51st ANNUAL NATIONAL CONFERENCE OF NUTRITION SOCIETY OF INDIA

Theme:
“Nutrition Security: Blending Tradition with Modern Technology”

7th - 9th November 2019
Programme, Proceedings and Abstracts

Jointly Organised by
Nutrition Society of India
&
Rajiv Gandhi Centre for Biotechnology
Thiruvananthapuram
# NUTRITION SOCIETY OF INDIA

## EXECUTIVE COMMITTEE

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<td>Dr. B. Sesikeran</td>
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<td>Dr. K. Madhavan Nair</td>
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<td>Dr. Kumud Khanna</td>
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<td>Dr. Anura V Kurpad</td>
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<td>(Past-President)</td>
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<td>Dr. R. Hemalatha</td>
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<td>Dr. V. Prakash</td>
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<td>(Vice-President, IUNS)</td>
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## CHAPTER CONVENORS

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<td>Dr. Vansana Bharati</td>
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<td>Dr. Ram Gopal</td>
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Convenor : Dr. Anitha Mohan
Convenor : Dr. Asha Nair
Organizing Secretary : Dr. Anooja Thomas K.
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Ms. Gayathri Abhilash

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Ms. Anjana
Welcome

Thiruvanathapuram has become the precinct of hosting the prestigious NSI conference after a long interlude of nearly three decades. In this contexture, it is our proud privilege to welcome each one of you to the 51st Annual National Conference of Nutrition Society of India.

NSI conferences are appraised to be in the forefront of the various nutrition forums in the country. They acquire more significance in the modern era wherein, greater linkage of health with nutrition has been realized than before. Improving nutritional status of the community for achieving the millennium development goals has been focused in the deliberations here, among researchers, academicians and field functionaries.

The theme for the 51th annual national conference is “Nutrition Security –blending tradition with modern technology”. As, global community at large have realized the need to incorporate modern technology into traditional practices and at the same time integrate our timeless indigenous knowledge with advanced scientific innovations.

You are heartily welcome to the Capital of God’s own country, Thiruvanathapuram, for enlightening and enriching your mind and soul.

With warm wishes

Prof. Radhakrishan Pillai, M
Chairman

Dr. B. Sesikeran
President, NSI

Dr. Anooja Thomas K
Organising Secretary
Amidst of dramatic advancements in the global economy, ‘nutrition’ has always been a cardinal facet in showcasing healthy individuals, reflecting a healthy society. Public nutrition, while remaining to be a convoluted, charismatic and multifarious motif, endures to be double headed sword and a global perplexing paradox. When one side of the globe faces dilemmas of under-nutrition, the other fraction faces burgeoning problems of over-nutrition and allied health issues, including major non-communicable diseases - all of which are purely acquired due to numerous biological, cultural, lifestyle and socio-economic factors. Tackling these detrimental impact of nutrition challenges creates an urgent need for multidisciplinary, innovative and futuristic nutritional research encompassing food science and disease biology. This can then be translated into clinical and population research as well industrial partnerships, ensuring their availability at the strategic levels. The future calls for envisaging such a revitalised field of nutrition science and public health to maximize research and translation to improve the human health for sustenance of a better tomorrow.

Professor M. Radhakrishna Pillai,
FRCPath, PhD, FASc, FNASc, FAMS, FNA
Director
Email: mripillai@rgcb.res.in
Dear Delegates,

We have come to the end of our four-year term as executive committee and wanted to sign off in style, but this was not to be. We are relinquishing our responsibility at a time when we have a great void due to the passing of our beloved founder president Dr C.Gopalan. All of us were always eager to hear the inaugural address by him for years and his message during the later years when he was unable to attend, but from now on there will be no message. The greatest of all nutrition scientists in India had left us on the 3rd of October 2019.

This society was started in 1968 by Dr Gopalan to create a forum for exchange of ideas between a multidisciplinary group of scientists, nutritionists, dieters, physicians, social scientists, statisticians, economists etc. Such was his vision that he knew the future of nutrition science will not be in the hands of nutritionists alone and needed this multidisciplinary approach. While in these 50 years, many professional bodies have been breaking down into super specialty associations, ours has remained a cross-disciplinary one. If we take into consideration the fact that nutrition related problems in the world, though are diet related, are a result of agricultural, social, cultural, economic, political, clinical and human behavioral problems and need the expertise from all these specialties to find solutions.

We now have fortified foods with a major role for the industry; we have labeling regulations which involve industry, regulators and consumers; we need nutritional solutions for clinical problems and a wide range of diseases. The boundaries for the discipline of nutrition are blurred. The most recent discipline that has come into our nutrition framework is environmental science. Climate change is now real and dietary habits may contribute to global warming and global warming may in turn impact food production and nutrition security and with this the need for change to reduce the carbon footprint has become more imminent.

Nutrition was known to prevent one-third of cancers but present knowledge points to nutrient supplements as reasons for some cancers not responding adequately to treatment modalities. Neurodegenerative diseases will increase due to higher life expectancy and an aging population. There would be a sizeable number of neuropsychiatric disorders like senile dementia and Alzheimer’s and a promise that some bioactive molecules from foods could prevent or delay these diseases. Autism is a new challenge and a link between nutrition and gut microbiome seems to be in some way contributing to this disorder in children. Are we now stepping into the realm of neuropsychiatry?
We also need specialized skills in communication and information dissemination, to bring about behavioral changes. The power of social media needs to be leveraged beneficially. When things get so complex we need to harness new science like artificial intelligence, nanotechnology, and gene editing for quick solutions.

Friends, the NSI is now entering into Post Gopalan Era and an era of technology driven nutrition research. We need to gear up to both these challenges. We will be able to achieve this only through dedication, discipline and going beyond the limits of knowledge of nutrition. The beacon light of Nutrition fraternity has flickered out but has lit several other lights and ensured there will never be a dark moment.

My best wishes to all the delegates and members of NSI and to the incoming President and the executive committee members

Good Bye

B Sesikeran
Greetings from IUNS and the global fraternity of Nutritionists on the occasion of the 51st NSI Annual National Conference at Trivandrum, India.

This has been a very sad time for NSI and for all of us as Nutritionists as we have lost the doyen of India’s Nutrition leader and globally renowned Dr. C. Gopalan very recently. As a doyen in Nutrition Science for India and Global Nutrition he stood as a pillar for reaching Nutrition to the needy and many programmes that are running today were initiated during his time. His enormous service to NIN, NSI, MFPI, ICMR, FANS, IUNS and many related departments and Academia in India and abroad and his strong views on the reachout of needed Nutrition to women and children were exemplary and stood as a promoter of such agenda globally. Some of us were fortunate to be associated with him personally and have gained tons and tons of knowledge through him.

In a tribute to him, I would like to call upon an all Members of NSI and the fraternity of Food Scientists and technologists in India to make Nutrition as an important agenda in spreading the awareness in various sectors to combat under-nutrition and needed nutrition to adolescents and women in the first instance on a Food based approach. As India trails with its rank in 2019 with Hunger index at 102 with our neighbouring countries in the range of 88-94, we have to now take very serious and urgent steps to combat this. However some consolation is there if one looks over nearly 20 years of data. The under nourished population has gone down from 18.3 to 14.5%; child wasting has increased from 17.1 to 20.8 percent; child stunting has shown a remarkable decrease from 54.2 to 37.9 per cent, child mortality from 9.2 to 3.9 percent (GHI, 2019). These are very positive signals of the programmes that are working (except child wasting data) but we cannot stand as No.1 in the world in the mortality of children below 5 years of age with losing a child almost every 20 seconds. This is just NOT ON. We cannot allow this to happen. Hence there is an urgent need to take up this agenda of undernourished, child wasting, child stunting and child mortality along with women and adolescent nutrition on a top priority and NSI can vibrate with policy makers and the Hon. Prime Minister and Ministries to express its powerful view.

