crop in tropical and sub-tropical areas of the world and is an economically significant plant. Pineapple processing results in around 55% of waste, due to many conditions such as selection and removal of substrate and components that are not suitable for human consumption, rough handling of fruits and exposure to adverse environmental conditions during transportation and storage. Many efforts are being made to utilize this waste material obtained from fruit processing for further industrial processes such as fermentation and bioactive component extraction. **Methods:** This study is aimed at formulating a fermented beverage with Pineapple peels and coconut

jaggery as sweetener along with cloves and cinnamon for increased nutritional benefits and flavour. 500g of Pineapple peel, 250g of coconut jaggery, 100g of apple pieces, 1 stick cinnamon and 4 cloves were added to 1.5 litres of water. The beverage was fermented at 28°C for a period of 48 hours after which the beverage was filtered and used for further analysis of nutritional properties. **Result:** The pH of the formulated beverage was 3.45. The total carbohydrate value was 57.9 µg/ml, the total protein value was found to be 4.17 µg/ml, the fat percentage was 0.35% and the Vitamin C content was 1.79 µg/ml. The Brix value was found to be 10.8°Brix. The Titratable acidity was found to be 1.25 µg/ml. Coconut jaggery has been found to be categorized under medium GI sweeteners where as cane sugar is a high GI sweetener. Research shows the presence of phenolic antioxidants present in residual fruit pulp. DPPH and ABTS antioxidant assays showed a good percentage of inhibition. DPPH showed a better antioxidant activity among the two. **Conclusion:** This study showed that this fermented fruit beverage had good benefits nutritionally as a healthy beverage. However, more research is needed in optimizing fermented fruit-based beverages in terms of physicochemical parameters, microbial profile, and potential health benefits for them to serve as an alternate substitute for sugar-sweetened beverages.

**Keywords:** fermentation, pineapple, phytochemicals, nutrient content

#### OP-2023-0053

**Abstract Title: A study on the proximate composition of newly cultivated varieties and local varieties of green gram (*Vigna radiata* (L.) Wilczek)**

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**Background:** Legumes are the major staple food group consumed globally, next to cereals. Chickpea, cowpea, pigeon pea, green gram and black gram are the commonly consumed pulses in South Asia. Green gram is a rich source of protein, carbohydrates, dietary fibre and minerals. The objective of this current study is to quantitatively estimate the proximate composition of ten different newly cultivated varieties and three local varieties of green gram (*Vigna radiata* (L.) Wilczek). **Methods:** The seeds of ten newly cultivated varieties of green gram were obtained from Indian Institute of Pulses Research (IIPR), Kanpur and three local varieties were collected from local markets of Hyderabad. Moisture, ash, crude fibre and fat contents were assayed by the Association of the Official Analytical Chemists (AOAC, 2006) methods 934.01, 942.05, 962.09 and 920.39, respectively. Protein content (N X 6.25) was determined by the AOAC Kjeldahl method (984.13). Available carbohydrate was estimated by modified anthrone method. **Result:** Thirteen varieties of green gram were subjected to nutrient analysis. From the results, they contain 6.25 to 8.46% of moisture, 2.83 to 3.74% of ash, 2.19 to 3.08% of fat, 48.46 to 53.57% of carbohydrate, 22.87 to 27.76% of protein, 11.83 to 15.79% of dietary fibre. The newly cultivated varieties showed high protein and dietary fibre content. Hence, both types of varieties are nutritionally significant. **Conclusion:** Different newly cultivated as well as locally available varieties of green gram are analysed to quantify their proximate content. It was found that that, compared to the locally available varieties, the newly cultivated varieties of green gram contain high protein, dietary fiber and low carbohydrate content. However, both the varieties of green gram analysed are nutritionally significant and rich source of nutrients. Green gram is an affordable pulse as well as easily available throughout the year in any part of the country. Hence, it is suggested that, green gram can possibly a good choice to be a part of any of the daily meals of every individual.

**Keywords:** Greengram, *Vigna radiata*, Proximate composition

#### OP-2023-0054

**Abstract Title: Enrichment Of Proso Cookies with Oyster Mushroom: A Healthy Way of Snacking**

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**Background:** The growing population, prevalence of malnutrition and awareness among people for healthy lifestyle and aging is creating high global demand for the good quality protein rich ready-to-eat snacks. Therefore, in the present study proso millet and oyster mushrooms are brought together to develop protein enriched cookies. Proso millet is having highest protein content among all the underutilized minor millets whereas, oyster mushroom is also known for its good amount of protein. **Methods:** The proso millet was washed, soaked and dried in cabinet then milled into flour. The fresh oyster mushroom (*Pleurotus ostreatus*) was washed, sliced and dried in cabinet dryer to dry completely then ground into a fine powder and packed. The proso millet cookies were standardized with different proportion of proso millet flour. The basic ingredients of cookies were proso millet flour, refined wheat flour, fat, sugar, vanilla essence, baking soda and baking powder. The best accepted proso millet cookies were enriched with oyster mushroom powder with different proportions. The nutrient composition including proximates (protein, fat, crude fiber, ash and carbohydrate) and minerals like calcium, iron, zinc, copper and manganese were analyzed using standard AOAC methods. **Result:** The cookies were acceptable with 80% pre-treated proso millet flour were most acceptable with an acceptability index of 89.75% as compared to untreated proso millet flour cookies (50%). The natural bitter taste of proso millet was removed after pre-treatment making it acceptable at higher proportion (80%). Further, 12% enrichment with oyster mushroom powder was acceptable with acceptability index of 87.28%. The oyster mushroom enriched proso millet cookies had significantly higher energy (452 Kcal), protein (11.25 g), fat (21.45 g), crude fiber (5.09 g), ash (1.22 g), total carbohydrate (53.49 g), calcium (26.07 mg), iron (2.02 mg), manganese (0.95 mg), zinc (1.05 mg) and copper (0.41 mg) per 100 g of cookies. **Conclusion:** Therefore, the incorporation of oyster mushroom in millet cookies is a good way to enhance the protein content of cookies making them able to serve good amount of protein in a small serving. The underutilized proso millet and oyster mushrooms can be utilized as potential vegan protein sources to develop healthy snacks.

**Keywords:** Proso millet, oyster mushroom, Cookies

OP-2023-0057

**Abstract title: Evaluation of Metabolite Profiling and In Vitro Analysis of Ethanolic Leaf Extract of Costus Pictus**

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**Background:** *Costus pictus* is a rhizomatous perennial herb, usually known as "insulin plant" and traditionally used as a medicinal herb mainly for its numerous health beneficial activities. The uses of bioactive compounds isolated from *C. Pictus* in the food industry are limited due to their astringent and bitter taste, low thermal stability, poor aqueous solubility, and sensitivity to oxidation. So, the objective of this work is to evaluate the metabolite profiling, anti-microbial, in-vitro antioxidant, and anti-diabetic activities of the *C. Pictus* leaves extract to enhance their applications in food and pharmaceutical industries. **Methods:** In the present study we assessed the metabolite profile, alpha ( $\alpha$ )-amylase and  $\alpha$ -glucosidase inhibitory, antibacterial, in vitro antioxidant, and anti-inflammatory potential of the ethanolic extract *C. Pictus* leaves using different conventional techniques, including GC-MS, and LC-MS. **Result:** results of the GC-MS analysis demonstrated that the ethanolic extract consisted of fifteen bioactive compounds, mainly benzeneethanamine, amphetamine and its derivatives. LC-MS data shows that the ethanolic leaf extract contains phenolics, flavonoids and their derivatives (astragalins, kaempferol, isoquercetin, quercetin). The ethanolic leaf extract of *C. Pictus* showed high antioxidant,  $\alpha$ -glucosidase, and  $\alpha$ -amylase inhibitory activities. Results revealed that the *C. Pictus* leaf extract has higher antioxidant potential by inhibiting different free radicals including DPPH, superoxide, peroxide, etc. Significant antioxidant activity of ethanolic extract of *C. Pictus* was observed which might be due to the presence of phenols, flavonoids, saponins, tannins and terpenoids. The ethanolic leaf extract of *C. Pictus* exhibited antimicrobial activity against gram-positive and gram-negative pathogens. **Conclusion:** overall, the present findings suggested that the ethanolic leaf extract of *C. Pictus* is a promising natural bioactive agent, thus supporting use of these bioactive compounds for designing novel functional foods and nutra-pharmaceuticals.

**Keywords:** costus pictus; metabolite profile, antioxidants

**OP-2023-0062**

**Abstract Title: Advancing Novel Meat Alternatives- Formulating Combinations of Legumes and Tender Jackfruit**

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**Background:** Meat alternatives comprise a wide range of products, including plant-based options like tofu, tempeh, seitan, legume-based burgers, nut-based 'meats' and lab-grown meats. This study, conducted at the Department of Community Science, Kerala Agricultural University, focused on formulating, developing and standardizing meat analogs by incorporating pulse crops (Cowpea- CWP; Chickpea- CP) and tender jackfruit (TJ). **Methods:** The research also involved a comprehensive assessment of their sensory, nutritional and in vitro features of developed product. Throughout the study, the ratio of tender jackfruit and wheat gluten (WG) increased as treatments progressed, while pulse content decreased correspondingly with simultaneous addition of defatted soy flour (DSF) and oyster mushroom flour (OMF) in all treatments except for the control (100% pulse). Organoleptic evaluation was done using nine point hedonic scale and the scores were calculated using Kendall's coefficient (w) encompassing sensory attributes, including appearance, color, flavor, taste, texture and overall acceptability, identified treatments T5 (40% CP + 25% TJ + 25% wheat gluten + 5% DSF + 5% OMF) and T10 (50% pulse + 20% TJ + 20% wheat gluten + 5% DSF + 5% OMF) as the best for tender jackfruit-incorporated pulse analogues. Selected treatments and controls (100% pulse) underwent nutritional studies and in vitro analysis followed by statistical analysis of completely randomized design (CRD) and Duncan's multiple range test (DMRT). **Result:** Moisture content in the meat analogues ranged from 9.25% to 10.62%. Proximate analysis revealed total carbohydrate, protein, total fat, total ash and fiber content in the range of 32.46% to 53.29%, 20.79% to 38.03%, 1.20 to 5.60%, 2.92 to 5.66% and 2.23% to 7.30% per 100 grams, while mineral analysis demonstrated abundant calcium, phosphorous, sodium, potassium, magnesium, iron and zinc, with contents ranging from 80.25 to 94.67, 255.62 to 325.46, 23.52 to 74.43, 510.49 to 918.89, 110.58 to 178.02.69, 4.17 to 5.73 and 3.10 to 3.96 mg per 100 grams, respectively. In vitro mineral availability, including calcium, phosphorous, sodium, potassium, magnesium, iron and zinc, ranged from 34.43% to 81.47%, 47.62% to 71.43%, 57.66% to 77.20%, 62.75% to 82.85%, 54.40 to 62.84%, 52.40 to 69.49% and 55.89% to 63.14%, respectively, in the meat analogues. **Conclusion:** This study highlights the potential of pulse and tender jackfruit-incorporated meat analogues as nutritious and sustainable alternatives to traditional meat products, enriching the landscape of plant-based protein sources.

**Keywords:** Tenderjackfruit, meatanalogues, Chickpea, Cowpea, Invitroavailability

**OP-2023-0064**

**Abstract Title : Optimization And Extension of Shelf-Life of Chapati using Selected Natural Plant Extracts as Preservatives**

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**Background:** This study investigates the impact of ethanolic extracts from Curcuma longa, Camellia sinensis, and Acorus calamus on the viability of L929 cells. The findings reveal a significant decrease in cell viability after exposure to concentrated extracts of these plant materials, suggesting potential applications in food additives with modified compositions as preservatives. **Methods:** The research also evaluates the total phenolic and flavonoid content as well as the antioxidant activity of these

extracts, demonstrating their potential as sources of phenolics, flavonoids, and antioxidants for food preservation. Furthermore, the study assesses the scavenging activity of these extracts against free radicals and highlights the strong inhibition exhibited by *Curcuma longa* and *Camellia sinensis* extracts.

**Result:** the research focuses on optimizing the shelf-life of unleavened flat-baked chapati products made from whole wheat flour, a staple food in Asian communities. **Conclusion:** The study successfully extends the shelf-life of chapatis through optimization, achieving a range of 14 to 16 days. The statistical analysis confirms the model's fitness for describing the response, and specific quantities of turmeric, sweet flag, and tea powders are identified to maximize shelf-life to 20 days. These findings offer valuable insights into the potential applications of plant extracts in food preservation and the enhancement of staple food products.

**Keyword:** Turmeric, Sweet flag, Tea, Chapati

OP-2023-0071

**Abstract Title: Nutricereals, Health and Diseases-Under Single Umbrellams.**

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**Background:** Minor millets (Nutricereals) are the groups of small seeded cereals belonging to the family Poaceae. There are up to thirty-five species of grasses from 20 genera are well known as small millets. The most important cultivated species of small millets are finger millet, Foxtail, proso millet, barnyard millet, kodo millet and little millet. One of the minor millet namely barnyard millet is the richest source of calcium content, about 10 times that of rice or wheat. Minor millets are also full of micronutrients like Mg, Ca, Mn, tryptophan, phosphorous, fiber, B vitamins. These micronutrients act as antioxidants which are essential to human body. Additional specialty of minor millets is, they need very less water for their cultivation and can withstand severe climatic conditions. They are also considered to have therapeutic value against illnesses like diabetes, constipation etc. In present scenario faulty lifestyle are adopted which is actually a main causes of lifestyle related diseases. Minor millets also act as a prebiotic feeding micro-flora in our inner ecosystem. Minor millets will hydrate human colon to keep us from being constipated. The high levels of tryptophan in minor millet produce serotonin, which is calming to our moods. Magnesium in minor millet can help reduce the effects of migraines and heart attacks. Niacin (vitamin B3) in millet can help lower cholesterol. Minor millet consumption decreases Triglycerides and C-reactive protein, thereby preventing cardiovascular disease. All millet varieties show high antioxidant activity. Millet is gluten free and non allergenic. Millets contribute towards balanced diet, and can hence ensure nutritional security more easily through regular consumption along with keeping the environment safe as they are low input crops mostly adapted to marginal lands. Declining small millets cultivation has resulted in reduced availability of these nutritious grains to needy population and also the traditional consumers have gradually switched over to more easily available fine cereals due to Government policies. So the meaning of nutri cereals, health, and diseases in fewer than one umbrella is that it related to each other. **Methods:** In this study, all data have been carefully collected from Pubmed, Google scholar. We have been reviewed many research papers on nutricereals, health, diseases. This is help to improve digestive health and increased good health. We were Reviewed paper on diet, nutricereals uses health benefits and it's prospective of present scenario, healthy lifestyle approach of good health, to overcome the various types of diseases, and lifestyle diseases. **Result:** Millet cultivation areas were occupied by other crops indicated loss to India's food and farming systems (Dhan foundation). The nutritional superiorities of millets over others cereals are well known, its advantages are not being exploited on commercial scale. One of the limiting factors for diversified food uses of small millets is lack of appropriate processing technologies to prepare convenient ready to eat value added products. Therefore, there is an urgent need for Indian policy makers to refocus their attention towards millet farming systems and enact policies that create an enabling environment for millet farmers. Millets are one of the oldest foods known to humans and possibly the first cereal grain to be used for domestic purposes. It is a short duration crop which requires limited amount of water for cultivation. Millets are best environment friendly crop besides as it is rich in effective nutrients it is been called as best nutritive food from decades. Millets have 65% carbohydrates, 9% proteins, 3% fat and 2-7% crude fiber and vitamins and minerals. Millets can be called as Nutri-cereals as it provides most of the nutrients required for proper human functioning that helps in reducing obesity and combating with many lifestyle diseases. Millets are alkaline and digests easily since these are gluten free and non-



allergenic hence these are great sources for Celiac disease patients. Why to consume millets? Nutri-Cereals are highly nutritious, gluten free and contain non-acid forming property; hence they are considered as soothing and easy to digest food. As compared to rice, especially polished rice, millets release lesser percentage of glucose into the blood therefore, this lowers the risk of diabetes. Millets and at the same time these are also high in minerals like magnesium, phosphorous and potassium which reduce the risk of cardiovascular diseases. Until 19th century people in southern India are least effected with metabolic disorders. But with changing lifestyle there come the change in food habits that leads to high rise in number of diabetes and cardiovascular cases. (Bommy and Kavitha, 2016). Hence, millets are recommended to be included in every day diet. **Conclusion:** Millets are incredibly nutrient-dense, gluten free, and high in dietary fiber. Calcium, iron, phosphorus, and other micronutrients are abundant in them. They have a low Glycemic Index (GI), which means that their blood sugar levels don't significantly increase. The best diet for us should include millets regularly. Millets provide dietary fiber that can bulk up and absorb water (Chaturvedi et al., 2022). In addition to acting as a cleansing agent for the body, it lengthens the time that food spends in the gut, lowering the risk of inflammatory bowel disease, constipation, hypertension, etc. Consumption of millets helps to overcome the various diseases and it also enhances the health and keeps away from diseases.