Almost two years back we had written a letter from NSI to the Hon. Prime Minister on this agenda. Now that the National Nutrition Mission is launched perhaps it is time to write and pursue again not only to Hon. PMO and also to NitiAayog. We have a duty in this and silence does not augur well. Further it will be a great tribute to Dr. Gopalan if we at least can do this. We need proactive approach and reach all concerned on a weekly basis and make the programme get more
funds and more attention for implementation. I have the optimism if we take it up as a mission in NSI it will work if not we meet year after year and move on as silent spectators.

With the fond hope that we must make this a National Awareness Information (NAI) system that NSI and move forward with passion to minimize the Nutritional maladies with Scientific remedies as Prof. Swaminathan always puts it. But we need to take it up as MISSION AGENDA of NSI.

The best to all delegates.

World Food Day
Oct. 16, 2019

V. Prakash
Vice President, IUNS
Mysore
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51ST ANNUAL INTERNATIONAL CONFERENCE OF NUTRITION SOCIETY OF INDIA
8 – 9 November, 2019
Pre-conference workshops on 7th November, 2019
Venue- Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala

Theme- Nutrition Security- Blending Tradition with Modern Technology

PROGRAMME

Day1 – 7th NOVEMBER 2019- PRE-CONFERENCE WORKSHOPS

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<td>Venue- M.R. Das Convention Centre (Main Hall)</td>
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<td>Venue- Srinivasa Ramanujam Board Room</td>
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WORKSHOP-I Clinical and Hospital Nutrition
Venue- M.R. Das Convention Centre (Main Hall)

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<td>Dr. SARATH GOPALAN (Executive Director, Centre for Research on Nutrition Support Systems &amp; Deputy Director, Nutrition Foundation of India, New Delhi)</td>
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<td>9.10 AM – 9.30 AM</td>
<td>WELCOME ADDRESS</td>
<td>Dr. P. HEMALATHA (Director, National Institute of Nutrition, Hyderabad)</td>
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<td>9.30 AM – 9.50 AM</td>
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<td>Dr. S. BHUVANESHWARI (Sr. Consultant Dietitian, Apollo Hospitals, Chennai)</td>
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<td>ENTERAL NUTRITION IN HOSPITALIZED ADULTS</td>
<td>Dr. V. DEDEEPIYA DEVAPRASAD (Senior Consultant &amp; Head, Critical Care Services, Apollo Specialty Hospitals, Chennai)</td>
<td>SESSION -1 (ABC of Enteral and Parenteral Nutrition)</td>
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<td>PARENTERAL NUTRITION IN HOSPITALIZED ADULTS</td>
<td>Dr.V. DEDEEPIYA DEVAPRASAD (Senior Consultant &amp; Head, Critical Care Services, Apollo Specialty Hospitals, Chennai)</td>
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<td>PAEDIATRIC ENTERAL NUTRITION</td>
<td>Dr. SARATH GOPALAN (Executive Director, Centre for Research on Nutrition Support Systems &amp; Deputy Director, Nutrition Foundation of India, New Delhi)</td>
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<td>Dr. SARATH GOPALAN</td>
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<td>12.20 PM –</td>
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<td>LUNCH BREAK</td>
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<td>2.00 PM –</td>
<td>NUTRITION IN THE CRITICALLY ILL PATIENT AND CALCULATION OF ENERGY AND</td>
<td>Dr. V. DEDEEPYIYA DEVAPRASAD (Senior Consultant &amp; Head, Critical Care Services, Apollo Speciality Hospitals, Chennai) + Dr. S. BHUVANESHWARI (Senior Consultant Dietitian, Apollo Hospitals, Chennai)</td>
<td>SESSION- 3 (Nutrition Intervention in Specific Disease Settings)</td>
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<td>NUTRIENT REQUIREMENTS – A CASE BASED APPROACH</td>
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<td>3.00 PM –</td>
<td>DISEASE – SPECIFIC NUTRITION INTERVENTION (HEPATIC, RENAL, DIABETIC</td>
<td>Dr. S. BHUVANESHWARI (Sr. Consultant Dietitian, Apollo Hospitals, Chennai) + Dr. SARATH GOPALAN (Executive Director, Centre for Research on Nutrition Support Systems &amp; Deputy Director, Nutrition Foundation of India, New Delhi)</td>
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<tr>
<td>4.30 PM</td>
<td>CLOSING REMARKS</td>
<td>Dr.S.BHUVANESHWARI</td>
<td></td>
</tr>
</tbody>
</table>

WORKSHOP-II- Application of Mass Spectrometry in Nutrition Research

Venue- Srinivasa Ramanujam Board Room

<table>
<thead>
<tr>
<th>TIME</th>
<th>SUBJECT</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00 AM –</td>
<td>Mass Spectrometry based proteomics in Nutrition Research (Lecture)</td>
<td>Abdul Jaleel .K. A  Ph.D Scientist F RGCB ,Thiruvananthapuram</td>
</tr>
<tr>
<td>10.30 AM</td>
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<tr>
<td>10.30 AM –</td>
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<td>Tea break</td>
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<tr>
<td>11.00 AM –</td>
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<tr>
<td>01.00 PM</td>
<td></td>
<td>Laboratory Demonstration</td>
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<tr>
<td>02.00 PM</td>
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<td>Lunch Break</td>
</tr>
<tr>
<td>04.00 PM</td>
<td></td>
<td>Laboratory Demonstration</td>
</tr>
</tbody>
</table>
## 51st Annual International Conference of Nutrition Society of India

8 – 9 November, 2019
Pre-conference workshops on 7th November, 2019
Venue- Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala
Theme- Nutrition Security- Blending Tradition with Modern Technology

### Programme

#### Day 2 – 8th November 2019- Main Conference

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.30 am – 9.00 am</td>
<td>Registration</td>
</tr>
<tr>
<td>8.00 am – 8.45 am</td>
<td>Breakfast</td>
</tr>
<tr>
<td>8.45 am – 10.00 am</td>
<td>Inauguration &amp; Presentation of Sixth Dr. B.K. Anand Memorial Award to Dr. S. Sucharita</td>
</tr>
<tr>
<td>(Venue- M.R Das Convention Centre MAIN HALL)</td>
<td>Professor and Head Clinical Physiology Unit Department of Physiology St John's Medical College, Bangalore</td>
</tr>
<tr>
<td>10.00 am – 11.00 am</td>
<td>43rd GOPALAN ORATION By Dr. K.M. Venkat Narayan</td>
</tr>
<tr>
<td>(Venue- M.R Das Convention Centre MAIN HALL)</td>
<td>Hubert Department of Global Health, Atlanta, GA On “Back to the Future- Historic Roots of Diabetes Point to Unknown Solutions”</td>
</tr>
<tr>
<td>11.00 am – 11.15 am</td>
<td>Inaguration of Stalls / Poster Session &amp; Tea</td>
</tr>
</tbody>
</table>

#### Parallel Sessions

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.15 am – 12.15 pm</td>
<td>Debate on “Is Coconut Oil Good for Health”</td>
</tr>
<tr>
<td>(Venue- M.R Das Convention Centre MAIN HALL)</td>
<td>Moderator &amp; Dr. B. Sesikeran</td>
</tr>
<tr>
<td></td>
<td>Flagging the issues Former Director, ICMR-National Institute of Nutrition, Hyderabad</td>
</tr>
<tr>
<td></td>
<td>For the motion Dr. B.R. Lokesh, CSIR-CFTRI, Mysore &amp; Dr. Rajmohan, Univ. of Kerala, Trivandrum</td>
</tr>
<tr>
<td></td>
<td>Against the motion Dr. Ahmed Ibrahim, ICMR-NIN, Hyderabad Dr. Sanji Kanjilal, CSIR-IICT, Hyderabad</td>
</tr>
<tr>
<td>11.00 am – 01.00 pm</td>
<td>Poster Session</td>
</tr>
<tr>
<td>(Venue- Hall)</td>
<td>1. Clinical Nutrition</td>
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<td>2. Community Nutrition</td>
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<td>3. Experimental Nutrition</td>
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<td>4. Nutrition Education and Communication</td>
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<td></td>
<td>5. Sports Nutrition</td>
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<tr>
<td>12.15 pm – 01.15 pm</td>
<td>Industrial Session</td>
</tr>
<tr>
<td>(Venue- M.R Das Convention Centre MAIN HALL)</td>
<td>“Improving choices across our portfolio” Ms. Ankita Marwaha Associate Director, Nutrition Science</td>
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<tr>
<td></td>
<td>“Can we manage Dyslipidemia through Edible Oils?” Dr. Sudhakar Mhaskar</td>
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<td></td>
<td>“Diabetes- Medical Nutrition Therapy” Dr. Harita Syam</td>
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<tr>
<td></td>
<td>“Walnuts-An excellent source of plant based Omega 3ALA” Dr. Anitha Mohan</td>
</tr>
<tr>
<td>12.15 pm – 01.15 pm</td>
<td>Executive Committee Meeting</td>
</tr>
<tr>
<td>(Venue- G N Ramachandran Hall - Seminar Hall)</td>
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</tr>
<tr>
<td>1.15 pm – 2.00 pm</td>
<td>Lunch</td>
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</tbody>
</table>