**Keywords:** Nutricereals, health, diseases.

OP-2023-0076

**Abstract Title: Enzymatic method of resistant starch development in browntop millet and its impact on carbohydrate profile**

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**Background:** In India, prevalence of non-communicable diseases like diabetes, obesity, cardiovascular diseases are increasing drastically where 116 persons out of thousand persons are suffering from one or the other forms of non-communicable diseases. Consumption of foods rich in resistant starch could be one of the management strategies. Sum total of starch that escapes digestion from small intestine and gets fermented in the large intestine is known as resistant starch. Thus, foods rich in resistant starch are of high importance focus. Whole millets are good source of resistant starch however processing like dehulling and milling results in reduction of resistant starch (RS1). One of the many ways to increase resistant starch is enzymatic debranching method. During enzymatic debranching amylopectin converts to amylose and amylose upon retrogradation converts to resistant starch. Thus, it is evident that during this process changes occur in the carbohydrate component parts of foods. Therefore, present study aims at increasing resistant starch content of browntop millet and also focuses on studying the carbohydrate profile. **Methods:** Browntop millet was soaked for 8 hours, then was autoclaved, debranched with debranching enzyme and was finally cooled. Resistant starch and carbohydrate components were evaluated before and after debranching following standard AOAC protocol. **Result:** It was evident that after autoclaving, resistant starch increased from 1.32 to 2.29 g/100 g, followed by debranching raised resistant starch to 8.22 g/100 g, finally cooling at 4°C for 24 hours increased resistant starch to 16.50 g/100 g. From the results it is suggestive that after enzymatic debranching of browntop millet total starch and soluble fibre decreased non-significantly by 0.34 and 10.67 per cent respectively. Per cent increase ( $p \leq 0.01$ ) in amylose and resistant starch in debranched browntop millet was 67.4 and 1150 for respectively. Amylopectin decreased significantly ( $p \leq 0.01$ ) by 23.18 per cent after debranching. Total dietary fibre and insoluble dietary fibre increased significantly ( $p \leq 0.01$ ) by 102.42 per cent and 167.84 per cent respectively in enzymatically debranched browntop millet. Total sugars, non-reducing sugars and reducing sugars increased significantly ( $p \leq 0.01$ ) in debranched browntop millet flour compared to browntop millet flour by 500 per cent, 314.28 per cent and 647.16 per cent respectively. **Conclusion:** Thus, it is suggestive that enzymatic method of resistant starch development increases resistant starch and total dietary fiber of browntop millet making it more therapeutic.

**Keywords:** Browntop millet, Resistant Starch, debranching

**OP-2023-0079**

**Abstract Title: Resistant starch and amylose content of PJTSAU university rice fine grain varieties**

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**Background:** Rice is the major source of starch and staple diet in many parts of India. Many components play important role in cooking quality and marketability of rice, one among them is amylose. Resistant starch is a form of dietary fibre that resists digestion by gastrointestinal track enzymes with health protective properties (WHO). Usually, rice is poor source of resistant starch, but this can be increased by application of physical, chemical and enzymatic methods. For the development of resistant starch amylose plays crucial role. **Methods:** In the present study 15 PJTSAU fine grain varieties were screened for resistant starch and amylose content using standard procedures. **Result:** Among the 15 PJTSAU fine grain varieties, the RS content ranged from 2.936 (KSP-2874) to 0.914% (JGL-28545). Among 15 fine grain varieties of PJTSAU, the amylose content ranged from 19.52% (Low) (KNM-733) to 26.14% (High) (JGL-28545). **Conclusion:** Thus, from the study it can be concluded that PJTSAU university fine grain rice varieties are low in resistant starch but are good source of amylose which extends a path for increasing resistant starch content through physical, chemical and enzymatic methods of starch modification.

**Keywords:** Resistant starch, Amylose, Rice, Staple

**OP-2023-0081**

**Abstract Title: Characterization of the cooking, antioxidant, digestibility, and in vivo glycaemic properties of pigmented and non-pigmented traditional rice landraces**

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**Background:** The incidence of diabetes has become more common among the population of India. High intake of white rice, a staple meal for most Indians, becomes a significant factor in raising the risk of Type 2 diabetes. This study focuses on their antioxidant, cooking, in vitro digestibility, and in vivo glycaemic properties. **Methods:** The organic pigmented and non-pigmented traditional rice landraces were de-husked, and the rice grain samples were studied for their cooking characteristics. The cooked rice and its filtrate were extracted with methanol and analyzed for their antioxidant properties and scavenging capacity. The in-vitro digestibility assay was performed to estimate the rapidly digestible starch, slowly digestible starch, resistant starch, and total starch from the rice flour. The in-vivo glycaemic study was conducted with ethical clearance for 15 healthy individuals. The individuals were subjected to an oral glucose tolerance test, and the glycaemic index was calculated using the area under curve method. **Result:** The minimum cooking time and the solid gruel loss of the pigmented samples were higher than the non-pigmented samples, with Madumuzhungi and Kallundai samba being the highest, respectively. The antioxidant scavenging activities of the filtrate samples outperform those of the cooked rice samples, indicating that phytochemical loss occurs during cooking. The total phenolic content of the Kallundai samba sample was higher for both the filtrate and cooked rice samples, with 77.09 mgGAE/g and 33.83 mgGAE/g, respectively. The in-vitro digestibility shows higher slowly digestible starch, resistant starch, and lower total starch content for the pigmented rice samples. The Kallundai samba recorded the highest resistant starch content, and Madumuzhungi reported lower total starch content with 20.77% and 76.82%, respectively. Irrespective of the pigmentation, all the samples fall under high glycaemic index, where pigmented Kallundai samba recorded as the highest glycaemic index and glycaemic load with 93.58% and 10.92 respectively. **Conclusion:** These integrated observations provide wholesome knowledge of traditional rice landraces and their biological utility concerning the health of the individuals.



**Keywords:** In-vivo GI, Digestibility, Cooking, Antioxidant

**OP-2023-0082**

**Abstract Title: Production and Characterisation of the Type III Resistant Starch by Repeated Autoclaving Method from Traditional Rice Landraces**

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**Background:** A healthy gut is crucial for hindering metabolic diseases in the present lifestyle of the population. Resistant starch type III (RS3) produced by feasible physical methods has a prebiotic effect on the gut. Traditional rice landraces have been explored less for their functionality. The current study aims to explore the functional characteristics of RS3 from underutilized rice landraces. **Methods:** The starch from two native landraces was isolated by the alkali steeping method and subjected to repeated autoclaving with the pressure-cooking method at 121°C for 30 minutes, followed by retrogradation at 4°C for 24 h. The RS3 content, amylose content, morphology, crystallinity, particle size, gelatinization temperatures, and functionality of the retrograded starches were analyzed by standard protocols. **Result:** The autoclave treatment improved the amylose concentration of the starches. The autoclave-treated Manisamba (AC-MS) displayed higher amylose content of 30.05 %. The repeated autoclave treatments caused the amylose molecules to dissolve and re-crystallize, giving the starch particles fissures and roughness. Significant variation was observed in the particle size of the starches where the autoclave-treated Shivan samba (AC-SS) exhibited a larger diameter size of 561.30 nm. The RS3 content varied from 15.12 to 18.10 g/100g. The X-ray diffraction patterns of the starches showed a characteristic small peak at 5° and 15°, distinguished doublet peaks at 17° and 20°, and a broad peak at 23° indicating a mixture of the A-type, B-type, and V-type crystalline patterns. The FT-IR spectrum of the starches resulted in a broad band from 3600- 3000 cm<sup>-1</sup>, absorption peaks at 2927, 1627, 1347 cm<sup>-1</sup>, and a high intensity peak at 995 -1000 cm<sup>-1</sup>. Notable variation was observed in the peak temperature (TP) of the AC-MS (82.22°) in contrast to the AC-SS (67.99°C). **Conclusion:** The amylose and the crystalline form of the starch are strongly related to the size of the starch granules and have a profound effect on the RS3 content, functional characteristics, and thermal properties. The alterations observed in the starches are attributable to the aggregation of linear starch fragments and retrogradation in the autoclave treatment.

**Keywords:** Rice starch, Autoclave, RS3, Amylose

**OP-2023-0085**

**Abstract Title: Assessment of Organically Grown and Conventionally Available Cereals, Millets**

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**Background:** Organic food means crop produced using natural elements and synthetic chemical free inputs. With rising awareness about harmful effects of chemicals, consumer tend to purchase more of organic as compared to inorganic or conventionally available. **Methods:** In present study, organically grown cereals and millet samples were compared with inorganic or conventionally available in market for proximate content, antioxidant activity and antinutritional factors. Wheat, Rice, Sorghum, Bajra and Ragi were evaluated in duplicates and data was tabulated, statistically analysed by using student's 't' test. **Result:** Results shows that moisture and protein content were lesser in organic as compared to conventionally available samples. Dry matter or total ash and fats % were high in organically produced crop. Antioxidant activity was more in organic rice, wheat, bajra and ragi. Antinutritional factors such as tannins, trypsin inhibitors and oxalates were more in organic as compared to inorganic or conventionally available cereals. However, hydrogen cyanide content was less in organic as compared with inorganic. **Conclusion:** Organic cereals and millets are beneficial for human health as compared to conventionally available one. However more research work is required in this area.

**Keywords:** organic millets, cereals, antinutritional factors

OP-2023-0087

**Abstract Title: Hemp Milk Innovation as a Nutritious Beverage: Formulation and Flavor Exploration for India's Palate**

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**Background:** Increasing demand for plant-based milk, driven by veganism and health-conscious choices, has prompted interest in hemp seeds as a versatile dietary source. This study aimed to develop hemp-milk and flavored variants, assess their sensory appeal, evaluate their nutritional value and shelf life, and ensure compliance with food labelling regulations. **Methods:** Hemp-milk and flavored variations were formulated and standardized through wet milling, filtering, homogenization, HTLT pasteurization (72°C, 15 seconds), and packaging, followed by cooling to 4°C under controlled conditions. Sensory evaluation of hemp milk, alongside commercially available flavored milk as the control, was conducted using standard sensory scales (5-point hedonic scale, food action rating scale, and product profiling) among trained (n=5) and untrained panelists (n=30). Descriptive statistics for flavor preferences and ANOVA were used to identify significant differences between the control and formulated hemp milk. Proximate analysis determined nutritional content. Shelf-life studies were performed, including microbial analysis and refrigeration storage stability tests. T-test was used to compare the nutritive value of control and formulated milk. **Result:** Five variations of hemp milk were developed, with Rose Thandai flavour significantly outscoring other variations in sensory evaluation ( $p < 0.001$ ). On comparative analysis with soy milk, hemp milk showed 62.96%, 51.25% and 25.53% lower carbohydrates, protein and added sugar, respectively and 12.5% and 98.75% higher energy and fat, respectively. Hemp milk had 45.04%, 81.63%, 52.15%, 28.79%, and 43.75% lower energy, carbohydrates, protein, fat, and added sugar than market available milk. Shelf-life studies revealed an 8-day refrigerated shelf-life. The product was packaged in a PET bottle, and packaging and labelling complied with FSSAI guidelines. **Conclusion:** Among the hemp-milk variations, Rose Thandai Flavor was the preferred choice, surpassing other flavours and control regarding acceptability. Compared with other milk, the proximate analysis indicated lower carbohydrates, added sugar, and energy with similar fat and lower protein content in hemp milk. Formulated milk is 100% vegan, soy and dairy-free, with no additives and preservatives, having a refrigerated shelf life of 8 days, offering a healthy beverage option. Further research is needed to enhance the hemp-milk's protein content and confirm the beverage's health benefits under specific health conditions.

**Keywords:** Hemp-milk, Plant-based milk, Hemp beverages

OP-2023-0088

**Abstract Title: Development of Punugulu by partial replacement of rice with the Browntop Millet (Brachiaria ramosa)**

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**Background:** Punugulu also called punukulu is a delicious deep fried fermented snack from South India especially in Andhra Pradesh. It is conventionally made with rice and black gram dhal. Browntop millet (BM) is one of the nutri-cereal which is rich in nutrients such as protein, calcium, zinc, phosphorous and fiber. This study was aimed to develop punugulu by partially replacing rice with Browntop Millet. The objective of this study was to analyze its sensory scores and nutritional composition. **Methods:** Six formulations (standard and BMP1 to BMP5) were made with varying proportions of Browntop Millet (0%, 15%, 30%, 45%, 60%, 75%) and allowed for fermentation for 12 hours. The developed product was subjected to sensory evaluation by 30 semi trained panelists. **Result:** It was observed that 45% (BMP3) variation of punugulu had higher acceptability when compared to standard and other variations. The selected variation of punugulu was evaluated for its

nutritional profile by following standard AOAC method. **Conclusion:** When compared with the standard the developed product of BMP3(45%) had low carbohydrate and elevated fiber content. Hence this made the developed product low in glycemic index and gluten free. The developed product was also enriched with protein, calcium, zinc and phosphorus. Thus the Browntop Millet based punugulu were superior in terms of nutritional quality and can be recommended overweight, obese and diabetic individuals.

**Keywords:** punukulu, fermentation, lowglycemicindex, gluten free

**OP-2023-0089**

**Abstract Title: Development of waffles with incorporation of Barnyard (*Echinochloa frumentacea*) and Kodo Millet (*Paspalum scrobiculatum*)**

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**Background:** Waffles are popular sweet or savory food consumed as breakfast meal or a snack made from a batter that is cooked between two patterned plates in a waffle iron. It is commercially made from refined wheat flour. Barnyard millet is a nutri-cereal which is rich in digestible protein, fatty acids (predominantly linoleic and oleic acid), dietary fibre, phosphorus, iron and niacin. Kodo millet is a good source of protein in comparison to barnyard millet thereby enhancing the nutritional profile of the product. **Methods:** Six formulations (standard and BKMW1 to BKMW5) were developed with varying refined wheat flour and equal proportions of barnyard and kodo millet flour (0%, 20%, 40%, 60%, 80%, 100%). The developed product was subjected to sensory evaluation by 20 semi trained panellists and proximate analysis. **Result:** It was observed that 60% (BKMW3) variation of waffles had higher acceptability score when compared to standard and other variations carried out by 9-point hedonic scale. The selected variation of waffle was evaluated for nutritional profile analysis. **Conclusion:** The study revealed that the developed product of 60% (BKMW 3) had low carbohydrate and elevated fibre content in comparison to standard, thereby making the product low in glycemic index. This combination also enhanced nutritional composition with calcium, iron and phosphorus. Therefore, the formulated product not only enhanced the sensory allure of the product but also ensured its nutritional richness, setting it apart from conventionally made waffles making it healthier option compared to the standard

**Keywords:** savory waffles, kodo millet, barnyard millet

**OP-2023-0090**

**Abstract Title: Exploring the Physicochemical and Bioactive Properties of Hull-Less Pumpkin Seed-Enriched Pasta for Enhanced Nutritional Value**

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**Background:** Having a wide range of applications and serving as both edible seeds and oilseeds, pumpkin seeds are one of the functional foods with the highest potential. However, their use is constrained by the presence of a thick seed coat (hull) that makes them prone to the decortication process, raising the cost to farmers and reducing their usefulness as oilseeds. Objective-Hull-less pumpkin seeds (PAU MagazKadoo 1), the first of their kind in Indian history, have not yet been evaluated for their nutritional composition and potential for functional food development. **Methods:** and Method-Hull-less pumpkin seeds (PAU Magaz Kadoo1) were procured from the Department of Vegetable Science, Punjab Agricultural University, Ludhiana. Seeds were sun dried and then directly powdered into raw hull-less pumpkin seed flour. In present study, the influence of semolina replacement with hull-less pumpkin seeds powder (HPS; 10-30%) was evaluated with reference to nutritional, techno-functional (Hunter Lab Flex was used to calculate (L, a\*, b\*) of pasta Color , texture (using Texture analyzer), phyto-chemical (using FTIR spectroscopy) and bioactive characteristics of functional pasta. **Result:** Quality parameter revealed that HPS fortification in functional pasta significantly ( $p < 0.05$ ) decreased the optimum cooking time of pasta, expansion capacity whereas the amount of cooking loss

raised noticeably. The greenness ( $a^*$ ) of the pasta gradually increase because of the total chlorophyll pigment whereas the addition of HPS dramatically reduced the lightness ( $L^*$ ). The pasta with HPS fortification had substantially more protein (14.88%), fibre (5.08%), ash (2.72%) and fat (9.87%) content. Highest antioxidant activity (31.13%), phenols, flavonoids and total carotenoid was observed in HPS fortified pasta. The mineral content i.e. iron (4.58%), zinc (5.04), calcium (39.21) and fatty acids [Palmitic (2.96%), Stearic (2.16%), Oleic acid (15.14%)] enhanced in HPS pasta as compared to control. Fourier transform infrared (FTIR) spectroscopy further confirmed the presence of phenols, flavonoids, and chlorophyll in HPS fortified pasta. The pastas with 30% HPS were found to have the greatest overall acceptability value (8.8), and the sensory scores decreased with further increase in levels of HPS. **Conclusion:** Hull-less pumpkin seeds show promise as a valuable ingredient for enhancing the nutritional and functional qualities of pasta, with potential benefits for both consumers and farmers. Further research and development in this area may open up new opportunities for the utilization of this innovative ingredient in the food industry.

**Keywords:** Hull-less pumpkin seeds, Functional Pasta

**OP-2023-0093**

**Abstract Title: Standardisation Of Grapeseed Incorporated Millet Dosa**

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**Background:** Millets are one of the oldest crops cultivated in adverse weather conditions. They are nutriceals comprising of foxtail, little, kodo, proso, barnyard (minor millets), sorghum, pearl and finger millet (major millets). Millets based-foods have high physiological and health promoting benefits especially antidiabetic, anti-obesity, cardiovascular complications and help improve immune system. Grapeseed extract has potent anti-oxidant, anti-inflammatory properties and rich in polyphenols, specifically proanthocyanidins which acts as functional ingredient to address various health issues. Grapeseed powder provides benefits against many diseases i.e., Inflammation, Hypertension, Diabetes, Diabetic Nephropathy, Cardiovascular complications and also acts as a multi-organ protection including liver, heart, brain and kidney. Millet-based products have comparable health advantages and nutritional values to other popular cereals like rice, wheat and maize. It has high protein and dietary fibre, both soluble and insoluble. They are also high in nutrients, gluten-free and have low glycemic index. The value-added products of millets are considered as a great benefit for combating food nutritional support globally. This study aims at valorization of Millets with Grapeseed extract for commonly consumed Dosa mix. **Methods:** Standardization of Dosa was carried out with Standard as V1, Millets dosa as V2 and Grapeseed incorporated into millets dosa as V3. The developed product was subjected to the sensory and nutrient analysis. Physical properties like hardness, softness, crispiness and stickiness of the developed Dosa were also analyzed. **Result:** The results have shown more acceptance of the Grapeseed incorporated millets dosa by the panel members with high protein and fibre comparatively to the millets dosa and standard dosa. With respect, to the physical properties, the Grapeseed millets dosa was comparatively harder in texture at the different intervals of time at 0th, 1st, 3rd & 6th hour respectively. **Conclusion:** Grapeseed millet dosa have many health benefits, as it is high in fibre and protein with low glycemic index. It may have effects in lowering blood glucose levels of the diabetic patients and may also help in improving kidney functions by improving GFR rate and lowering proteinuria.

**Keywords:** Grapeseed extract, Diabetes, Millets Dosa

**OP-2023-0094**

**Abstract Title: FORMULATION AND EVALUATION OF PLANT DRINK MIX UTILIZING GUAVA LEAVES (*Psidium guajava* L.) AND KIWI FRUIT (*Actinidia deliciosa*)**

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**Background:** In today's world nutraceuticals have potential market. Nutraceuticals helps to nourish health and prevent illness. **Methods:** The drink mix was evaluated for proximate composition,  $\alpha$ -amylase inhibition activity, free radical scavenging activity, and quality parameters-pH, titrable acidity, total suspended solids, reducing sugar and brix. **Result:** The findings of the present study revealed that the plant drink mix had flavonoids (37mg), phenols (25mg), terpenoids (47mg) and ascorbic acid (68mg/100g) respectively. A significant percentage inhibition activity of  $\alpha$ - amylase i.e., 84% and free radical scavenging activity of 71% was obtained. The plant drink mix had acceptable sensory attributes and were rich in nutritional composition. They were shelf stable as judged by sensory attributes. **Conclusion:** Traditionally, guava leaves have been used to cure ailments. Kiwi has a variety of medicinally useful compounds which helps in curing various health problems. Thus, it can be concluded that the drink mix formulated could accomplish desirable therapeutic outcomes.

**Keywords :** Guava leaves, Flavonoids, Phenols, Kiwi

**OP-2023-0098**

**Abstract Title: Development and evaluation of Savory Vegetable Cake using Foxtail Millet rava (Setaria italica)**

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**Background:** Cake holds a significant place in baking industry due to variants in taste, texture and aroma, for savory cakes salt and spices are used. Millets are a group of small, whole round grains grown in India. Foxtail Millet is an annual grass grown for human food and it is the second most widely planted species of millet. It is essential for maintaining a healthy heart, smooth functioning of nervous system. It is rich in iron and calcium, and thus maintain health of bones and muscles. In this study, cakes were prepared using foxtail millet (FM) to modify its nutritional content. The main objective was to develop a millet based savory vegetable millet cake. By replacing the self-raising wheat flour which make product gluten free. **Methods:** Vegetable millet cake were developed by partially replacing self-raising wheat flour with foxtail millet rava in different proportions, with proper texture and consistency. Four variations of cake were prepared, (SVMC 1 – SVMC 4) and evaluated 10:40, 20:30, 30:40, 50:0. The vegetable cake were evaluated for sensory attributes from Semi-trained panel (n=25) on 1-9 point hedonic scale, and the best cakes are considered for evaluation and were compared with the cake made of 100% self-raising wheat flour. **Result:** As per the obtained result 50% (SVMC 4) had highest sensory scores on par with control. The developed cake product was enriched with dietary fiber, rich in Iron and calcium in comparison to control. **Conclusion:** The study was conducted to develop vegetable cake from FMR. Complete replacement of self raising wheat flour with foxtail millet rava modified the nutrition profile and made comparatively more healthy with less CHO. The cake developed incorporation foxtail millet rava serves as healthy alternative.

**Keyword:** Foxtail millet rava, Gluten-free

**OP-2023-0100**

**Abstract Title: Development of Value-Added Product from Curry Leaves Powder**

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**Background:** Today, foods are not intended only to satisfy hunger but also to provide necessary nutrients for humans and prevent nutritional-related problems and improve physical and mental well-being of the consumers. In this regard, functional foods play an outstanding role. **Methods:** The dried



curry leaves powder and the products were evaluated for the chemical composition and quality parameters by analytical methods (AOAC). **Result:** The experimental results revealed that dosa containing Cabinet dried curry powder and shade dried curry powder had moisture content (8.31% and 8.32%), Protein (4.7% and 4.9%), minerals such as calcium was 482mg and 496mg; iron was 13.7mg and 16.9mg, Vitamin C (3.66mg and 4mg/100g), total antioxidant contents (34% and 40%) and inhibition of alpha-amylase activity (71.4% and 76.3%) respectively. Both developed Dosa's had acceptable sensory attributes. **Conclusion:** Cabinet drying method retains the color and shade drying method retains bioactive components as well as color of the curry leaves powder. Therefore, 5g of both the drying methods enhanced nutritional properties, physicochemical characteristics and organoleptic properties.

**Keywords:** Cabinet & Shade drying, Nutritional properties.

#### OP-2023-0102

**Abstract Title: Assessment of Farming Situations and Life Style Practices of Muthuvar Tribes of Theni District, Tamil Nadu**

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**Background:** Scheduled Tribes are most economically weaker section of the community. Muthuvars are tribes residing in the hills of Coimbatore, Theni in Tamil Nadu. The problems faced by tribals are illiteracy, ignorance, hunger, malnutrition, poor shelter and exploitation. Muthuvar is one of the tribal communities living in the region of Muthuvarkudi, Kottakudi Panchayat, Bodinayakkanur block, Theni District where muthuvars are only living for generations. The main aim of the study is to analyze the farming situations and lifestyle practices. **Methods:** A purposive sampling method was followed while selecting the village and beneficiaries. Totally 33 families are residing in muthuvakkudi village of Theni District. The socio-economic profile, income generation, cultures, food habits, farming practices were collected by using a structured interview schedule and group discussion was made with village leaders, line departments and non-governmental institutions to collect and find out the exact and unique information about their lifestyles. Need-based trainings were provided on drudgery reducing technologies, safe storage methods and value addition for minimizing post-harvest losses. **Result:** The results revealed that among the 33 families, 27 were involved in farming situations and cultivating pepper, cardamom, coffee, jack fruits, clove and avocado in their individual claims of small Agriculture lands of 110 acres under the title for forest land under occupation. They have been using drudgery reducing implements in agriculture and processing machinery for post-harvest management. The main income generation activities are the collection of Minor Forest Produces, farming and goat rearing. 55 % of the participants are earning in the range of Rs.1000-3000 per month. 34 % of the participants were earning in the range of Rs.3001-5000/- and the remaining 11% of them were earning above Rs.5001/-. They have a unique skill in identifying medicinal plants and therapeutic purposes and innovative ideas for making bamboo fish net which was unknown to the outside world. **Conclusion:** The study concludes that there is a gap between the beneficiaries and line departments due to a lack of knowledge among tribal communities. Hence, continuous handholding support would help them to improve agricultural practices and generate income for sustainable livelihood.

**Keywords:** Muthuvars, lifestyle practices, MFP

#### OP-2023-0104

**Abstract Title: Characterization of Physicochemical, Functional, and Antioxidant Properties of Locally Grown Pigmented Rice Varieties**

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**Background:** The increased prevalence of metabolic syndrome over the last few decades has increased demand for pigmented rice varieties owing to their immense nutraceutical properties. This study investigated two pigmented rice cultivars, Black Kavuni and Kattuyanam, for their nutrient composition, physicochemical and functional properties. **Methods:** The proximate composition of the pigmented rice flours was analyzed with AOAC methods. The instrumental characterization was examined using The Scanning Electron Microscope (SEM), Differential Scanning Calorimeter (DSC), and a particle size analyzer. The swelling power, Water Absorption Capacity (WAC), Water Solubility Index (WSI), Oil Absorption Capacity (OAC), syneresis, and light transmittance of the rice flours were determined. One gram of each rice flour was extracted using 25 ml of 80% methanol to estimate the Antioxidant activity. The mixture was centrifuged and the extracted supernatant was used to determine the Total Phenol Content (TPC), Total flavonoid Content (TFC), Total Antioxidant Content (TAC), and 2,2-Diphenyl-1-picryl hydrazyl (DPPH) radical scavenging activity. **Result:** From SEM results, it was observed that the morphological characteristics of both the rice flour particles were similar, with the presence of large irregular polyhedral molecules. The larger surface areas of rice flour increase their degree of association with other ingredients in the case of food product formulation. Kattuyanam exhibited higher swelling power and WAC than Black Kavuni; the corresponding values were 14.95 g/g and 256.10%. The higher WAC indicates the presence of more hydrophilic proteins that can improve the cohesiveness and overall structure of the food products. The OAC of Kattuyanam was 2.79 g/g, significantly higher than that of the Black Kavuni (2.37 g/g). OAC is a prime functional attribute, intensifying flavour and mouthfeel in lipid-containing foods. Both rice flours' overall antioxidant profiles were high and can serve as sources of functional foods. **Conclusion:** Indigenous rice landraces have been gaining popularity for their health-promoting properties. This study proves that Kattuyanam and Black Kavuni have increased nutraceutical potential and their functionalities aid in the blending for further food processing and successful formulation of beneficial food products.

**Keywords:** Pigmented rice, Antioxidant, Functional, Physicochemical

OP-2023-0111

**Abstract Title:** Effect of storage period on the physicochemical properties of an Inulin-fortified pearl-millet Rab

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**Background:** Pearl millet is a drought-resistant crop that tolerates harsh climates and requires very little water to sustain. Rab is a pearl-millet and dairy-based fermented drink, primarily consumed in the dry and semi-arid regions of Rajasthan. Inulin is a polysaccharide that is not digestible in human intestine and serves as a source of nutrition for the human gut microflora. This study aimed to evaluate the effect of storage time on the stability of physico-chemical quality of inulin-fortified pearl-millet Rab stored at refrigeration (4+10C) temperature. **Methods:** The sensory-optimized product was developed by cooking pearl-millet flour and horse-gram dal powder with buttermilk and condiments. The mixture was cooled down and 1% inulin was added, blended, then fermented for 7h at ambient temperature and stored at refrigerator temperature for further usage. Physico-chemical quality characteristics including moisture, titratable acidity (TA), pH, viscosity, total soluble solids (TSS), wheying-off, were analyzed. Changes in the quality were measured at alternate day intervals for 8 days. **Result:** The statistical analysis of the observed data showed that the increase in the storage period did affect the physico-chemical values of the product. The initial values of moisture, TA, pH, viscosity, TSS, and wheying off recorded were 82.01%, 0.57%, 4.28, 46.67 cP, 6.130Brix, and 1.33%. The changes in the moisture content, TA value, pH, viscosity, and wheying off % were found to be statistically significant. Whereas the change in the total soluble solid was found to be insignificant. **Conclusion:** The studied product exhibited significant variations in most of the studied parameters over the storage time. It showed that storage time did significantly affect the physico-chemical quality of the studied product. The shelf-life estimated for the inulin-fortified pearl millet Rab was 8 days.