## PARALLEL SESSIONS

**Symposium on “Biotechnology Advance – Nutritional Benefits”**  
*Chairpersons-*

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Details</th>
</tr>
</thead>
</table>
| 2-00 pm – 4.00 pm (Venue- M.R Das Convention Centre **MAIN HALL**) | Deciphering metastasis  
Dr. Radhika Nair Ph.D  
Ramanujan Faculty Fellow  
Rajiv Gandhi Centre for Biotechnology,  
Bio-Innovation Centre  
Thiruvananthapuram, Kerala  

Genome Editing  
Dr. Bhabatosh Das  
Assistant Professor  
Translational Health Science and Technology Institute  
NCR Biotech Science Cluster  
Faridabad – Gurgaon  

Can the beneficial Microbes in diet protect us from *Helicobacter pylori* associated gastric diseases?  
Dr. Santanu Chattopadhyay  
Rajiv Gandhi Centre for Biotechnology  
Thiruvananthapuram, Kerala, India  

Enzyme applications to improve food nutrient density and health.  
Dr. Sreedevi A . Singh  
Senior Principal Scientist  
CFTRI, Mysore |

**ORAL FREE COMMUNICATION SESSION - I**  
Community Nutrition  
(Venue- 1 - CV Raman Hall (Lecture Hall))  
Food Science Nutrition  
(Venue- 3 – Srinivasa Ramanujam Board Room)  
Community Nutrition  
(Venue- 4 - JC Bose Board Room)  
4.00 pm – 4.15 pm  
TEA

## PARALLEL SESSIONS

**YOUNG SCIENTIST AWARD SESSION-I**  
(Senior Award Experimental & Community Nutrition)  
4.15 pm – 6.15 pm  
(Venue- M.R. Das Convention Centre – **Main Hall**)  

**ORAL FREE COMMUNICATION SESSION - II**  
Free Communications - Clinical Nutrition  
Free Communications - Experimental Nutrition  
*Venue-1 CV Raman Hall (Lecture Hall)*  
Free Communications - Nutrition Education and Communication  
Free Communications - Experimental Nutrition  
*Venue- 2 G N Ramachandran Hall (Seminar Hall)*  
Free Communications - Nutrition Health Policy Research / Sports Nutrition  
*Venue- 3 Srinivasa Ramanujam Board Room*  
Free Communication – Community Nutrition  
*Venue- 4 JC Bose Board Room*  
6.15 pm – 7.00 pm (Venue- M.R Das Convention Centre **MAIN HALL**)  

**31st DR. SRIKANTIA MEMORIAL AWARD LECTURE** by  
Dr. K. Madhavan Nair  
Former Head of Micronutrient Research and Scientist-F  
ICMR-National Institute of Nutrition, Hyderabad  
On “NUTRITION FOR ANEMIA”  
7.00 pm –8.00 pm  
(Venue- M.R Das Convention Centre **MAIN HALL**)  

7.00 pm onwards  
DINNER
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>7:00 am – 7:30 am</td>
<td>BREAKFAST</td>
</tr>
<tr>
<td>8:00 am – 9:00 am</td>
<td>ANNUAL GENERAL BODY MEETING</td>
</tr>
<tr>
<td><strong>PARALLEL SESSIONS</strong></td>
<td></td>
</tr>
<tr>
<td>9:00 am – 10:00 am</td>
<td>YOUNG SCIENTIST AWARD SESSION-II (Junior Award Experimental &amp;Community Nutrition) (Venue- M.R Das Convention Centre – Main Hall)</td>
</tr>
<tr>
<td>10:00 am – 10:45 am</td>
<td>10th DR. RAJAMMAL. P. DEVADAS MEMORIAL AWARD LECTURE by Dr. S. Kowsalya Registrar, Avinashilingam University for Women , Coimbatore, Tamil Nadu On “Neutraceutical Potencials of Functional Foods” (Venue- M.R Das Convention Centre MAIN HALL)</td>
</tr>
<tr>
<td>09:00 am – 10:45 am</td>
<td>FREE COMMUNICATION SESSION – III (Venue- 1 CV Raman Hall (Lecture Hall) (Venue- 2 GN Ramachandaran Hall (Seminar Hall) (Venue-3 Srinivasa Ramanujam Board Room) (Venue-4 JC Bose Board Room) )</td>
</tr>
<tr>
<td>10:45 am – 11:00 am</td>
<td>TEA BREAK</td>
</tr>
<tr>
<td>11:00 am–12:30 pm</td>
<td>SYMPOSIUM - “Nutritional and Health Benefits of Indian Herbs” (Venue- M.R Das Convention Centre MAIN HALL)</td>
</tr>
<tr>
<td>12:30 pm – 1:30 pm</td>
<td>LUNCH</td>
</tr>
<tr>
<td>1:30 pm-3:30 pm</td>
<td>CONCLUDING CEREMONY &amp; AWARD PRESENTATIONS (Venue- M.R Das Convention Centre MAIN HALL)</td>
</tr>
<tr>
<td>3:30 pm</td>
<td>TEA</td>
</tr>
</tbody>
</table>
GOPALAN 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, Lathyrisn, 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& Padma Bhushan by the Government of India.

Dr.Gopalan passed away after a 100 fruitful years of life on 3rd 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 43rd Gopalan Oration will be delivered Dr.K.M.Venkat Narayan, Ruth and O.C. Hubert Chair of Global Health; Director, Emory Global Diabetes Research Center; Director, Georgia Center for Diabetes Translation Research, and Professor of Medicine & Epidemiology at Emory University in Atlanta, Georgia, USA on “Back to the Future- Historic Roots of Diabetes Point to Unknown Solutions”.

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. Gurudev 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.

2003  Dr. Chen Chunming (At IX Asian Congress of Nutrition)
      Nutrition and Economic Development.

      Dr. Prakash S Shetty
      Non-Communicable Diseases in Developing Societies - Causes, Costs and Consequences.
2004  Prof. Mark L Wahlqvist
The New Nutrition Science - Solutions for Development.

2005  Dr. Shanti Ghosh
For Better Health and Nutrition, Prioritize the Young Child.

2006  Dr. M.K. Bhan
Preparing to Face the Challenge.

2007  Dr. Ricardo Uauy
Leadership more than new knowledge is required to improve nutrition in India.

2008  Dr. 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
Foetal 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”.

2018  Prof. John H Cummings
“50 years of dietary fibre”
43rd GOPALAN ORATION

Back to the future- Historic roots of diabetes point to unknown solutions

Dr.K.M.Venkat Narayan

Ruth and O.C. Hubert Chair of Global Health; Director, Emory Global Diabetes Research Center; Director, Georgia Center for Diabetes Translation Research, and Professor of Medicine & Epidemiology at Emory University in Atlanta, Georgia, USA

THE RECIPIENT

Dr.K.M. Venkat Narayan, MD, MSc, MBA, FRCP. is a member of the US National Academy of Medicine (NAM) and is currently Ruth and O.C. Hubert Chair of Global Health; Director, Emory Global Diabetes Research Center; Director, Georgia Center for Diabetes Translation Research, and Professor of Medicine & Epidemiology at Emory University in Atlanta, Georgia, USA.