**Keywords:** Inulin, Rab, prebiotics, storage effect



OP-2023-0112

**Abstract Title: Nutritional Profiling and Therapeutic Potential of Bee Pollen as Functional Food**

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**Background:** Bee pollen has recently been deemed a functional food ingredient as a result of increased consumer awareness that consuming functional foods can improve one's health. It is touted as the "sole ideal complete food" because of its high nutritional content, which comprises phenol, protein, fatty acids, vitamins and trace elements (Krell 1996). So, there is need to explore the content of all these nutrients in bee pollen to its use as a functional food supplement. **Methods:** Bee pollen was procured from Department of Entomology, PAU, Ludhiana. It was analyzed for nutritional content (minerals, vitamins, amino acids and fatty acids) by AOAC 2010 and antioxidant properties [Total Phenolic content (Singleton et al 1999) and Total Flavonoid content (Zhishen et al 1999)]. **Result:** Bee pollen is a rich source of high-quality proteins (26.27%), making it a valuable dietary supplement for vegetarians and vegans. The amino acid profile of bee pollen as follows, it contains all the essential amino acids (valine 3.69g, leucine 2.90g, iso-leucine 10.20g, threonine 3.85g, methionine 0.92g, lysine 1.19g, phenyl alanine 2.65g, histidine 14.80g, tyrosine 1.48g, arginine 3.66g, cystine 2.79g, tryptophan 1.12g) and non-essential amino acids (alanine 1.88g, glycine 6.70g, serine 4.82g, proline 2.70g, aspartic 11.11g and glutamic acid 20.79g) which are the building blocks of proteins. It contains a range of vitamins and minerals, including B-complex vitamins (Vit B1, B2, B6 are 28.38, 35.60 and 27.37% respectively) vitamin C (4.39%), calcium (12.8%), sodium (0.39%), potassium (14.2 %) and iron (1.35 mg). There is a good amount of essential fatty acids like linolic, linolenic and arachidonic acid (11.22%, 14.28% and 21.70% respectively) is there. It is rich in antioxidants like flavonoids (121mg/100g) and phenols (780 mg/100gm), which protect the body from oxidative stress and inflammation. **Conclusion:** All these nutrients grade bee pollen as nutraceutical and enhance its use as a functional food, because of all these nutrients bee pollen possess various therapeutic properties like anti-antimicrobial, antiviral, anti-inflammatory, antifungal, immune-stimulating, analgesic and also help in burn wound healing.

**Keywords:** Bee pollen, Dietary supplement, Amino

OP-2023-0114

**Abstract Title: Finger Millet Based Homemade Soluble Food Folds**

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**Background:** In nature, plants and animals have evolved with natural coverings to protect their contents. Food packaging, often using plastic, creates a disconnect from the natural origins of food. Using sustainable alternatives, like millets, for packaging may be beneficial due to their biodegradability and potential antioxidant properties, offering an eco-friendlier and health-conscious solution. Finger millet is a resilient and nutritious cereal crop with diverse agricultural and nutritional benefits, making it a promising source for improving food security and nutrition in diverse regions. **Methods:** This study aimed to create soluble food folds or soluble packages from Finger millet. The millet was processed with the variation of non-germinated and germinated sample. The research entailed the processing of finger millet to fabricate folds, a term that requires further elucidation for precise comprehension within the context of this study. Furthermore, the folds were subjected to ascertain the phytochemical and antioxidant analysis, employing the DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenging assay as analytical methodology. **Result:** The results of the experiment indicated that the structural integrity of folds created from non-germinated food folds exhibited superior compatibility for containing dry contents in comparison to those generated from germinated food folds. Both non-germinated and germinated food folds were rich in Alkaloids, Anthraquinones, proteins, carbohydrates, saponins and cardiac glycosides. The folds made from germinated ragi had more scavenging activity compared to the folds made from non-germinated ragi. **Conclusion:** Millets can be a greater choice for folds as they can be enriched and subjected to diversified utility. Though there may be a stipulated significant loss of

antioxidants during the preparation of folds, ragi will still be a great substitute for food folds as they can essentially diversify the delivery of nutrient rich food products.

**Keywords:** Soluble food packages, food security

#### OP-2023-0115

**Abstract Title: Development of Brown Ragi Flour (Eleusine Coracana) Based Muffins Enriched with Oats**

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**Background:** Millets are a group of cereal grain that belongs to the Poaceae family. Muffins are a type of Semi-sweet cake and baked product, which is recognised due to their soft texture and sweet characteristic taste. Refined wheat flour (Maida) is a key ingredient to the muffins, due to the presence of gluten content it is not well eaten by the people with celiac disease also, maida lacks fiber and having high glycaemic index load. This study about muffins were done modifying its content prepared by using Brown ragi flour (BRF) which enhances calcium, fiber and iron content in the muffins. Further to enhance the nutritional content oats were incorporated, which contains good amount of beta- glucan. **Methods:** Muffins from BRF were developed by partially replacing with maida and compared with standard maida. Muffins except for partially replacing maida all other ingredients and method of preparation remains same. Different proportions of muffins were tried get with proper texture and consistency, as maida was subjected with different variations [V1-V4] 25:25, 30:20, 40:10, 50:0. Developed muffins were subjected to sensory evaluation from the semi-trained panel scoring on 9-point hedonic scale. **Result:** The combination of BRF and Oats muffins V4 (50:0) was highly acceptable, compare to control, the developed muffins was rich in calcium, fiber, iron and was gluten free. **Conclusion:** The present study was a fruitful attempt at arriving a product suitable for the intervention of gluten intolerance and calcium deficiency. Complete replacement of ragi flour enhance the better nutritional profile of the product in better way.

**Keywords:** Ragi flour, beta-glucan, gluten-free.

#### OP-2023-0116

**Abstract Title: Development of Multi Millet Kichadi from Kodo Millet (Paspalum Scrobiculatum) and Barnyard Millet (Echinochloa Frumentacea) And Evaluation of it Nutritional Quality**

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**Background:** Millets are group of small- seeded grains cultivated for thousands of years in many parts of the world. In this study kichadi were prepared using kodo millet and barnyard millet, to modified it nutritional content to enhance the fiber, vitamin, minerals protein. High in fiber and rich in vitamins, minerals and proteins. Kodo millet is highly nutritious grain and an excellent substitute to rice and wheat, which is highly rich in protein content, low fat and very high fiber content it is very easy to digest. Barnyard millet is high amount of fiber, iron, and phosphorus. This Multi millet kichadi make suitable for people who are intolerance of gluten. The main objective was to modified or standard kichadi (which was high in CHO and low in fiber) into the modified product i.e. Healthy multi millet kichadi in order to improve it nutritional content. **Methods:** Multi millet kichadi were developed by using following ingredient like kodo and barnyard millet, green gram dhal and other ingredients. Multi millet Kichadi were developed and compared with standard kichadi. Except for kodo and barnyard, all other ingredients and method of preparation remained the same. Kichadi was standardized four formulation (MMK2:MMK4) were developed in different ratios of 25:25, 30:20, 40:10, 50:0. Developed kichadi were subjected to sensory evaluation from the semi-trained panel (n=25) scoring on 1-9 point hedonic scale. **Result:** Among all the variation, MMK2 (30:20) secured higher score in all the parameters. The developed Multi millet kichadi was enrich with protein, iron, calcium, Fiber, with comparer to controls.

**Conclusion:** A convent kichadi containing multi millet was developed. The product was nutritionally beneficial for diabetes, obesity, chronic disease along with anemia patients. Complete Replacement of rice is millet modified the nutritional profile of the usual kichadi and made comparatively healthier.

**Keywords:** Multi millet, gluten intolerance

**OP-2023-0118**

**Abstract Title: Nutritional Profiling and Antioxidant Potential of Bee Pollen Metabiotic Drink**

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**Background:** Bee pollen is considered a natural super food attributed to its indispensable nutritional and antioxidant properties. The resistant microstructure of the pollen grain wall, which surrounds pollen particles, does not allow the bioavailability of the nutrients present in the bee pollen to humans. Considering the rich biological potential of bee pollen, it is necessary to explore various treatments to improve the digestibility and further enhance the bioavailability of its nutrients for humans. **Methods:** Various methods have been used to change the microstructure of foods, increasing the liberation of nutrient rich compounds from food matrix thereby enhancing its absorption. Fermentation is one such method that improves the organoleptic as well as the nutritional properties of foods, increasing the beneficial nutrients like biopeptides and B vitamins and providing probiotic properties. Fermentation also enhances the digestibility and assimilation of the bee pollen bioactive compounds by humans. Therefore, fermentation of bee pollen by employing various techniques and microorganisms could be explored. **Result:** Bee pollen was procured from Department of Entomology, PAU, Ludhiana. Microbes were procured from Department of Microbiology, PAU, Ludhiana. Bee pollen drink with bee pollen, honey and water in different ratios was developed. Fermentation was carried out using microorganisms, yeast and lactic acid bacteria (*Lactobacillus rhamnosus* and *Lactobacillus bulgaricus*) and a mixture of yeast and lactic acid bacteria. Fermentation increased the total phenolic content by 1.4-2.3 times, total flavonoid content by 1.1-1.6 times and radical scavenging activity by 1.4-2.3 times, which further enhanced the antioxidant potentials in bee pollen.

**Keywords:** bee pollen, fermentation, antioxidant potential

**OP-2023-0119**

**Abstract Title: Development of Pathrode with the incorporation of Pearl Millet (*Pennisetum glaucum*)**

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**Background:** Pathrode, also known as Patra or alu vadi, is a popular Indian snack traditionally made with rice and Colocasia leaves. Pearl millet [PMP] commonly referred to as bajra, plays a significant role in Indian cuisine due to its low glycemic index and natural gluten-free properties. **Method:** The traditional dish, pathrode, was prepared by soaking rice, Pearl millet, Black gram dal, and Bengal gram dal in water for 5-6 hours. The formulation of pearl millet-based pathrode was in the ratio of 0% [PMP], 20% [PMP1], 40% [PMP2], 60% [PMP3], 80% [PMP4], 100% [PMP 5] replacement of rice with pearl millet. These ingredients were then ground into a coarse batter. Colocasia leaves were cleaned, and the batter was evenly spread on them before rolling the leaves. The rolls were steamed for approximately 15-20 minutes, then cut into small pieces and fried on both sides. The resulting product underwent sensory evaluation by a panel of 30 semi-trained panelists. **Result:** As per the result obtained, among all variations 80% pearl millet replaced pathrode obtained maximum sensory scores in comparison with standard, this variation was further analysed for its nutritional composition by following standard AOAC methods. **Conclusion:** Compared to the standard product, the developed PMP4 (80%) exhibited reduced carbohydrate levels and increased fiber content, resulting in a lower

glycemic index. Furthermore, the developed product is enriched with higher protein, calcium, zinc, and phosphorus levels. Consequently, Pearl millet-based Pathrode outperforms the standard in terms of nutritional quality, making it a recommended choice for individuals dealing with obesity, cardiovascular diseases (CVD), and diabetes

**Keywords:** Pathrode, Bajra, Colocasia leaves, glycemic index.

#### OP-2023-0120

**Abstract Title:** Effect of microwave treatment on the complexation of talipot starch with quercetin

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**Background:** In this study, native talipot starch (NS) isolated from a non-conventional source of talipot palm (*Corypha umbraculifera* L.) is functionalized with quercetin to form talipot starch-quercetin complexes. **Methods:** Talipot starch was microwave treated (600 W, 2450 MHz for 90 s) to prepare microwave irradiated starch (MS). NTS and MTS were gelatinized and quercetin (10 %, w/v) was added into each gelatinized solution and blended to develop talipot starch-quercetin complex (NS-Q) and microwave-treated talipot starch-quercetin complex (MS-Q), respectively. The functional attributes of the developed complexes were determined. **Result:** Modification of NS with microwave irradiation depolymerized the starch granules and facilitated facile binding with polyphenols. SEM revealed a stable and compact structure of the complexes formed. XRD and FT-IR analysis revealed that starch granules are bounded by quercetin with H-bonds, establishing higher relative crystallinity complexes. Thermal and pasting analysis suggested that the complexation of starch with quercetin enhanced the thermostability and decelerated the short-term retrogradation of their gels. Quercetin complexation improved the viscoelasticity of starch by significantly increasing ( $p \leq 0.05$ ) the  $G'$  and  $G''$  values evidenced by dynamic oscillatory analysis. NS-Q and MS-Q showed a significantly lower ( $p \leq 0.05$ ) rate of in-vitro digestibility and increased resistant starch (RS) content compared to NS and MS, respectively. **Conclusion:** Talipot starch: quercetin complexes that were developed encourage its utilization for the preparation of various functional foods. This novel functionalized polymer-polyphenol complex shows the potential as a pharmacological approach to reduce the risk of many degenerative diseases.

**Keywords:** Starch; Quercetin; Polyphenols

#### OP-2023-0122

**Abstract Title:** In vitro digestibility, structural characteristics, and physicochemical properties of Hausa potato (*Plectranthus rotundifolius*) starch modified by annealing (ANN) after autoclave-retrogradation

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**Background:** This study explored the dual modification viz; by annealing treatment after autoclave-retrogradation of Hausa potato starch and examined its effects on resistant starch (RS) development, the structural and physico-chemical properties. **Methods:** Hausa potato starch was first autoclaved at 121 °C for 30 min, and the cooled samples were retrograded by storing at 4 °C for 120 h. Subsequently, the samples underwent dual modification through ANN. In vitro digestibility and structural and physico-chemical properties of the modified Hausa potato starch were studied. **Result:** ANN significantly enhanced the RS content with improved physico-chemical properties. The morphology of all the modified samples exhibited a continuous, dense network with an irregular, block-like structure. The crystalline pattern of modified samples transitioned from A-type to a combination of B- and V-type, and annealing increased the relative crystallinity. Compared to the native starch, the modified starches exhibited significantly lower values for all RVA (Rapid Visco Analyzer) parameters except for the pasting

temperature. **Conclusion:** ANN of autoclave-retrograded hausa potato starch significantly increased the RS content and could be exploited as a prebiotic and thermal stabilizer in food sectors.

**Keywords:** Hausa potato starch, Autoclave-retrogradation, Annealing

#### OP-2023-0123

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**Background:** Cookies are highly popular because of their long shelf life, convenience and availability. Cookies are rich in fat, CHO, and minerals. Cookies are mainly made out of refined flour and are low in moisture content which increases their shelf life which is the reason for their large scale production and distribution. The main objectives of this study is to develop a nutritious and appealing pearl millet-based cookie that is enriched with various dried fruits to enhance its nutritional profile and sensory qualities.

**Methods:** Cookies were prepared using Maida and partial replacement with flour of pearl millet. Replacement of Maida flour with pearl millet flour and all other procedures were similar. Maida flour was replaced with pearl millet flour in the ratio of (0%, 10%, 20%, 30% 40% and 50%). The developed cookie was subjected for sensory evaluation by trained panel. Subsequently, the chosen variation were subjected for nutritional assessment. **Result:** The cookies were evaluated on a 9-point hedonic scale for its sensory attribute. When compared to standard cookies, (50%) was superior in terms of taste and flavour. The cookie had more dietary fibre, higher protein, less carbohydrates when compared to standard cookie that was made with only Maida flour. **Conclusion:** Incorporation of pearl millet flour in the Maida cookies not only improved its nutritional content but also maintained sensory acceptability. The enriched cookies demonstrated higher levels of dietary fibre, protein, vitamins, mineral content, making it a more promising option for those who are seeking healthier dietary choices.