Noted for substantial, multidisciplinary work in diabetes clinical and public health sciences, with nearly 480 publications, including several seminal and high-impact studies, his work exemplifies his leadership in diabetes public health. Prior to his time at Emory, Dr. Narayan spent 10 years at the U.S. Centers for Disease Control and Prevention (CDC), leading science efforts in his role as chief of the Diabetes Epidemiology and Statistics Branch. He was also an intramural researcher at the National Institute of Diabetes and Digestive and Kidney Diseases.

His research has focused on the epidemiology of type 2 diabetes, and on large national and international observational and intervention studies to prevent and control the disease, and to translate science into practice and policy. He is currently also exploring intriguing differences in the pathophysiology of type 2 diabetes in South Asian and other developing countries’ populations globally. He advises the World Health Organization, the NIH, CDC, and several national governments.

Narayan won the American Diabetes Association’s Kelly West Award for outstanding achievement in epidemiology. He is Fellow of the Royal College of Physicians of Ireland, and Fellow of the Faculty of Public Health Medicine, UK. He won the Emory University’s Mentor of the Year, the Marion Creekmore award for internationalization, the Danish Diabetes Academy Visiting Professorship at University of Copenhagen, South Asian Health Foundation Lifetime achievement award, and the Nehru Chair at University of Hyderabad.
ABSTRACT

People of Indian ancestry are at very high risk of type 2 diabetes, and it has largely been believed that the population’s propensity for central fat deposition and consequent insulin resistance, coupled with changes in lifestyle (unhealthy diet and physical inactivity), is the primary reason for this high risk. In this lecture, I will step back from this oft-held and totalitarian assertion and examine some clues from history (body phenotype, economics) and also present some newer emerging data on potential differences in the pathophysiology of type 2 diabetes in populations, such as Indians. I will then argue that the historical roots have for long set the conditions for the current explosion of type 2 diabetes, and conclude with the implications for research and programmatic action to prevent and/or contain the consequences of the diabetes epidemic.

Evidence from physical anthropology indicate that the Indian population, which may have once been the most nourished among world populations, has experienced steady decline of stature and nutritional status over the past 10,000 years, and has also experienced major decline in lean mass and conceivably possibly impairments of various organ development, including the beta cell of the pancreases, liver, and lung. Examination of economic history also indicates that for the vast majority of the past 2,000 years, India and China were the world’s largest economies until the rise of Western European nations in the 18th century and later the United States of America. In the case of India, inflation-adjusted per capita income remained flat between 1700 and 1950, while in the same period that of the United Kingdom (UK) grew more than 7-fold, although the population of the UK relatively grew 3-times faster than that of India in the same period. This recent 250-year gap in industrial and economic development has accentuated the diabetogenic factors established over the deeper and longer historical roots. This context may be central to understanding the large current and increasing burden of diabetes among individuals of Indian descent.

With rapid industrialization, loss of physical activity, changes in diet, in the context of historical under nutrition, in populations, such as Indians, we are witnessing the rapid rise in diabetes prevalence. Indians living in urban India today have prevalence of type 2 diabetes higher than their compatriots living in the United States do. In the US, Indian and African migrants, who hail from places which missed the industrial revolution and are now catching up economically, have the highest prevalence of diabetes among all immigrants or native populations in the US (except Native Americans) and are at high risk even when normal or underweight.

A study that compared non diabetic Indian-Americans with Chinese-, Hispanic-, Black-, and White-Americans found that in every age group, Indians had the lowest insulin secretion, followed by the Chinese. Studies in adults in India, youth-onset diabetes in India, and adult Indian-Americans in the US all point to the role of deficiency of insulin secretion in the early natural history of type 2 diabetes in South Asians. Furthermore, a comparison of Indians living in urban Chennai with Pima Indians in Arizona revealed that both populations are at roughly equal risk, despite the Chennai-Indians being seven body mass index units (BMI) lighter and 25 centimeters smaller in the waist, on average, compared to the Pima Indians. Additionally, in all age groups, across weight and glucose categories (including those with normal BMI and normal glucose levels), the Pima Indians were 2-4 times more insulin resistant than the Chennai-Indians and the Chennai-Indians secreted half to a third of insulin compared to the Pima Indians. These data suggest phenotypes of type 2 diabetes,
with varieties driven primarily due to insulin resistance (type 2 A – high metabolic load) and others primarily due to deficiency in insulin secretion in the early stages of the natural history (type 2B – poor metabolic capacity). In addition to potentially poorer insulin secretion to begin with, the factors that may be important in the pathophysiology or type 2 diabetes in Indians may be lean mass and ectopic fat deposition in the pancreas, liver, and muscle.

Large-scale basic and epidemiological research studies in Indians and in other populations emerging from countries traditionally regarded as “developing” are needed to better understand type 2 diabetes phenotypes, as this information can potentially influence diagnostic tests, and prevention and treatment strategies for hundreds of millions of people worldwide. There is currently a major mismatch between where diabetes burdens occur (i.e., low- and middle-income countries) and where research happens (i.e., high-income countries). Correcting this imbalance will advance our knowledge and arsenal to win the global war against diabetes.
THE AWARD

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 31st Dr. Srikantia Memorial Lecture will be delivered by Dr. K. Madhavan Nair, Scientist ‘F’ & HOD, Biophysics Division (Retd.), National Institute of Nutrition, Hyderabad on “Nutrition for Anemia”.

14
PREVIOUS RECIPIENTS

1989  *Dr. P. S. Shetty*
Energy Metabolism in Chronic Energy Deficiency.

1990  *Dr. M. Gabr*

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. Rajamal 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. Rajagopal*
Perspective Planning for Human Development.

2001  *Dr. Prema Ramachandran*
Research Studies on Mother Child Dyad - Foundation for National Programmes.

2003  *Dr. M. S. Swaminathan*

  *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.
<table>
<thead>
<tr>
<th>Year</th>
<th>Author</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Dr. V. Prakash</td>
<td>Nutrition Links in the Food Chain.</td>
</tr>
<tr>
<td>2008</td>
<td>Dr. Ramesh V Bhat</td>
<td>Status of Food Safety in India - Past, Present and Future.</td>
</tr>
<tr>
<td>2009</td>
<td>Prof. H.P.S. Sachdev</td>
<td>Improving Nutrition through Relevant Evidence - Transforming an Indian Dream into Reality.</td>
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<td>“Food and Nutrition Security as Fundamentals of Human Development - National Perspective International Agenda”</td>
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</table>
THE RECIPIENT

Dr. Krishna Pillay Madhavan Nair currently is the Vice-President of Nutrition Society of India and a Fellow of National Academy of Medical Sciences and Fellow of National Academy of Agricultural Sciences and a fellow of Telangana Academy of Sciences. He is a member of a large number of National and International expert committees on Public Health Nutrition.

Born in Alappuzha, Kerala, educated at Thiruvampady High School, Alappuzha, graduated from Sanatana Dharma College, Alappuzha and postgraduation in Biochemistry from University College, Thiruvananthapuram. He was a Research Scholar at National Institute of Nutrition and obtained his PhD in Biochemistry from Osmania University, Hyderabad.

He has received post-doctoral training in methodologies in iron metabolism at the International Center for Control of Nutritional Anemia and the Public Health Service International Research Fellowship award of the Fogarty International Center for Advanced Study in Health Sciences, U.S. He has worked for more than 36 years at the ICMR- National Institute of Nutrition and developed micronutrient bioavailability as a focus area. He has made significant contributions in understanding iron-induced free radical damage. He was instrumental in establishing efficacy of staple foods fortified with iron and the proof of concept of inclusion of fruits rich in ascorbic acid in habitual meals in enhancing iron bioavailability. He coordinated the Expert Group of the Indian Council of Medical Research to revise the Nutrient Requirements and RDA for Indians and in developing the National standards for staple food fortification. He has published over 150 papers and book chapters and guided many students for PhD.