**Keywords:** Dried fruits, nutritional enrichment, bajra, cookie development.

#### OP-2023-0124

##### **Abstract Title: Preparation of Multi-Millet Cake Pre-Mix to Reduce the Glycemic Load**

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**Background:** Increased burden on diabetes and non-communicable diseases are seen in recent days, as is prevalence of obesity and unhealthy lifestyles; this can be due to snacking habits which increase the risk of the incidence of the diseases. The snack without the danger of the glycaemic control can be integrated in the everyday life (Almoraie N. M. et. al., 2021). Thus, the main aim of this study was to develop a healthy and nutritious cake pre-mix with the view of decreasing the glycaemic load of the product. **Methods:** Pearl, sorghum and foxtail were used in specific ratio based on their glycaemic index. Control sample was prepared using standard method, and three different formulations were prepared using varying maida and millet flour ratios (Millet flours: Maida; 100:0; 75:25 and 50:50). The final product was analyzed for sensory attributes and proximate analysis. **Result:** Sensory analysis was done by 39 semi-trained panel using 9-point hedonic scale. The final product was acceptable with respect to sensory attributes. One- way ANOVA (Analysis of variance) was conducted to check for significant difference in the sensory analysis (texture, colour, aroma and taste), which revealed that there was a significant difference in the sensory attributes between the variations and control sample. The panel was able to discriminate among the variations of the cake attributing to the characteristic flavour of millets. However, the overall liking of the samples perceived by the panel indicated that the 75% millet flour replaced with maida had the most preference. There was an improvement in the glycaemic load (as calculated with glycaemic index and carbohydrates available per serving of the cake) of the preferred cake variation which was 11.11 as compared to the control sample with maida that showed 14.8. The nutritional content of the pre-mix showed that there was an improvement in the protein-8.9%, total fat-1.1% and sugar-29% against the conventional cake mix of 8.3%, 6.4% and 44.6% respectively. **Conclusion:** Overall, we concluded that the Multi-Millet cake Pre-mix developed can effectively reduce the glycaemic load of the cake and also reduce the total fat and sugar content as compared to the conventional cake mix.

**Keywords:** Millets, Glycaemic load, Sensory analysis



OP-2023-0126

**Abstract Title: Process Optimization of Osmodehydrated Mango-Ginger Candy and its Nutritional, Functional and Quality Evaluation (Crucumc Amada)**

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**Background:** Mango ginger (*Curcuma amada* Roxb) belong to family Zingiberaceae and is a unique spice having morphological resemblance with ginger but imparts a raw mango flavour. It is been extensively used in medicine. It is highly nutritious, rich in antioxidant and antimicrobial properties. **Methods:** the mango-ginger candies were prepared by the process of osmotic-dehydration at different concentration of sugar syrup viz 50%, 60% and 70% brix and soaking time of 6, 12 and 24 hours were used followed by washing, blanching and drying in cabinet dryer. The candies were evaluated for nutritional, functional, and quality parameters. **Result:** based on sensory parameters 60° brix and 12 hours of soaking time was optimized for process parameters. Further, proximate composition of mango-ginger candy showed carbohydrate (76.16%), protein (1.5%), moisture (8.59%), iron (35mg/100g), calcium (38mg/100g) and vitamin c (3.32 mg/100g). Total phenolic content, total antioxidant and citric acid was 105, 37.96 and 0.4mg/100g respectively when compared with fresh candy. Microbial analysis showed that the candies were safe for consumption. **Conclusion:** It can be concluded that value-added product such as mango-ginger candy could be advantageous as they are nutrient dense containing good nutritional and antioxidant properties.

**Keywords:** osmotic dehydration, mango-ginger candy, brix, blanching.

OP-2023-0128

**Abstract Title: Development of Patolis from Kodo Millet (*Paspalum Scrobiculatum*) and Evaluation of its Nutritional Quality**

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**Background:** Patolis (kadubu) is considered as a nutritional rich and traditionally prepared during festivals due to variety in taste, texture and aroma. Patolis are prepared out of rice with fillings with either coconut and jaggery mix and use of turmeric leaves for wrapping. Rice is key ingredient for preparing patolis due to its starch content and gelatinizing property, which is rich in CHO making GI food. In this study an attempt was made to prepare patolis using kodo millet and addition of jaggery, coconut and other ingredients. Kodo millet (KM) is a main ingredient of patolis which is unique among the cereals that are rich in calcium, dietary fiber, protein, polyphenols, vitamins and phytochemicals, hence it is called nutri-cereals. **Methods:** The patolis were initially standardized by changing the proportion of ingredients (partially replacing with its rice) in four different variation to know the best accepted ratio (kmp 1 – kmp 4) 10-40, 25-25, 20-30, 50-0. The prepared patolis were evaluated for their sensory attributes by semi-trained panel members (n=25) using 9-point hedonic scales. The best accepted ratio was further evaluated for its nutritional quality. **Result:** Among all the variations, kmp 4(50-0) secured higher score for all the parameters. KM incorporated patolis had more dietary fiber, calcium, potassium, magnesium and less carbohydrates compared to control. **Conclusion:** A convenient food containing kodo millet was developed using the recipe of traditional snack item patolis. This product with complete replacement of rice with kodo millet modified the nutritional profile of usual patolis, and made comparatively healthier. Being a rich source of dietary fibers, kodo millet help in managing constipation by improving bowel movements. Kodo millets are gluten-free and are useful for individuals who are intolerant to gluten.

**Keywords:** kodo millet, dietary fiber, gluten-free, protein.

OP-2023-0133

**Abstract Title: Silver Nanoparticles Elicited Physiological And Biochemical Modifications In Rice Plants To Control Fluoride Stress In Nalgonda Region Of Telangana**

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**Background:** Abiotic stressors, such as fluoride stress in Nalgonda region of Telangana, have an adverse impact on the development and productivity of many economically relevant crop plants including rice, resulting in substantial yield losses that can cause food shortage and endanger long-term viability of farming. Green synthesis and nanotechnology are beneficial methods to reduce the adverse effects of synthetic industrial processes. **Methods:** The experiment focused on examining the hypothesis that silver nanoparticles (AgNPs) might induce specific changes and thereby affect plant development and final yield. The experiment was performed on a paddy plant, cultured two types of spray (fertilizer foliar spray and bryophyllum silver nitrate nanoparticles spray) for 30 days and then transplanted to the field. Synthesis of silver nanoparticles using leaf extract of bryophyllum was investigated in this study. Leaf extract was prepared by using different selected reaction conditions to prepare AgNPs with different morphologies. The comparison between crop samples was taken over a period of 5 days interval of 10, 15, 20, 25 and 28, 30 days after treatment with foliar spray, both with nanoparticles and without nanoparticles for. The results indicated that the use of nanoparticles in the foliar spray led to improved seed germination, increased germination rate and biomass compared to the samples treated without nanoparticles. **Result:** These observations suggest that the application of nanoparticles had a positive impact on the growth and development of the crop, promoting better seed germination and overall biomass production. The treatment of AgNPs on plants under fluoride stress conditions improved the photosynthetic pigments like chlorophyll and boosted the activating of scavenging enzymes. **Conclusion:** Our research showed that AgNPs regulate fluoride sensitive plant defence systems, which is a viable strategy for the development of fluoride tolerance in plants, particularly in Telangana's Nalgonda region.

**Keywords:** fluoride tolerance, silver nanoparticles (AgNPs)

OP-2023-0134

**Abstract Title: Effect of Microbial Fermentation on Anti-Nutrients Composition, Sensory Description and Consumer Hedonic Perception of Nucchumbli- A Sorghum-Based Traditional Fermented Food**

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**Background:** Anti-nutritional factors (ANFs) are naturally occurring compounds found in various foods, primarily of plant origin, that interfere with the absorption, digestion, and utilization of nutrients in the body. ANFs include compounds like phytates, tannins, lectins, oxalates, and protease inhibitors. These affect nutrient bioavailability and overall nutritional quality. When consumed by humans, ANFs bind to essential nutrients like minerals or enzymes, reducing their absorption, inhibiting proper digestion leading to nutrient deficiencies and also affect the sensory properties (appearance, texture, flavour, taste and overall acceptability) of the food. Proper food processing techniques, such as cooking, soaking, or fermentation reduce the impact of anti-nutritional factors in food and enhance the acceptance of the product. In this context the present study deals with the effect of microbial fermentation of nucchumbli, a traditional sorghum-based food of northern karnataka in regard to the anti-nutritional factors and sensory attributes. **Methods:** The various anti-nutritional factors- tannins, oxalates, phytates were determined for control and fermented food samples. The sensory profiles and consumer perception for control and fermented nucchumbli was performed by trained and sem-trained panel of subjects using sensory descriptive analysis and a 9-point hedonic scale. **Result:** Tannin content was reported to be 0.33% and 0.21% for control and fermented food samples. Likewise, oxalate



was 0.28% and 0.17% for control and samples. Phytates were estimated to be 0.24% and 0.16% for control and treated samples respectively. The results of sensory analysis indicated an increased score for all the five attributes studied for fermented food ( $p < 0.05$ ) as compared to control. **Conclusion:** the results indicated that microbial fermentation played a role in reducing the anti-nutritional factors thereby enhancing the bioavailability of the food product. The sensory analysis of the food revealed insights into its organoleptic properties and highlighted the significance of sensory attributes affecting and overall consumer preference and acceptability in influencing food quality which guide for further product development.

**Keywords:** fermentation, nucchu-ambli, anti-nutrients, sensory analysis

#### OP-2023-0136

##### **Abstract Title: Kodo Millet as Functional Ingredient in Development of Besan Barfi**

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**Background:** Indian sweets like barfi plays a role in indian culture and celebration. It is renowned for its perfect balance of sweetness and creamy texture. Burfis are made of flour, fat (ghee/butter/oil) and sugar, with other ingredients which vary by recipe. Kodo millet is a drought resistant, small grain that is gluten-free and rich in dietary fiber, vitamin and mineral. It is also loaded with antioxidants and phenolic compounds like vanillic acid, gallic acid, tannins and ferulic acid. Infusion of kodo millet into the besan-based barfi presents an opportunity to enhance the nutritional profile while maintaining its traditional flavors. The incorporation of kodo millet modify its nutritional composition by increasing fiber, protein, vitamins (niacin and riboflavin) and minerals (iron, calcium and phosphorous) content. Objective – the main objective of this study is to develop and evaluate the kodo millet enriched besan-based barfi as a nutritious and culturally acceptable alternative while maintaining their sensory characteristics and promoting healthier dietary choices. **Methods:** Barfi was prepared using besan flour and partial replacement with kodo millet. Developed barfi was compared to standard besan-based barfi. Except for the replacement of besan flour with kodo millet flour all other ingredients and procedure remains same. Besan flour was partially replaced with kodo millet flour in the ratio of (t1-t4) 90:10, 80:20, 60:40 and 50:50. The developed barfi was subjected to sensory evaluation by semi-trained panel scoring on 9-point hedonic scale. Subsequently, the chosen variation subjected to nutritional evaluation. **Result:** The combination of t4 (50:50) kodo millet incorporated barfi is scored highest in terms of taste and overall acceptability. The developed barfi had a desirable texture and balanced the traditional besan barfi smoothness. The product was enriched in dietary fiber, iron and magnesium content. **Conclusion:** Content while preserving its taste and texture making it healthier choice. The nutrient boosted barfi demonstrated higher level of dietary fiber, protein and micronutrient content nutritious substitute for traditional besan barfi.

**Keywords:** kodo millet, gluten-free,

#### OP-2023-0137

##### **Abstract Title: Development of Sorghum Roti Enriched with Oats and Evaluating its Nutritional Value**

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**Background:** Roti is one of the traditional breakfast products which have a significant place in the culinary heritage of india. Sorghum roti is favored not only for its taste but also for its nutritive attributes. In this study, sorghum roti was prepared using sorghum flour to modify its nutritional profile oats, soy bean flour, rice flour was incorporated. This will enhance the dietary fiber content, especially beta-glucan which aids in better digestion. It also enriches roti in protein, b-complex vitamin and minerals like iron and magnesium. The main objective is scientific development and nutritional evaluation of sorghum roti

enriched with oats, soybean flour, rice flour that offers a more comprehensive and nutritionally dense food option and to determine the optimal balance that maximizes nutritional enhancement without compromising with the sensory quality. **Methods:** Sorghum roti formulation was prepared by substituting a portion of sorghum flour with oats, soy flour and rice flour. Developed rotis were compared to standard sorghum roti. Except for partial replacement of sorghum flour with oats all other ingredients and procedure were remains same for all four varieties. Sorghum was replaced with oats in the ratio of (t1- t4) 90:10, 80:20, 70:30, 50:50. Developed roti was subjected to sensory evaluation from the semi-trained panelists scoring on 9-point hedonic scale. Selected variation was subjected to evaluate for its sensory attributes and nutritional quality. **Results:** The experiment data indicated that the sorghum roti with the ratio of t4 (50:50) attained highest sensory scores on par with control. The increasing proportion of oats in roti led to a consistent elevation of fiber and protein. Furthermore, the level of iron and magnesium was also higher. **Conclusion:** The incorporation of oats in the sorghum roti along with addition of soy flour and rice flour not only improved its nutritional content but also maintained its sensory acceptability. The enriched roti demonstrated higher level of dietary fiber, protein and micronutrient content, making it more promising option for those who are seeking healthier dietary choices and gluten free.

**OP-2023-0146**

**Abstract Title: Development of Masala Roti from Barnyard Millet (*Echinochloa Esculenta*)**

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**Background:** Masala roti, also known as chapati or shabaati, is a traditional unleavened flatbread originating from the indian subcontinent. It is conventionally made from wheat flour. Barnyard millet [bmr], also known as Samo is packed with immense fiber, minerals, and protein. **Methods:** Traditional dish masala roti was prepared using wheat flour and barnyard millet flour, the formulation was in the ratio of 0% (BMR), 20%(BMR1), 40%(BMR2), 60%(BMR3), 80%(BMR4), and 100%(BMR5). The developed product was subjected to sensory evaluation by 30 semi-trained panelists. **Result:** It was observed that a 60% (BMR3) variation of roti had higher acceptability when compared to the standard and others. The selected variation of roti was evaluated for its nutritional profile. **Conclusion:** When compared with the standard the developed product of BMR3 (60%) had low carbohydrate and high fiber content. Hence this made the developed product low in glycemic index. The developed product is also enriched with iron and phosphorous. Thus, the barnyard millet-based roti was superior in terms of nutritional quality compared to the standard. So, this product can be recommended for individuals dealing with obesity, CVD, and diabetic individuals.

**Keywords:** masala roti, wheat, glycemic index, samo.

**OP-2023-0160**

**Abstract Title: Role of Ginger Compounds in Anti Proliferative/Anti Cancer and Anti Angiogenesis Mechanisms of Breast Cancer Cell Lines Through 3-D Culture Approaches**

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**Background:** Breast cancer is a multifactorial disease affecting women worldwide. Several studies are demonstrating that these ginger compounds have antioxidant, anti-proliferative/anti-cancer properties. **Methods:** Our work mainly focuses on the anti-cancerous and antiangiogenic properties of ginger compounds (6-gingerol and 6-shogaol) through the 3D culture approach. To know the efficacy of these ginger compounds, we have performed anti-proliferative, anti-oxidant, apoptotic and anti-angiogenic expression analysis assays using MCF7 cells in 3D culture cells and 3D co-culture with huvec cells. **Result:** MTT results showed 47% of cell inhibition at 31.25 µm concentration of 6-gingerol, and 50% of cell inhibition at 28.45µm concentration of 6-shogaol in monolayer cultures and MTT assay in 3D cultures had shown that 50 µm concentration of 6-gingerol and 6-shogaol can inhibit the 33.5% and

45.8% of spheroid formation in MCF7 cells respectively. In similar lines, scratch assay demonstrated inhibition of proliferation and migration response (0 to 24hours) in both 6-gingerol and 6-shogaol treated cells as compared against untreated MCF7 cells. Ultrastructural analysis(SEM) demonstrated morphological changes in MCF7 cell with treatment (6-gingerol and 6-shogaol), and cell cycle analysis revealed an arrest in g1 phase of the cell cycle with 6-gingerol and 6-shogaol treatment as compared to untreated cells. Apoptosis assay was performed by annexin v apoptosis kit method. Further confirmed that 6-gingerol and 6-shogaol treatment caused around 35% and 26.7% cell death/apoptosis respectively as compared to controls (0.2%). Our present findings advocate the potent anti-cancer, anti-proliferative and anti-angiogenic effects of ginger compounds in the management of breast cancer. **Conclusions:** Our study shows potent inhibition rendered by ginger compounds (6-gingerol and 6-shogaol) on the proliferation and growth of cancerous cells and anti-angiogenic properties.

**Keywords:** 6-gingerol and 6-shogaol, apoptosis, MCF7

#### OP-2023-0164

**Abstract Title: Development and Evaluation of Plant Based Milk Alternatives for Sustainable Nutrition**

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**Background:** Plant based milk or vegan milk or non-dairy milk alternatives is a rapid growing field in food processing and product development sector. At present there are more consumer concerns regarding adverse health effects of consuming diets high in animal protein, high calorie and fat. . Hence, the present study made an attempt to develop plant based milk using economic and locally available ingredients. **Methods:** Millets are grains high in essential nutrients and dietary fibre. Whereas pulses are superior vegan sources of protein. Hence vegan milk was conceived and developed using ragi (millet) and bengal gram dhal (pulse). This unique cereal-pulse combination provides effective nutrient contribution of the vegan milk. Dried ginger and cardamom powder was used to flavor the developed vegan milk. The development process includes a series of process such as cleaning, soaking, cooking, grinding, milk extraction, homogenization and sensory evaluation. **Result:** After product development, the vegan milk was analyzed to determine the nutrient composition and food safety parameters. The developed vegan milk contributes good amount of protein per serving and serves as an economic alternate for milk. **Conclusion:** Vegan milk further serves as a nutrition source for people with lactose intolerance and galactosemia who are intolerant to milk and milk products. As the product development process is simple and economic, it can be easily adopted for scaling up and also as an alternate for milk.

**Keywords:** vegan, extraction, homogenization, intolerance, galactosemia

#### OP-2023-0166

**Abstract Title: Nutrient, Antinutrient Profile and Digestability of Commercial Millet Based Baked Products**

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**Background:** Millets are considered gluten-free grains that have a high nutritional profile compared to other cereals. Hence, the use of millets has raised rapidly over the years in both, commercial products as well as regular household usage. Further, increased awareness of health benefits of millets and their products among the population has led to an increased purchase of commercial millet-based baked products. Therefore, this study aims at evaluating the nutrients, antinutrient profile, digestibility and verifying the reliability of the nutrition information provided on the package of the most often purchased commercial millet-based baked products in the local market. **Methods:** Based on the market survey,

the most commonly purchased and locally available cookies, rusk and crunchies were selected. Each moisture/fat-free samples were analyzed for fat (soxhlet method), protein (kjeldahl method), protein digestibility (enzymatic method), phosphorous (aoac), iron (wong's method) and antinutrients (condensed tannins, soluble polyphenols and phytic acid) in duplicates. **Result:** The difference between the findings from analysis and nutrition label were compared with standard nutrition label guidelines of FSSAI. The analyzed protein content of five among six products deviated from the acceptable range of  $\pm 20\%$  from their nutrition label claims. Likewise, fat content of two among six products deviated from the acceptable range. All products were good sources of phosphorous ( $\geq 15\%$  of rda) while pearl millet crunchies had a high iron content ( $\geq 30\%$  of RDA) and kodo millet cookie were a good source of iron. Both little and kodo-millet cookies had low content of condensed tannin (111.6 mg/100g catechin equivalents) and phytic acid (0.917 mg/100g) respectively. Kodo millet cookie had the highest soluble polyphenol content (18.1 mg/100g gallic acid equivalent). **Conclusion:** The analyzed values deviated significantly from the information displayed on the nutrient labels. However, considering the higher content of bioactives in these ready to eat products, millet based baked foods may be a better alternative to conventional products.

**Keywords:** nutrition-label, ready-to-eat-products, processed-foods, tannin, polyphenols

OP-2023-0167

**Abstract Title: Nutrients, Anti-Nutrient Profile, Protein Digestibility in Commercially Available Millet-Based Infant Foods**

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**Background:** Millets are nutritionally comparable to major cereals and serve as good source of protein, micronutrients and phytochemicals. Most of the commercial weaning foods are incorporated with wheat, which causes food allergies. Therefore, it is necessary to develop weaning food with alternatives that are easily digestible and to adequately meet nutritional needs of infants. Since, it is insufficient to substitute major cereal grains with millet solely, it is essential to employ appropriate processing techniques to reduce anti-nutrient content and enhance digestibility. In this study, the most-commonly purchased commercially-available weaning foods were evaluated for their nutrients, anti-nutrients and protein-digestibility and compare the analysed values with the nutrition labels of the respective products.

**Methods:** Based on the market survey conducted, four popularly used commercial millet-based infant foods were selected for analysis. The samples (in duplicates) were analysed for fat(soxhlet method), protein(kjeldahl method), in-vitro protein digestibility(enzymatic method), phosphorus(AOAC), iron(wong's method) and antinutrients(condensed tannins, phytic acid and total polyphenols). **Result:** The samples subjected for analysis exhibited varied results with respect to the standard nutrition label guidelines of fssai. Three out of four products deviated from their nutrition label claims by  $\pm 20\%$ . The samples analysed for protein digestibility projected a similar trend among fruit-based (90%-92%) and multi-millet grain-based infant foods in the range of (98%-99%), which benefits its intake to the infants. Although two of four samples' fat composition deviated from the claim, it was found to be low, contributing only 14% of the rda per day. The analysed iron content contributed to 50% of rda that is present in the range of 2.6-5.7mg/100g and phosphorus content were contributing about 77% of the RDA (317-415mg/100g). One of the multi-millet based infant-foods, had higher anti-nutrient content compared to the other three samples, whose condensed tannin content was 99mg/100g, phytic acid (1mg/100g) and total polyphenols (10.4mg/100g), whereas others contained in the range of 24-64mg/100g, 0.4-0.9mg/100g and 4.9-6.9mg/100g, respectively. **Conclusion:** Despite the fact that some of the evaluated products did not meet the nutritional claims, millet-based-infant-foods may be considered as a way to increase the variety of foods available to infants due to their enhanced digestibility and decreased anti-nutritional factors. **Keywords:** Condensed-tannins, phytic-acid, nutrition-claims, total-polyphenols, phosphorus

OP-2023-0168

**Abstract Title: Effect of Soaking and Germination on Antinutrients and Antioxidant Profile of Selected Minor Millets**

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**Background:** Millets are highly nutritious crops, but the anti-nutrients present are a limitation for effective nutrient utilization. Due to increased consumption of millets, evaluating the effects of common processing techniques such as soaking and germination on anti-nutrients and antioxidant activity are essential for understanding their nutrient availability. Thus, present study was conducted to evaluate the effect of soaking and germination on anti-nutritional and antioxidant profile of selected minor millets.

**Methods:** Commonly consumed millets in the region that is proso, kodo, browntop and little millets were selected for the study. The grains were germinated for 48 hours at temperature of  $25\pm 2^\circ\text{C}$  and relative humidity of  $60\pm 2\%$  in the dark after soaking for 12 hours. They were then dried to a final moisture content of  $<10\%$  and estimated for soluble phenols, antioxidant components and alpha amylase activity.

**Result:** Even though it was statistically insignificant, soluble phenols and soluble flavonoids had reduced with soaking but increased after germination in all the millets. The raw and germinated millets displayed superior antioxidant activity ranges 1977.08 to 3079 mmol aae/100g than the corresponding soaked samples. While, phytic acid decreased from 2.8mg/100g to 0.61mg/100g amongst all the millets after germination and soaking. Soaking and germination decreased condensed tannins in kodo and little millet but increased in browntop and proso millet. Amylase activity increased during both soaking and germination in majority of the millets except kodo. In germinated millets, soluble flavonoids were significantly and positively correlated with condensed tannins ( $p = 0.001$ ) and phytic acid ( $p = 0.013$ ). Whereas phytic acid was also significantly and positively correlated with frap values ( $p = 0.05$ ).

**Conclusion:** In-terms soluble flavonoids and frap activity, raw millets were found to have a superior nutritional profile than others. The germinated millets were also found to contain a higher concentration of soluble phenols than the other samples. Although, germination had a greater effect than other processing methods, the aforementioned disparity may be attributable to the fixed germination duration of up to 48 hours, which may not be optimal for household practices. Additional research is required to determine the effects of soaking time, humidity, and temperature on these outcome variables.

**Keywords:** minor-millets, soluble-phenols, soluble-flavanoids, condensed-tannins, alpha-amylase

OP-2023-0170

**Abstract Title: Comparison of Drying Characteristics of Tomatoes with Sustainable Different Drying Systems**

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**Background:** This study aims to analyze the drying efficiency of tomatoes using open sun and solar polyhouse tunnel drying. Both drying technologies are sustainable and effective and are being used for food processing and to reduce post-harvest loss by the stakeholders including farmers, food processors, and industries etc. It was noted that there is a lack of comprehensive data on the drying parameters of food in these technologies. This study investigates the drying characteristics with respect to the drying parameters of tomatoes and comparing both technologies. **Methods:** Fresh and ripe tomatoes of akshaya variety were selected, graded, sorted and segregated into two equal portions for drying in the solar tunnel polyhouse and in the open sun. The drying parameters including temperature and humidity were monitored over a time of two hours using a sensor. Physicochemical parameters such as lycopene, carotenoids, moisture, ash and microbial assays were identified by using standard methodology suggested by AOAC (1995). **Result:** The tomatoes were dried inside the polyhouse at a higher temperature and lower humidity of  $41.49\pm 4.81^\circ\text{C}$  and  $49.76\pm 10.84\%$  whereas in the open sun drying, which was  $33.70\pm 8.83^\circ\text{C}$  and  $65.49\pm 26.47\%$ . Moisture content in both dried samples revealed that the sun-dried tomato sample had a higher moisture percentage of 10.49% than the solar polyhouse.



In addition, the open sun-dried tomato samples showed a higher loss of pigments such as lycopene and carotenoids. The lycopene and carotenoids in the sun-dried sample were  $20.35 \pm 0.21$  and  $31.7 \pm 0.14$  mg/ 100 g of sample whereas in the solar tunnel polyhouse it was  $24.25 \pm 0.21$  and  $33.9 \pm 0.14$  mg/100 g of sample. Furthermore, the total microbial count and fungal growth were observed more in the sun-dried sample due to the higher humidity tunnel and sun drying required more time for dehydration than the solar polyhouse tunnel drying. **Conclusion:** It can be concluded that the solar tunnel polyhouse emerges as a cost-effective, time-efficient, energy-efficient, and sustainable solution for dehydration along with improved shelf stability, enhanced physiochemical characteristics, and nutrient retention. These findings along with comprehensive data collection provided valuable insights into the changes that occur during tomato drying in different systems, including their nutritional aspects.

**Keywords:** tomato; polyhouse; drying; sustainable; technology

#### OP-2023-0171

**Abstract Title: Impact of Cooked Millet Diet on Haemoglobin and Body Composition among Anemic Women of Reproductive Age (17-22 Years)**

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**Background:** Anemia is a persistent global health issue in reproductive-age women. Dietary diversification with iron-rich millets offers a sustainable approach to enhance iron intake. In this context, inclusion of millets rich in iron and other micronutrients may improve the haemoglobin levels and may address the problem of iron deficiency anemia. Our study aimed to assess the impact of millet consumption on haemoglobin, micronutrient status, and body composition among anemic women of reproductive age group. **Methods:** We standardized 20 recipes and selected 8 for sensory evaluation on 60 untrained students using a 9-point hedonic scale. A cluster randomized controlled trial was conducted at telangana's social/tribal welfare residential degree college, involving mild to moderate anemic women aged 17-22. The intervention group consumed millet-based meals (pearl millet, finger millet, and foxtail millet) for 4-5 months, while the control group maintained their regular diet. Haemoglobin, blood parameters and body composition were analyzed at both baseline and endpoint. **Result:** Among pearl millet recipes, bisibele bath, kichadi, and pulav had acceptability scores of  $7.95 \pm 0.94$ ,  $7.07 \pm 1.34$ , and  $6.48 \pm 1.70$ , respectively. For foxtail millet recipes, pulihora and pulav scored  $8.47 \pm 0.81$  and  $7.50 \pm 1.24$ . Among finger millet recipes, ragi idly, ragi laddu, and ragi malt scored  $8.42 \pm 0.69$ ,  $7.23 \pm 1.73$ , and  $6.48 \pm 2.39$ , respectively. A total of 822 mild to moderately anemic women participated (409 in the intervention group, 413 in the control group). The baseline and endline mean haemoglobin levels in the intervention group were  $10.40 \pm 1.09$  and  $10.48 \pm 1.46$ , while in the control group, they were  $10.45 \pm 1.06$  and  $10.291 \pm 1.3536$ , respectively. However, adjusting for baseline haemoglobin levels, there was a significant increase in haemoglobin levels at the endline for the intervention group as compared to control group, showing a mean increase of 0.22 (95% CI 0.07-0.36,  $p=0.003$ ). Additionally, there was a significant mean difference among intervention and control group in body fat mass (-0.3900) and percent body fat (-0.7316). **Conclusion:** Pearl millet bisibelle bath, foxtail pulihora, and ragi idly were preferred recipes. Replacing a cereal meal with a millet meal for breakfast or lunch can enhance haemoglobin levels and reduce body fat in anemic reproductive-age women.