- Recipient of the Public Health Service International Research Fellowship award of the Fogarty International Center for Advanced Study in Health Sciences, U.S
- ICMR’s BGRC Silver Jubilee Oration Award.
- Dr (Smt.) Mrunalini Devi Puar Memorial Oration, Foods and Nutrition Alumni Association, The MS University of Baroda.
- Fellow of three National science academies, namely Fellow of the National Academy of Medical Sciences, Fellow of the National Academy of Agricultural Sciences and Fellow of the Telangana Academy of Sciences.
ABSTRACT

Foundation of nutrition in humans relies on the ability of integrating all aspects of healthy lifestyle into food and nutrition security and includes interactions amongst various biological processes such as digestion, absorption and transport. A robust food environment is not only critical for practicing sustainable dietary diversity at household level but also for satisfying the recommended dietary allowances of all the micronutrients across the populations. However, greater needs of certain nutrients such as iron during specific age and life stage necessitate complementary action. Opportunities to dovetail the concept of food/nutrient synergy can make a difference in the reducing iron deficiency. Scientific evidence to promote the practice of food synergy to improve iron nutrition to tackle anemia is the focus of this oration.

AnemiaMukt Bharat

Nutritional anemia is a public health problem in India especially among the vulnerable segments of the population. Periodic surveys have shown minimal rate of reduction in anemia prevalence of 1 per cent every year (NFHS 3 and NFHS 4). The goal of the government of India is to expedite the pace of reduction in anemia cases by three times every year and achieve reduction from 58 to 40%, 54 to 36%, 53 to 35%, 50 to 32% and 58 to 40% among preschool children, adolescent girls 15-19 y, women of reproductive age, pregnant and lactating women respectively by 2022. The vision is to achieve AnemiaMukt Bharat (Anemia free India) by the year of 2030 (PoshanAbhiyaan). This appears to be an ambitious plan requiring a holistic public health approach of tackling nutritional anemia.

Nutritional anemia due to iron deficiency and strategies

Nutritional anemia is multi-factorial in etiology and involves both food and host factors. Dietary iron deficiency and poor bioavailability from plant based diet (absorption ~5-10%) are the two common causes of anemia in India and should be addressed simultaneously. However increasing iron intake through supplementation and fortification are the strategies implemented in India.

Iron supplementation programs target prevention and reduction in anemia while iron fortified staple foods is a preventive strategy to complement supplementation. Dietary diversification is a preventive strategy and is a comprehensive intervention; but can function as a standalone strategy only when iron deficiency has been eliminated in the population. The three strategies of dietary diversification, food fortification and supplementation will be effective when combined with functional public health measures which are in place and are implemented effectively.

Impact of iron supplementation and fortification

The review of evidence on daily iron supplementation among women aged 13-45 years have shown high quality evidence for hemoglobin (mean difference of 0.53 g/dL) and moderate quality evidence for reduced risk of being iron deficient. However, the quality of evidence for intermittent or weekly iron and folic acid supplementation (WIFS) program ranged from moderate for improved hemoglobin mean difference (0.519 g/dL) to very low in anemia risk reduction. This may be due to the poor implementation of the programme among participants with high prevalence of anemia.
Review of iron fortification trials with multiple vehicles and wheat flour, rice and salt have shown an increase in hemoglobin in the range of 0.20-0.64 g/dL. Introduction of iron bio fortified pearl millet among 12-16 year adolescent girls consuming 200-300g during lunch did not produce any difference in hemoglobin but increased iron store and a positive impact on cognitive function.

**Absorption of dietary non-heme iron**

Iron is a redox metal and acts as a catalyst. Its catalytic role depends on the ability of ferrous and ferric iron to respectively donate and accept electrons under conditions prevailing in biological systems. This process can promote oxidative damage of bio molecules within cells. Major source of iron for human nutrition comes from plant foods. Iron in the form of ferric oxy hydroxide-phosphate stored in plant ferritin is non-heme iron. The fate of plant iron during the gastric digestion appears to be similar to the chemical source of iron suggesting that food ligands that enhances or reduces iron absorption also influences phytoferritin iron (Bejjani et al 2007, Hoppler 2008 and Perfecto et al 2018). Non-heme iron is absorbed in the duodenum, where acidic gastric secretions enhance iron solubility. The reduction of ferric form of dietary iron to ferrous form is catalysed by duodenal cytochrome b reductase or reducing agents such as ascorbic acid prior to uptake. Duodenal iron transporter DMT1 transports ferrous form.

**Concept of food/nutrient synergy**

Food synergies are the additive or more than additive influences of foods and nutrients on nutrient metabolism. Food synergy helps certain nutrients to sustain its solubility and maintain its absorbability at the site of absorption. This is achieved through chemical interaction between the nutrients at acidic pH of stomach which keep the primary nutrient in a soluble state beyond the gastric pH and aids in better absorption. To establish this synergy there is an absolute essentiality of simultaneous presence of both the primary and the co-nutrient in gastric phase of digestion.

Dietary iron needs an acidic environment for its solubility and ascorbic acid is the most potent promoter of iron absorption. In normal digestive processes iron and vitamin C interact at gastric phase and mediate reduction of iron to the ferrous and in the formation of soluble iron-chelate (Bergeim and Kirch 1949 and Conrad and Schade 1968). This interaction has been shown to enhance iron absorption by 2 to 3 folds. Thus to ensure optimum iron absorption in duodenum, iron needs to be kept soluble beyond gastric phase. Such reaction at gastric pH can be established by practicing food synergy approach. A food rich in ascorbic acid such as guava, papaya, pineapple which when forms part of habitual diet establishes food synergy and ensures absorbability of food iron. There have been many metabolic studies that established this proof of concept for enhancing iron bioavailability (Nair and Augustine 2016).

**Food synergies for enhancing iron bioavailability from habitual meals**

Studies both in vitro and in vivo have demonstrated a synergistic effect of vitamin C, both in synthetic and food form on iron owing to its reducing property. The molar ratios of vitamin C and iron for iron absorption have also been studied. A molar ratio of 2-1 or 4-1 increased iron absorption by 270% or 343% in control subjects and by 291% or 350% in subjects with iron deficiency anemia respectively Absorption studies using radioisotopes have shown that papaya and guava having the
maximum iron enhancing property (Ballot et al 1987). Regular intake of 100 g of guava as part of rice based meal has been shown to double the iron absorption among adolescent boys and girls (Nair et al 2013). Therefore, fruits and minimally processed vegetables high in ascorbic acid should form part of habitual meals to enhance iron bioavailability.

Based on the available evidence it appears ensuring access to iron fortified food and effective implementation of I-NIPI strategies it will be possible to reduce anemia. In India there is a need to improve dietary diversification especially consumption of vitamin C rich fruits along with meals so that iron bioavailability is improved. This will enable the country to achieve the target of POSHAN Abhiyan and World Health Assembly target of 50% reduction of anemia by 2025.

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10th RAJAMMAL. P. DEVADAS MEMORIAL LECTURE

THE AWARD

The Rajammal P Devadas Memorial Lecture Award was instituted by the Nutrition Society of India, in association with A VINASHILINGAM 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 VignanaChudar. 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

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 10th Dr.Rajammal P. Devadas Memorial Lecture will be delivered by Dr.S.Kowsalya, Registrar & Professor, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore on “Neutralceutical Potencials of Functional 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

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
THE RECIPIENT

Dr. S. Kowsalya did her specialization in Food Science and Nutrition; and Biochemistry and started her career as a Research Associate in 1986 and joined as a Faculty in the Department of Food Science and Nutrition in Avinashilingam University in the year 1991 and became Professor in 2009. Currently, she holds the position of Registrar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore since November, 2016. She has held membership in ICMR, IHEC, IAEC, RAC and currently serving as Executive Committee member of Nutrition Society of India and Editor of Indian Journal of Nutrition and Dietetics and in various academic Boards. Dr. S. Kowsalya has 27 years of teaching experience and carried out research and extension activities for 32 years.