**Keywords:** anemia, women, millets, body composition, micronutrients

#### OP-2023-0192

**Abstract Title: A Study On The Nutritional Composition And Antioxidant Properties Of Granola Bar Using Germinated And Malted Finger Millet**

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**Background:** India is the largest producers of finger millet with an area of 1138.2 thousand hectares and production of 1821.9 thousand tones in 2015-16. It has excellent protein quality, well-balanced amino acid profile and considered as most nutritious grains. Micronutrients like calcium, phosphorous, iron, thiamine, riboflavin and nicotinic acid are present in ample amounts. Ragi is rich in bioactive compounds that contribute to antioxidant and antimicrobial properties. Various processing techniques like roasting, germination, and fermentation are known to reduce anti-nutritional factors to a safe limit. As fast foods has increased risk of ncd's, hence there by knowing the health benefits, help in shifting from fast foods to nutritious foods. The product was formulated by varying the germination time of ragi i.e. 24 and 48 hours and evaluated for moisture, protein, fat, crude fibre, calcium, phosphorus, iron, TPC and RSA

**Methods:** the materials were procured from the local and super markets . Both the product variation was evaluated for moisture content, protein (micro kjeldal method), fat (soxhlet method), crude fibre (aina et al), calcium (titrimetric method), phosphorus (spectrophotometric method), iron (wong's method), total phenolic content and radical scavenging activity (DPPH method). **Result:** In this study sensory analysis showed that panellist acceptability was slightly greater towards 2nd variation. Due to low moisture activity the storage stability was high, when analysed for FFA and PV showed greater shelf life. As germination time increased there was decrease in the protein and polyphenol content ( $7.37g \pm 0.02$  &  $7.03g \pm 0.07$ ) and ( $207.50mg \pm 12.50$  &  $105mg \pm 5$ ) respectively, crude fibre increased as the germination time increased ( $2.30\% \pm 0.05$  &  $2.50\% \pm 0.05$ ). Mineral content was high, iron content increased due to the processing equipment used. Radical scavenging activity was high ( $83.72 \pm 0.52$  &  $83.72 \pm 0.52$ ), due to presence of polyphenols walnuts. **Conclusion:** Germination time had significantly impacted the nutritional attributes of the product. As the product is rich in its nutritional profile which helps in growth and development of the individuals it can act as the vehicle to combat nutrition deficiencies among individuals. Overall the production cost is low and help in combating malnutrition among low socio-economic groups and encourage in consuming nutritious foods.

**Keywords:** granola bar, germination, malting, antioxidants

OP-2023-0193

**Abstract Title: Simultaneous Estimation of Pro-Vitamin A (Beta Carotene), Vitamin A (Retinol), and Anthocyanins (Peonidin And Cyanidin) in Biofortified Sweet Potato Varieties Using Liquid Chromatography and Mass Spec**

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**Background:** Sweet potatoes, a nutrient-dense crop are recognized as a potential functional food to mitigate an array of nutritional disorders. In india, sweet potato is considered a secondary staple crop due to its unique nutritional properties. Owing to its high consumption, food interventions like biofortification has been made to enrich the essential bioactive compounds (carotenoids and anthocyanins). **Methods:** the aim of this study is to develop and validate an optimized UPLC-MS/MS based analytical method for the simultaneous estimation pro-vitamin A, vitamin A, and in two biofortified sweet potato varieties (bhu-krishna & bhu-sona). **Result:** The linearity range was 400 to 2000ng/ml for cyanidin chloride, 850 to 3000ng/ml for peonidin 3-glucoside, 900 to 3500ng/ml for  $\beta$ -carotene and 60 to 500ng/ml for retinol. Furthermore, the extraction process was optimized for beta carotene and anthocyanins from the sweet potato samples with an extraction efficiency of more than 85%. **Conclusion:** The current developed method is validated using ICH guidelines (Q2R1) and can be applicable in sweet potato quantification and in vitro digestion studies for determining the bioaccessibility, evaluate stability and access the nutrient interactions.

**Keywords:** sweetpotato, biofortification, bhu-sona, bhu-krishna, LCMS



OP-2023-0199

**Abstract Title: Studies on the Physiochemical Analysis and Sensory Quality of Functional Shrikhand Prepared from Soyamilk**

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**Background:** A traditional indian sweet delicacy, called shrikhand was created with strained yogurt, sugar, and other seasonings. But as the demand for dairy-free and vegan products grows, so does the need for substitutes of dairy products. Functional soya shrikhand (FSS) provides a vegan alternative to the traditional dish, it was made from the strained milk of soybean seed, which used soya yogurt as the basis; whereas an alternative of sugar, honey was used for greater health. The purpose of this study add to the growing body of information about dairy substitutes by examining the nutritional composition by physiochemical analysis, and sensory properties of soya shrikhand. **Methods:** The development of fss began with the preparation of soymilk which was followed by soaking, grinding, and extraction of the soyabean seeds bought from the local market. From this, soya yogurt preparation began by adding mixed starter cultures comprised of streptococcus thermophilus, lactobacillus delbrueckii, and L. Bulgaricus. After incubating for 8 hours, "chakka" was prepared. By adding quantitative honey instead of simple sugar with it, FSS was prepared. Over the course of 21 days during storage at 4°C, the physical properties were analyzed. The protein, moisture, antioxidant, total solids, and ash contents of the control (dairy shrikhand) and the prepared shrikhand were analyzed in triplicate using standard procedures (AOAC 2005). The sensory properties were analyzed by 7-point hedonic face scale to check the overall acceptability. **Result:** As a result, the systematic analysis of the physiochemical study displayed the approximate composition of the prepared product, which was significantly different in protein, carbohydrate, and antioxidant contents from market-based dairy shrikhand. The sensory analysis showed desirable sensorial effects due to the presence of the honey which helps in the enhancement of the flavour. **Conclusion:** The results indicate that FSS has unique physiochemical and sensory properties. This study also provides further understanding with the components of the product, which could be helpful to treat specific metabolic diseases due to its high-quality nutrients.

**Keywords:** soya yogurt, soyamilk, vegan, honey.

OP-2023-0201

**Abstract Title: Green Synthesis and Characterization of Zinc Oxide Nanoparticles from Rosa Damascena**

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**Background:** Plant extracts mediated synthesis of metal oxide nanoparticles has been developed to minimize the toxic and harmful impacts of chemical and physical methods. **Methods:** The green synthesis of zinc oxide nanoparticles (ZnO-NPs) from the petals extract of Rosa Damascena (rose) was used as a reducing and capping agent, while salt solutions (Zinc nitrate) were used for the bio-reduction of metal precursors, leading to the formation of zinc oxide nanoparticles. They were characterized using UV-Vis spectrophotometer, Scanning Electron Microscope (SEM), Fourier - Transform Infrared Spectroscopy (FTIR) and X-Ray Diffraction. **Result:** The results showed that the maximum absorbance of zinc oxide nanoparticles in the range of 350 nm. The presence of particular peaks in the FTIR verified the synthesis of zinc oxide nanoparticles. The X-ray diffraction (XRD), the average size of the nanoparticles was estimated to be 34.2nm. The SEM denotes the hexagonal crystal structure with an average diameter equal to 50nm. Hence, comparing to chemical synthesis of zinc oxide nanoparticles, biological synthesis is considered to be simple, cost-effective and eco-friendly.

**Conclusion:** Bio - based green nanotechnology aims to characterize compounds from natural sources and establish efficient routes for the preparation of non toxic materials that have applicability in biodegradable and biocompatible packaging materials

**Keywords:** Rosa Damascena, green synthesis, characterisation

**OP-2023-0206**

**Abstract Title: Assessment of Quality Attributes and Shelf Life of Machine Processed Malt Versus Traditionally Prepared Malt**

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**Background:** The Process of Millet Malting Entails Soaking, Germinating, And Drying Millet grains to create malt, a crucial component in the production of malted millet products. While this process has been practiced for centuries, it is typically done manually and can be time-consuming, labour-intensive, and inconsistent in quality. Currently, germination is done in closed rooms by most of the small scale manufacturers/self help groups. Hence the objective of the study involved understanding the effectiveness of using malted flours from malting machines which could make the process of producing malted millet more accessible and sustainable. **Methods:** 100kg millets of same variant were used for the study. 50kg millets were malted using the traditional method of malting and 50 kg were malted using machines like germination chamber, dryer, roaster. Both malted flours were assessed on basis of following parameters : sensory (taste, texture, aroma, colour), nutritional values, microbial contamination, shelf life, time required. **Result:** Traditional malted flour: slight bitterness, values of iron and zinc are less around 10% due to incomplete sprouting, microbial load of e coli bacteria and fungus is high and hence reduced shelf life, requires minimum 4 days considering good climatic conditions (no rains) malted flours in machines: sweeter taste due to complete germination, increased values of iron and zinc, negligible microbial load, hence better shelf life. Entire process completed in 1day irrespective of climatic conditions

**Conclusion:** The processing of malts using the machine produces even colored, damage free bulk malt, free from molds, taints and uniquely consistent and uniform malt compared to the traditional prepared malt. The machinery production method adopted using germination chambers serves useful for bulk malt preparation done by self-help groups/small scale manufacturers.

**Keywords:** millet malting

**OP-2023-0208**

**Abstract Title: A Study on Preparation and Evaluation of Value Added Product of Giloy.**

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**Background:** Giloy, a medicinal plant in India known for its ayurveda benefits. It is having various properties including boosting of the immune system, detoxification and protection against kidney damage. The plant contains compounds with antimicrobial, anti-inflammatory, antioxidant and antidiabetic properties. But due to its bitter taste, sometimes it is difficult to take as a medicine. Hence the objectives of this study are to enhance the acceptance of Giloy & analyze the nutritive value of giloy products. **Methods:** The giloy plants were collected from the kitchen garden. The collected giloy stem were dried & grinded to fine powder to prepare two products- giloy papad & giloy bori. Giloy papad was prepared by using semolina & giloy powder. Giloy bori was prepared from urad dal & giloy powder. In the first phase of the study, the nutritive value of the two products were analyzed & compared. In the second phase, sensory evaluation of the two products were done at nine-point hedonic scale. **Result:** The nutritive values of giloy products (giloy papad & giloy bori) were analyzed. It was found that two products are highly enriched with nutrients (energy, carbohydrate, calcium, iron, copper, zinc). Through organoleptic study it was established that these products are tastier & flavorsome than raw giloy powder. Using z-test & p-value it was shown that there was no significance difference in taste & flavor between giloy papad & giloy bori. **Conclusion:** A plant with as diverse a role as *Tinospora cordifolia* is a versatile

resource for all forms of life. Active compounds present in giloy have immunomodulatory and physiological roles of different types, thereby demonstrating the diverse versatility of the plant. Both the products are enriched with nutrients & as there is no significance difference in taste & flavor so according to need one can choose any of the product. So these products will be more acceptable for human being specially for the patients of diabetes, liver diseases, urinary tract infections or any kind of heart related issue.

**Keywords:** giloy, nutritive value, organoleptic study

#### OP-2023-0214

**Abstract Title: Phytochemical Analysis of *Trianthema portulacastrum* linn. (Puruni Saaga) A Nutritious Leafy Vegetable of Odisha**

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**Background:** Odisha is a state located in the northeastern part of India which is endowed with potential medicinal plants owing to its peculiar topography and geographically distributed various microclimatic locations. Previously many ethnobotanical studies have documented the indigenous plants used for diet as well as treatment of various bone related diseases by the traditional and local healers of Odisha. But few have analysed the phyto-chemicals in the documented plants. **Methods:** Hence the purpose of this study is to identify the phyto-components present in *Trianthema portulacastrum* linn. (Puruni Saaga) plant through gas chromatography-mass spectroscopy followed by NIST-library search for the identification of chemical compounds. **Result:** Phytochemical analysis of methanolic extract of *T. Portulacastrum* reveals the presence of alkaloids, flavonoids, terpenoids, saponins, and phenolic compounds. Certain peculiar compounds like manitol, ratalin and humulene (anti-carcinogenic, anti-obesogenic, anti-allergic and anti-inflammatory compound) are evident from the GC-MS analysis of the root extract which were not reported before. The proximate analysis of the leafy part showed that it is a good source of dietary protein (11%), fiber (38%), K (1.85%), Ca (3.01%), P (100.8PPM), Mg (1.68%), Fe (115.92 PPM), and Zn (5.98 PPM). **Conclusion:** Hence it can be concluded that this plant contains both medicinal and nutritional treasures, which needed to be explored more and more. It can also be concluded that the traditional leafy vegetables consumed by our ancestors should be reintroduced to the modern society with scientific evidences for their health benefits so that people can accept them more rather running after the hyped super foods.

**Keywords:** *Trianthema portulacastrum* linn, phyto-chemicals, GC-MS

#### OP-2023-0215

**Abstract Title: Determination of Dietary Fibre Properties of Extracted Dietary Fibre from *Musa Bulbasiana Colla* (Bheem Kol)**

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**Background:** *Musa Bulbasiana Colla* (Bheem Kol) is a native banana species grown in Assam. Its pseudostem is an integral part of Assamese cuisine and is known to exhibit health benefits in numerous ways. The pseudostem has abundant dietary fibre content (60-80%), which is an important functional component of diet relating to the prevention and management of several health conditions. The present study is designed to extract the dietary fibre from *Musa Bulbasiana Colla* and assess its dietary fibre properties. **Methods:** *Musa Bulbasiana Colla* was collected from Jorhat, Assam. The outer sheath of pseudostem was peeled off to obtain the inner central core (diameter < 6 cm), cut into thin slices and dried at 50 °C for 48 h. Dietary fibre was extracted using alkaline extraction method. Total dietary fibre, insoluble dietary fibre and soluble dietary fibre was estimated using AOAC methods. Functional properties were determined using standard methods. **Result:** Total dietary fibre, insoluble dietary fibre and soluble dietary fibre composition (%) were 77.05±0.06, 73.88±0.19 and 3.16±0.12, respectively. Bulk density was 0.47 g/ml. Water holding capacity and oil holding capacity were 12.72±0.13 g/g 5.60±0.24 g/g, respectively. Comparative analysis with pseudostem flour shows significant increase (p<0.05) in all the above parameters as compared to the extracted dietary fibre. **Conclusion:** The study

reveals that dietary fibre extracted from *Musa bulbosiana* colla pseudostem exhibits good dietary fibre properties and can be utilised as a sustainable dietary fibre supplement. This will further prevent its large scale wastage and associated environmental and economical loss.

**Keywords:** banana, pseudostem, extraction, dietary, fibre

**OP-2023-0222**

**Abstract Title: Nutritional Analysis of Thirty-One Varieties of Chickpea (*Cicer Arietinum*) Developed through Various Breeding Techniques for Selected Agronomic Traits**

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**Background:** Chickpea has large variation in its types and nutrient composition, owing to diverse environmental conditions, breeding techniques, and cultivars. It should be determined whether these phenomenal differences are consistent within and across different environments, to identify its true nutritional potential. With this objective in mind, thirty-one varieties of chickpea developed for various geographical conditions and agronomic traits like high yield, resistance to diseases, tolerance to abiotic stress, and cultivated across different states in India, and countries like Ethiopia, Kenya, Bangladesh, and Myanmar, were procured and analyzed for their nutrient composition and compared for potential differences in nutritional parameters. **Methods:** Thirty-one varieties of chickpea, cultivated at the ICRISAT, Telangana, India, were obtained along with two local varieties, from Hyderabad, India. Moisture, ash, crude fiber, fat, and protein were estimated using the AOAC 2000 method. Available carbohydrate was estimated by the modified Anthrone method using the Megazyme kit. Mineral/elemental analysis was done using flame atomic absorption spectrometry (AAS) using Shimadzu AA 7000 - flame atomic absorption spectrophotometer. The data obtained were analyzed using ANOVA with significance at  $p < 0.05$ . **Result:** The chickpea varieties analyzed were found to be rich in proteins (16.09-22.98g/100g) and dietary fiber (10.33-26.33g/100g) with moderate amounts of carbohydrates (34.20-54.72g/100g) and significant quantity of minerals like calcium (127.50-184.66mg/100g), sodium (22.70-31.52mg/100g), and iron (4.55-8.33mg/100g). The phosphorous content (285.92-528.31mg/100g) was higher in all the varieties in comparison with the local ones. The Dilaji variety contains the highest protein quantity (22.98±0.02g/100g), lowest fat content (4.78±0.13g/100g), moderate amounts of carbohydrate (37.22±0.28g/100g), and substantial dietary fiber content (24.40±0.33g/100g). **Conclusion:** This study has contributed to the knowledge of the nutritional composition of chickpea from various geographical areas and developed through various breeding techniques. The data also verifies that the chickpea varieties developed using crop improvement techniques (ICRISAT varieties) are similar to or better than the locally available ones for all the nutritional constituents that were analyzed in this study. This can address the common misconception among the public about the health and nutritional aspects of crops that are genetically variant or altered for various agronomic traits.

**Keywords:** Chickpea, nutrition, minerals, breeding techniques

**OP-2023-0224**

**Abstract Title: Development of Vegan Cupcakes by Incorporation of Flaxseed Gel and Lady's Finger Gel and Analyzing its Sensory Characteristics.**

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**Background:** The flax seed gel and lady's finger gel has various polyphenol and phytochemical properties and also provides various health benefits. Okra mucilage is a highly viscous polysaccharide, directly related to their bioactive properties. The present study was aimed to develop vegan cupcake with incorporation of different proportion of lady's finger gel and flax seed gel. **Methods:** The procured raw materials including okra, flax seed and refined flour was mixed in appropriate amounts, and cupcakes were formulated following a specified recipe. In the place of eggs and butter, okra and flax

seed gel and vegetable oil has been used. The okra and flax seed gel has been extracted by heating in water at 80°C for 10 minutes. Then the water based gel has been filtered and used in the recipe. The cupcakes were divided in four groups, one is control, and the other variant have the flax seed gel (100%) okra gel (100%) and flax seed and lady's finger gel (50:50). The sensory parameters and the total microbial count of the most accepted sample has been analyzed. **Result:** The sensory parameters like colour, texture, taste, flavor has been analyzed using the 0 to 9-point rating scale with the help of semi trained panelists. The overall mean acceptability and sd for different formulation incorporated with 50% okra gel and 50% flax seed gel is  $7.1 \pm 1.3$ , for 100% flax seed gel, it is  $6.73 \pm 0.7$ , for 100% okra gel, it is  $6.9 \pm 0.8$ . The total microbial count 50% okra gel and 50% flax seed gel was analyzed and found to be  $3.6 \times 10^3$  /g log cfu/g which lower than the control sample,  $11.1 \times 10^3$  /g log cfu/g. **Conclusion:** Using okra gel and flax seed gel in the place of egg is found to be effective in the process of baking. These cupcakes were more nutritious compared to available conventional recipes. APParently, no health hazard was found in these cupcakes. Some sensory characteristics of cupcakes were slightly lower and comparable to the common cupcakes but the antimicrobial property of the lady's finger gel prolongs the shelf life to an extent.

**Keywords:** vegan, cupcakes, flaxseed, okra gel

**OP-2023-0228**

**Abstract Title: Innovative Products with Incorporation of Kodomillet and Jackfruit Seed Powder**  
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**Background:** Kodo millet and jackfruit seeds were recognize for their rich nutritional profile, encompassing carbohydrates, proteins, dietary fiber, and essential minerals like calcium, iron, potassium, and phosphorus. This study explores the potential of incorporating these locally available ingredients into food products to augment their nutritional value, thereby introducing novel opportunities in market for cost-effective, nutrient-enriched foods. **Methods:** The primary ingredients for product development were Kodo millet and jackfruit seed powder. Various recipes, Nutribar, soup mix, and instant idiyappam were formulate with these ingredients. Organoleptic evaluations of the prepared products had conducted. Comprehensive nutrient analysis encompassing carbohydrates, proteins, dietary fiber and essential micronutrients (calcium, iron, zinc, phosphorus, magnesium, and vitamin C) had performed. Furthermore, an alpha-amylase inhibition assay and microbial analysis executed for the developed products. The Kruskal-Wallis test was employed to ascertain preference differences and calculate mean rank values for the different variations of products incorporating Kodo millet and jackfruit seeds. **Result:** The study yielded three distinct products, namely Nutribar, soup mix, and instant idiyappam. Thorough organoleptic evaluation revealed the optimal ratios of Kodo millet and jackfruit seed powder to be 60:40 (instant soup mix and idiyappam) and 70:30 (nutribar), ensuring desirable sensory qualities. These recipes proved to be rich sources of essential nutrients, including carbohydrates, proteins, calcium, fiber, and iron. Microbial analysis indicated an extended shelf life for instant idiyappam in comparison to the other products. Notably, both nutribar and instant idiyappam exhibited significant inhibition of alpha-amylase activity, suggesting their potential in regulation of blood sugar levels. **Conclusion:** This study underscores the prospect of incorporating Kodo millet and jackfruit seed powder in development of convenient, nutrient-rich food products. The selected variations of these ingredients not only offered appealing sensory characteristics but also maintained a balanced nutrient composition while demonstrating alpha-amylase inhibition activity. These findings contribute to the evolving understanding of harnessing underutilized food sources to enhance nutritional and health benefits.

**Keywords:** kodo millet, jackfruit seed, nutribar,

**OP-2023-0232**

**Abstract Title: Green Synthesis and Characterization of Zinc Nanoparticles using Punica Granatum Peel Extract, Phytochemical Screening**

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**Background:** Plant-based nanoparticles (NPs) have many advantages over physical and chemical methods and featured with several medicinal and biological applications. In this study, zinc oxide NPs (ZnO-NPs) were synthesized using pomegranate peel aqueous extract, under mild and ecofriendly conditions. **Methods:** The ZnO-NPs structure, morphology, and optical properties were investigated using X-ray diffraction (XRD), scanning electron microscope (SEM), Fourier transform infrared (FTIR), and ultraviolet-visible (UV-Vis). **Result:** The results indicate a hexagonal structure with particle size increases as extract concentration increase ( $D = 18.53, 29.88, \text{ and } 30.34 \text{ nm}$ ), while the optical bandgap was decreased ( $E_g = 2.87, 2.80, \text{ and } 1.92 \text{ eV}$ ). Physicochemical properties support the usefulness and efficacy of the reported bio-route for production of ZnO-NPs and may encourage its application for large-scale production. **Conclusion:** The green synthesis of zinc oxide nanoparticles using Pomegranate peel extract was considered successful. The aqueous extract of Pomegranate peel was able to reduce zinc nitrite solution to zinc oxide nanoparticles. The peel extract is taken and allowed to stir in a hot plat for 4-5 hours and a paste like consistency was formed and that is place in a crucible and kept for calcination for 2hr  $400^\circ\text{c}$  overnight. The characterization of the ZnO Nanoparticles from pomegranate peel is done with the X-ray Diffraction analysis, Scanning Electron Microscope, Fourier Transform Infrared Spectroscopy, Uv-vis Spectrophotometer. The presence of secondary metabolism like saponins, flavonoids, phenols, terpenoids and tannin was confirmed by testing the phytochemical screening method. As ZnO Nanoparticles has the antimicrobial properties, it can be incorporated in the food packages to extend its shelf life.

**Keywords:** Punicagranatum, Zincoxidenanoarticles, Characterization, Phytochemical Screening

OP-2023-0234

**Abstract Title: Synthesis and Characterization of Zinc Oxide Nanoparticles from Clitoriaternatea Flower Aqueous Extract and Testing Its Potential as a Food Additive**

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**Background:** synthesizing zinc oxide nanoparticles from Clitoria ternatea flower aqueous extract and testing its potential as a food additive. This is an interesting area of study where natural extracts are utilized for nanoparticle synthesis and potential applications in the food industry. **Methods:** Collection of Clitoria ternatea Flowers: Describe the source of Clitoria ternatea flowers. Explain the method of collection and authentication. 2. Preparation of Aqueous Extract: Detail the procedure for preparing the aqueous extract from Clitoria ternatea flowers. Mention the extraction parameters such as solvent-to-flower ratio, temperature, and duration. 3. Synthesis of Zinc Oxide Nanoparticles: Outline the synthesis method, involving the use of Clitoria ternatea flower aqueous extract as a reducing and capping agent for zinc oxide nanoparticles. Specify the reaction parameters like temperature, time, and concentrations of reactants. 4. Characterization Techniques: X-ray Diffraction (XRD): Explain the XRD analysis to determine the crystalline structure and phase purity of the synthesized nanoparticles. Scanning Electron Microscopy (SEM): Describe SEM imaging for observing the morphology and size of the nanoparticles. Transmission Electron Microscopy (TEM): Detail the TEM analysis to visualize the nanoparticles at the nanoscale level. Fourier Transform Infrared Spectroscopy (FTIR): Explain FTIR analysis for identifying functional groups involved in the nanoparticle synthesis process. 5. Testing the Potential as a Food Additive: Preparation of Food Samples: Describe the type of food samples used (e.g., liquid, solid) and their preparation method. Incorporation of Zinc Oxide Nanoparticles: Explain how the nanoparticles were incorporated into the food samples. Evaluation of Antimicrobial Properties: Detail the testing procedure to assess the antimicrobial activity of the food samples containing nanoparticles. Sensory Evaluation: Explain the sensory evaluation methods used to assess the taste, odor, and overall acceptability of the food samples. 6. Statistical Analysis: Specify the statistical methods used to analyze the data obtained from experiments. Mention the significance level (e.g.,  $p < 0.05$ ) used for determining the statistical significance. 7. Ethical Considerations (if applicable): Discuss any ethical considerations, such as human or animal subjects, and detail the steps taken to ensure ethical research practices. **Result:** This study presents the synthesis and characterization of zinc oxide nanoparticles (ZnO NPs) utilizing Clitoria ternatea flower aqueous extract as a green and eco-friendly reducing agent.

The synthesized nanoparticles were thoroughly characterized using X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Fourier Transform Infrared Spectroscopy (FTIR), confirming their crystalline structure, morphology, and functional groups. These ZnO NPs demonstrated significant antimicrobial activity against a spectrum of foodborne pathogens, as evidenced by substantial inhibitory zones observed in antimicrobial tests. Moreover, sensory evaluations revealed that the incorporation of these nanoparticles into food samples had no adverse effects on taste, odor, or overall acceptability. Statistical analysis supported the significance of these findings. Overall, this research highlights the potential of *Clitoria ternatea* flower-mediated ZnO NPs as effective and safe antimicrobial agents, paving the way for their application as a promising food additive in the food industry. **Conclusion:** In this study, zinc oxide nanoparticles (ZnO NPs) were successfully synthesized using *Clitoria ternatea* flower aqueous extract as a green reducing agent. The nanoparticles were systematically characterized through X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Fourier Transform Infrared Spectroscopy (FTIR), confirming their crystalline structure, morphology, and functional groups. Antimicrobial tests demonstrated the potent inhibitory effect of these ZnO NPs against a range of foodborne pathogens, highlighting their potential as natural antimicrobial agents. Sensory evaluations of food samples containing these nanoparticles revealed no detrimental impact on taste, odor, or overall acceptability, signifying their suitability as food additives. Statistical analysis supported the significance of the results. This research underscores the promising applicability of *Clitoria ternatea* flower-mediated ZnO NPs in enhancing food safety and quality, offering a sustainable and eco-friendly solution for the food industry. **Keywords:** Green synthesis, Zinc oxide nanoparticles.

YS-2023-0011

**Abstract Title: Formulation of Blended Oils and their Quantum of Oil Absorption in Different Cooking Methods**

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**Background:** Vegetable oils are an essential part of a healthy diet and a key source of fat. Vegetable oils come in a variety of forms, but there is no single edible oil that possesses the appropriate fatty acid composition, oxidative stability and functional characteristics. Blending improves the physicochemical properties and essential fatty acid composition of vegetable oil. Blending enhances the storage quality of the fat by increasing the self-life of the oil and also reduces oxidative damage reduce the decay of cooking vegetable oil. The main objective of the study formulation of blended oils and their quantum of oil absorption in different cooking methods. **Methods:** Based on the polyunsaturated fatty acids and monounsaturated fatty acids content five vegetable oils namely flaxseed, groundnut, safflower, gingelly and sunflower oil were chosen and blended into six different combinations- (Blended oil I to VI). Oil was extracted using the soxhlet extraction and the extracted oil was analysed for its fatty acids content of cooked products using gas chromatography flame ionization detector (GC-FID). Quantum of oil absorption in cooked food for different frying methods namely; deep fat frying, pan frying and sautéing using blended oil were carried out and the fatty acid content of cooked product was analysed using gas chromatography and flame ionization detector (GC-FID). **Result:** In deep frying (vada) blended oil- II (12.74%) had lower oil absorption compared to groundnut oil (24.83%) and gingelly oil (18.67%). Pan frying (chapthi) blended oil- III (6.13%) showed lower oil absorption compared to groundnut oil (8.51%) and blended oil-v (9.44%) showed lower oil absorption compared to gingelly oil (11.63%) and sunflower oil (12.58%). Sautéing (potato poriyal) blended oil-I (16.03%) showed lower oil absorption compared to sunflower oil (17.86%), groundnut oil (21.72%) and gingelly oil (22.41%). **Conclusion:** It concluded that, blended oil –III (50 ml of groundnut oil, 12.5 ml of sunflower oil, 12.5 ml of safflower oil, 12.5 ml of flaxseed oil, 12.5 ml of gingelly oil) had the least oil absorption and hence can be suggested as a healthy alternate source for cooking, to replace since groundnut oil, gingelly oil and sunflower oil.

**Keywords:** deep frying, pan frying, sautéing,



YS-2023-0028

**Abstract Title: Development and Organoleptic Evaluation of the Valueadded Products Using Processed Gardencress Seed Powder (Lepidium Sativum)**

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**Background:** Garden cress (*Lepidium sativum* L.) is a small perennial edible plant that produces seeds which are very small in size, oval shape, smooth texture, and reddish brown in colour. It has been using since vedic era as important nutritional and medicinal plant in India. Seeds contains several medicinal properties, anti-inflammatory properties, antimicrobial properties. and it is one of the traditional medicinal plant that packed with the nutrients like iron, calcium, folate, vitamin C, vitamin A, vitamin E, fibre and protein. In the present study, the main objective was to assess the effect of selected household processing methods in iron and calcium content. The processing methods like in germination and roasting, there was significantly increase in the iron and calcium content compared to constant (untreated). Thereafter, the second, objective was aimed at the development of value-added product by incorporating these processed powders in three selected products i.e in noodles (UGCP), biscuits (RGCP) and health mix powder (GGCP) and the products were evaluated using 9 point hedonic scale for sensory attributes. **Methods:** Garden cress seed used in the present study were procured from local market of Vijayapura city and sample were collected , cleaned and stored in container. The seeds were subjected to processing methods such as roasting and germination and were used for further study. **Result:** The processing methods like in germination and roasting, there was significantly increase in the iron and calcium content compared to constant (untreated). Incorporation of PGCP was done at the rate of 5, 10, and 15% of Incorporation. According to the Acceptability index of the products it was showed that 5% INP in noodles (84.22%), 10% INP for biscuits (84.88%) and health mix powder GGCP (93.11%), have found to be highly acceptable. **Conclusion:** In the present study it was found that Garden cress seed can be used as a supplementary foods as it contains a considerable amount of iron and calcium. The products can be acceptable upto 5 to 10 percent incorporation. As malnutrition is currently a major concern in all age groups of community and garden cress value added products can be utilized to combact the malnutrition.

**Keywords:** Garden cress seed, Roasting Germination



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