She has received around Rs. two crores funding from Research and Development agencies viz, UGC, DST, Department of Social Welfare Board, Ministry of Non-Conventional Energy Sources, Institute of Applied Research, Heinz India Pvt. Ltd., NMECT and UGC. She has produced 640 e-lessons for PG students in Food Science and Nutrition and as a research guide, has supervised so far 7 Ph.D, 22 M.Phil. and 53 M.Sc. students in Food Science and Nutrition and currently guiding 8 Ph.D. research scholars.

Being the Convenor of Coimbatore Chapter, she received the Best Chapter Award from Nutrition Society of India for three terms. She has been eulogized with reputable awards which embrace; ICAR Junior Research Fellowship; Gold medal for UG and PG; SagarmalGoenka Award, 'Best Teacher Award' from CII, RashtriyaVidhiyaSaraswatiPuraskar, RashtriyaVikasRatan Award, RashtriyaGaurav Award, Pandian Award and Meritorious Alumna award.

She has published more than 70 research papers in reputed National and International journals and has more than 80 abstracts/papers in Conference proceedings to her credit. Dr.Kowsalya received more than 15 Best paper awards in many National and International Conferences. She has published 13 books/booklets. Dr.S.Kowsalya's research contributions has been cited widely by many authors. She is an active member of Professional bodies viz., Nutrition Society of India, Indian Dietetic Association and Home Science Association of India.

In recognition of the outstanding research work done by Dr.S.Kowsalya in the field of Functional Foods, Nutraceuticals and Non-Communicable Diseases, the Tamil Nadu State Council for Science and Technology conferred her, the Tamil Nadu Scientist Award (TANSA) in Social Sciences for the year 2017-2018 on 27th December, 2018 and received from Hon'ble Chief Minister of Tamil Nadu ThiruEdapadyPalaniswamy. She has been honoured with Women Achiever Award from BNI Admirals Coimbatore for International Breakthrough in Science and Research on 12th March 2019. She has visited Sweden, Canada, South Korea, Tanzania and Mangolia for academic, research collaborations and administrative purpose.
ABSTRACT

Introduction

Functional foods reduce the risks of cancer, atherosclerosis, CVDs, diabetes, the process of aging and enhance the body’s immune responses. Phytochemicals in plant foods have antioxidant effects, increased activity of enzymes that detoxify carcinogens, effect on cell differentiation, inhibition of the carcinogenic N-nitrosamine, change of estrogen metabolism, change of colonic milieu, maintenance of DNA repair, preservation of integrity of intracellular matrices, effect on DNA methylation, increase in apoptosis of cancer cells, and decrease in cell proliferation. Functional foods may include conventional foods such as grains, fruits, vegetables and nuts and modified foods such as yogurt, cereals and orange juice. In our laboratories, studies on nutraceutical potentials of traditional and novel functional foods have been attempted.

a) Nutraceutical Potentials of Black Rice (*Oryzasativa* L.) and its Hypoglycaemic Activity in Streptozotocin Induced Diabetic Rats

The sampling of white and black rice was done in Keelamooingiladi, Tamil Nadu. The rice was subjected to pressure and conventional cooking and tested for nutrient content, physio-chemical and grain characteristics, phytochemical screening, enzymic and non-enzymic antioxidants using standard protocols. Enzymic antioxidants namely Superoxide dismutase, Glutathione-S-transferase, Peroxidase, Catalase and Polyphenol oxidase were assessed. In-vitro radical scavenging assays, DPPH assay, reducing power assay, FRAP, ABTS radical scavenging activity for ethanolic and aqueous extracts, in-vitro inhibitory potential of black rice and white rice against α-glucosidase and α-amylase enzyme inhibiting activity, in-vitro glycemic index and the in-vitro hypoglycaemic activity of black rice in streptozotocin induced diabetic rats was evaluated. Impact was assessed on biochemical and haematological parameters, hepatic markers and histopathology. Physicochemical characteristics revealed that the 1000 kernel weight was found to be 18.28±0.04 g and 10.66±0.09 g for black and white rice. The total TAA was found to be higher in pressure cooked black rice and very low in white rice. The administration of black rice reduced the glycosylation of haemoglobin which revealed the maintenance of glucose homeostasis and the cyanidine-3-glucoside present in black rice helps to control blood glucose level.

b) Nutraceutical Potentials of Seaweeds

i. Phytochemical screening, microbial load and antibacterial activity of underexploited seaweeds

Based on the results of pilot study on consumption pattern of seaweeds at Mandapam, Tamil Nadu, underexploited seaweeds namely *Acanthophora spicifera*, *Gracelaria edulis*, *Padinagymnospora*, *Ulva fasciata* and *Enteromorpha flexuosa* were collected and tested for their antimicrobial potentials against *Staphylococcus aureus*, *Streptococci*, *E. coli*, *Klebsiella*, Proteus, *A. niger* and *Candida* by disc diffusion methods. The salient findings indicated the presence of Phytochemicals namely carbohydrates, proteins, gums, mucilage, phenols and starch. The results of microbial load showed the presence of coliforms and *E. coli* within the permitted levels. The methanolic extracts of selected seaweeds were potentially a good source of antibacterial substances with a broad spectrum of activities in preventing the growth of all the microorganisms tested.
ii. Anti-diabetic activity of *Ulva faciata* in alloxan induced diabetic rats

The green algae *Ulva faciata* were collected from Gulf of Mannar, Tamil Nadu and tested for anti-diabetic activity in alloxan induced diabetic rats. After treatment with aqueous extract containing 200mg/kg and 400mg/kg for 28 days, the parameters tested were mean body weight, liver glycogen, glycosylated haemoglobin, blood glucose and carbohydrate metabolism enzymes. Results revealed that *Ulva faciata* exhibited hypoglycemic potentials.

iii. Anti-cancer activity of *Ulva faciata* in albino mice

The aqueous and methanolic extract of *Ulva faciata* was tested for anti-cancer property in adult male Swiss albino mice. The animals were injected with DAL cells (1 x 10^6 cells/mouse) intraperitonially and one group served as normal control group. Treatment was done at 200 mg/kg body weight after 24 hours of inoculation, per day for 14 days. Impact was studied in terms of haematological parameters, lipid profile, liver function tests, derived parameters and percentage increase in life span (ILS). The present study showed a decrease in cancer cell count as evidence for protection against DAL and increased life span was observed with extract-treated mice.

c) Impact of Supplementation of Carotino Oil on Blood Glucose, Lipid Profile and Antioxidant Status of Healthy Volunteers

Carotino oil is a blend of 80% canola oil and 20% red palm fruit extract. It is rich in anti-oxidant nutrients namely lycopene, alpha and beta-carotene, omega 3 and 6 fatty acids and co-enzyme Q10. The healthy volunteers aged 20 to 60 years, were given 15mL carotino oil per day based on the Food and Drug Administration recommendations. After 45 days, the biochemical parameters were assessed in these volunteers. The results revealed that the supplementation of carotino oil increased the beta-carotene, vitamin C and superoxide dismutase levels.

d) Development and Evaluation of a Hypoglycemic Tablet with the Herb *Salacia reticulata*

A native herb of Tamil Nadu, *Salacia reticulata* was tested for hypoglycemic properties in the form of capsules and tea in Type II diabetic subjects, as per standard protocols. *Salacia* in the form of tea, exhibited pronounced results when compared to capsules. Sub-chronic toxicity as per Organization for Economic Cooperation and Development (OECD) guidelines was tested in rats and proved to be non-toxic.

e) A Comparative Study on The Anti-Cancer Potential of Nano-Gelatin Encapsulated Glutathione Reductase and Lycopene Using Cancer Cell Lines

The study was conducted to develop and characterize nano-gelatin encapsulated GR and lycopene using nanotechnology and to compare their anti-cancer potential using MTT assay and flow cytometric analysis. The methods used for the study were Extraction of GR from frozen tomato peel by enzyme extraction method, extraction of lycopene from processed tomato by solvent extraction method, synthesis of nano-gelatin encapsulated GR and lycopene, characterization of gelatin synthesized GR, lycopene nanoparticles using UV Visible spectroscopy, SEM and FTIR analysis, Cytotoxicity of the nano-gelatin encapsulated GR and lycopene in cancer cell lines (MCF-7 and A549) - MTT Assay, evaluation and comparison of the anti-cancer potential of nanogelatin encapsulated GR and lycopene by flow cytometric analysis process. The results confirmed that the extracted enzyme is Glutathione Reductase. The different pigments in the crude pigment extract was confirmed using TLC analysis from which it was found that the pigments were identified as J3-carotene and lycopene, whose Rf value was found to be 0.84 and 0.5 cm respectively. The overall results obtained by cell cycle analysis, the percentage inhibition of cell cycle progression of nano-
gelatin encapsulated lycopene on MCF-7 and A549 cell lines is higher than nano-gelatin encapsulated glutathione reductase at different concentrations and at various phases of the cell cycle.

f) Evaluation of a Functional Food Supplement on Body Composition of Obese Young Adults and Influence of a selected PPAR Gamma Gene Polymorphism on its Outcome

A functional food supplement was prepared using traditional foods and tested for Phytochemicals qualitatively and quantitatively. Further, the functional food was supplemented to obese young adults and evaluated in terms of PPAR gamma gene polymorphism. Results revealed that a positive outcome on the dietary and physical activity intervention was observed among the obese adults. The difference in body fat mass of obese male and female genotypes with polymorphism showed a decline of around 3.36 to 3.96 kilograms. The prevalence of Pro 12 Pro was found to be 78.3 and 75 percent among male and female subjects. Subjects with Pro 12 Ala Polymorphism had a higher body weight and BMI at baseline when compared with Pro 12 Pro genotype. The functional food supplement proved the reduction in body weight, body fat percent and visceral fat area.

g) Impact of Interventions on the Iron Nutriture of Adolescent Girls (13 to 18 Yrs) and Young Women (19 to 35 Yrs) from Rural Coimbatore

In a rural area Thondamuthur, target groups were supplemented with functional food ‘Laddu’ after deworming. The local community was educated to grow home gardens. The green leafy vegetables were grown to enhance iron nutritional status. The mild and moderate levels of anaemia were prevalent among the target groups studied. The dietary intake of iron was low among the target population and lack of awareness on micronutrient foods and factors influencing their bioavailability. The impact of interventions in terms of providing functional food supplement, nutrition education and promoting kitchen garden activity to target groups showed significant improvement in terms of anthropometry, clinical picture, morbidity status and biochemical parameters. An improvement in knowledge, attitudes and practices (KAP) regarding anaemia and the inclusion of micronutrient rich foods was observed. This would enhance food security and a viable strategy to combat anaemia.
Introduction

The phrase “let food be thy medicine and medicine be thy food” by Hippocrates is relevant in the present scenario as the health benefits of certain foods are revealed by food scientists and consumers become more conscious about the foods consumed. Phytochemicals present in the diet that have been associated with health benefits are glucosinolates, sulfur containing compounds of the Alliaceae genus, terpenoids (carotenoids, monoterpenes, and phytosterols) and various groups of polyphenols (anthocyanins, flavones, isoflavones, ellagic acid etc.). A hybrid term between nutrients and pharmaceuticals, “nutraceuticals,” had been coined in 1989 by De Felice and the Foundation for Innovation in Medicine. Any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease is a nutraceutical, like vitamins, probiotics, bioactive peptides, antioxidants, etc. The International Food Information Council (IFIC) defines functional foods as “foods or dietary components that may provide a health benefit beyond basic nutrition.”

Functional foods reduce the risks of cancer, atherosclerosis, CVDs, diabetes, the process of aging and enhance the body’s immune responses. Phytochemicals in plant foods have antioxidant effects, increased activity of enzymes that detoxify carcinogens, effect on cell differentiation, inhibition of the carcinogenic N-nitrosamine, change of estrogen metabolism, change of colonic milieu, maintenance of DNA repair, preservation of integrity of intracellular matrices, effect on DNA methylation, increase in apoptosis of cancer cells, and decrease in cell proliferation.

In our laboratories, studies on nutraceutical potentials of traditional and novel functional foods have been attempted. Let us see the impact of nutraceutical potentials of selected functional foods as cited below:

a) Nutraceutical Potentials of Black Rice (Oryza Sativa L.) and its Hypoglycaemic Activity in Streptozotocin Induced Diabetic Rats

The sampling of rice, white rice and black rice was done in Keelamoongiladi area in Tamil Nadu. The rice was subjected to pressure cooking and conventional cooking and tested for nutrient content, physio-chemical characteristics, grain characteristics and phytochemical screening, enzymic and non-enzymic antioxidants using standard protocols. It was thought of interest to develop traditional recipes using black rice. A group of semi trained panellist were used for sensory evaluation of recipe using seven point hedonic scale. Traditional recipe for breakfast, lunch and snacks were prepared.

Further, enzymic antioxidants namely Superoxide dismutase, Glutathione S-transferase, Peroxidase, Catalase, Polyphenol oxidase were assessed. In-vitro radical scavenging assays, DPPH assay, reducing power assay, FRAP, ABTS radical scavenging activity were carried out for the ethanolic and aqueous extracts. In-vitro inhibitory potential of black rice and white rice assessed against α-glucosidase and α-amylase enzyme inhibiting activity. In-vitro glycemic index was also measured. Then, in-vitro hypoglycaemic activity of black rice in streptozotocin induced diabetic rats was evaluated, as per standard guidelines and its impact assessed on biochemical parameters, haematological, hepatic markers and histopathology.
Salient Findings

Physicochemical characteristics revealed that the 1000 kernel weight was found to be 18.28±0.04 g and 10.66±0.09 g for black and white rice. The total TAA was found to be higher in pressure cooked black rice and very low in white rice. Morphological properties of rice varieties are given in Table I.

Table I- Morphological Properties of Rice Varieties

<table>
<thead>
<tr>
<th>Rice varieties</th>
<th>100 kernel weight (g)</th>
<th>1000 kernel weight (g)</th>
<th>Broken kernel weight (g)</th>
<th>Length (mm)</th>
<th>Breadth (mm)</th>
<th>Length/Width ratio</th>
</tr>
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<tbody>
<tr>
<td>Black Rice (Raw)</td>
<td>1.67±0.05</td>
<td>18.28±0.04</td>
<td>0.53±0.02</td>
<td>0.63±0.03</td>
<td>0.21±0.02</td>
<td>2.95±0.02</td>
</tr>
<tr>
<td>White Rice (Raw)</td>
<td>1.38±0.12</td>
<td>10.66±0.09</td>
<td>0.61±0.02</td>
<td>0.58±0.02</td>
<td>0.20±0.00</td>
<td>2.67±0.03</td>
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The *In vitro* Abts+ radical scavenging activity is given below-

Figure No-1 (a-f) Abts+ Radical Scavenging Activity
WRCCEE - White Rice Conventionally Cooked ethanolic extract
WRPCEE - White Rice Pressure Cooked ethanolic extract
WRPCWE - White Rice Pressure Cooked water extract
WRREE - White Rice Raw ethanolic extract
WRRWE - White Rice Raw water extract
BHT - Butylated Hydroxy Toluene

From the figure a-f, the total antioxidant activities of raw samples of black rice in ethanolic extracts was 89.62 percent and in water extract, it was 81.92 percent and a considerable decrease in activities were found in the samples of black rice at 48 percent respectively in the reaction mixture. The high antioxidant activity may be attributed to proanthocyanidin, anthocyanin, oryzanol and Vitamin E. The TAA was less in ethanolic (25.15%) and water extracts (6.9%) of white rice.
Table II shows the effect of black rice on biochemical parameters of Blood Glucose and Glycosylated Haemoglobin In Serum of Control and Experimental Group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Glycosylated Haemoglobin (% HbA1c)</th>
<th>Blood Glucose(mg/dl)</th>
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<tbody>
<tr>
<td>Control</td>
<td>5.97±0.04 a</td>
<td>96.27±9.82 a</td>
</tr>
<tr>
<td>Diabetic</td>
<td>14.99±0.44 b</td>
<td>220.18±9.42 b</td>
</tr>
<tr>
<td>Diabetic+black rice</td>
<td>6.51±0.20 a</td>
<td>116.34±8.37 c</td>
</tr>
<tr>
<td>Diabetic+Glipizide</td>
<td>6.27±0.23 a</td>
<td>112.32±9.53 d</td>
</tr>
<tr>
<td>Non-Diabetic+Black rice</td>
<td>5.95±0.24 a</td>
<td>95.51±6.87 a</td>
</tr>
</tbody>
</table>

Values are expressed as mean± SD for six animals in each group. Values not sharing common superscript letters (a-d) differ significantly at p<0.05 (DMRT)

In-vitro hypoglycemic potentials of rice varieties were expressed in terms of IC 50 value of α-amylase and α-glucosidase inhibitory activity of black rice extract. Further, the administration of black rice reduced the glycosylation of haemoglobin which reveals that maintenance of glucose homeostasis is observed and the cyanidine-3-glucoside present in black rice helps to control blood glucose level.

b) Nutraceutical Potentials Of Seaweeds

i. Phytochemical screening, microbial load and antibacterial activity of underexploited seaweeds

Based on the results of pilot study on consumption pattern of seaweeds (Kowsalya and Abirami, 2011) in the Mandapam area of Ramanathapuram district, TamilNadu, underexploited seaweeds namely Acanthophoraspicifera, Gracelariaedulis, Padinagymnospora, Ulvafa sciata and Enteromorphiaflexuosa were collected and tested for their antimicrobial potentials against Staphylococcus aureus, Streptococci, E.coli, Klebsiella, Proteus, A. niger and Candida by disc diffusion methods. Phytochemical screening of ethanolic extracts was done and microbial load assessed.

The salient findings indicate the presence of phytochemicals namely carbohydrates, proteins, gums, mucilage, phenols and starch. The results of microbial load showed the presence of coliforms and E.coli (very low) within the permitted levels.
The Antibacterial activity by agar well diffusion method is given in table-III

Diameter of zone inhibition in (mm)

<table>
<thead>
<tr>
<th>Microorganisms</th>
<th>Amikarin</th>
<th>DMSO</th>
<th>A. spicifera</th>
<th>G. edulis</th>
<th>P. gymnospora</th>
<th>U. fasciata</th>
<th>E. flexuosa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 µg</td>
<td>25 µg</td>
<td>50 µg</td>
<td>40 µg</td>
<td>60 µg</td>
<td>40 µg</td>
<td>60 µg</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>7</td>
<td>12</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streptococci</td>
<td>20</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.coli</td>
<td>24</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>10</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proteus vulgaris</td>
<td>20</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>8</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klebsiella aerogenes</td>
<td>22</td>
<td>6</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>17</td>
<td>6</td>
</tr>
</tbody>
</table>

Inhibition zones 15 mm was declared as strong (bold), from 8 to 15 mm as moderate and from 1 to 8 mm as weak activities.

The methanolic extracts of selected seaweeds were potentially a good source of antibacterial substances with a broad spectrum of activities in preventing the growth of all the microorganisms tested.

ii. Anti-diabetic activity of Ulvafaciata in alloxan induced diabetic rats

The green algae Ulvafaciata were collected from the seashore of Gulf of Mannar coast of Tamil Nadu, and tested for anti-diabetic activity in alloxan induced diabetic rats. After treatment with aqueous extract containing 200mg/kg and 400mg/kg for 28 days, parameters tested were mean body weight, liver glycogen, glycosylated haemoglobin, blood glucose and carbohydrate metabolism enzymes. Figure 2 shows the changes in biochemical parameters and enzyme levels of rats.

![Figure No- 2 Biochemical Values of The Rats](image1)

![Figure No- 2 Enzyme Levels of the Rats](image2)
iii. Anti-cancer activity of *Ulva faciata* in albino mice

The aqueous and methanolic extracts of *Ulva faciata* was tested for anti-cancer property in adult male Swiss albino mice after obtaining IAEC approval. The animals were injected with DAL cells (1 x 10^6 cells/mouse) intra peritonially and one group served as normal control group. Treatment was done with methanol and aqueous extracts of *Ulva faciata* (MEUF) at 200 mg/kg body weight after 24 hours of inoculation, once daily, for 14 days. Impact was studied in terms of haematological parameters, lipid profile, liver function tests, derived parameters and percentage increase in life span (ILS).

Table IV - Life Span, Body Weight and Cancer Cell Count of Treated Groups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of animals</th>
<th>% ILS life span</th>
<th>Increase in bodyweight (g)</th>
<th>Cancer cell count (ml x 10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>6</td>
<td>&gt;&gt;30 days</td>
<td>1.30±0.009</td>
<td>-</td>
</tr>
<tr>
<td>Group II</td>
<td>6</td>
<td>46%</td>
<td>8.60±0.18^a</td>
<td>2.38±2.02^b</td>
</tr>
<tr>
<td>Group III</td>
<td>6</td>
<td>92%</td>
<td>1.83±1.03^b</td>
<td>1.01±1.03^b</td>
</tr>
<tr>
<td>Group IV</td>
<td>6</td>
<td>76%</td>
<td>7.45±0.76^a</td>
<td>1.26±1.78^a</td>
</tr>
<tr>
<td>Group V</td>
<td>6</td>
<td>72%</td>
<td>7.60±0.24^a</td>
<td>1.97±1.02^a</td>
</tr>
</tbody>
</table>

Group I – Normal Control, Group II – Cancer Control, Group III - seaweed nano particle, All values are expressed as mean ± SEM for 6 rats in each group. a – Values are significantly different from control (G1) at p<0.01

b – Values are significantly different from cancer control (G2) p< 0.05 MEUF– methanolic extract of *Ulva faciata*, AEUF – Aqueous extract of *Ulva faciata*

The present study showed a decrease in cancer cell count as a confirmatory evidence for protection against DAL. Consequently increased life span was observed with extract- treated mice.

c) Impact of Supplementation of Carotino Oil on Blood Glucose, Lipid Profile and Antioxidant Status of Healthy Volunteers

Carotino oil is a blend of 80% canola oil and 20% red palm fruit extract. It is rich in anti-oxidant nutrients namely lycopene, alpha and beta-carotene, omega 3 and 6 fatty acids and co-enzyme Q10. The healthy volunteers aged 20 to 60 years, were given 15mL carotino oil per day based on the Food and Drug Administration recommendations. After 45 days, the biochemical parameters were assessed in these volunteers. Table 5 gives the mean changes in the plasma anti-oxidant levels.
Table V- Changes in Mean Plasma Antioxidant Levels

<table>
<thead>
<tr>
<th>Groups</th>
<th>Initial</th>
<th>Final</th>
<th>Difference</th>
<th>‘t’ value</th>
<th>I vs. F</th>
<th>E vs. C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Beta-Carotene (mg/dL)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental I</td>
<td>7.19 ± 1.03</td>
<td>8 ± 0.68</td>
<td>+ 0.81</td>
<td>1.969**</td>
<td>0.860NS</td>
<td></td>
</tr>
<tr>
<td>Control I</td>
<td>7.74 ± 1.73</td>
<td>7.62 ± 1.45</td>
<td>- 0.12</td>
<td>0.255NS</td>
<td>0.860NS</td>
<td></td>
</tr>
<tr>
<td>Experimental II</td>
<td>7.44 ± 1.45</td>
<td>7.68 ± 1.36</td>
<td>+ 0.24</td>
<td>0.879NS</td>
<td>2.685*</td>
<td></td>
</tr>
<tr>
<td>Control II</td>
<td>7.09 ± 1.57</td>
<td>6.89 ± 1.17</td>
<td>- 0.23</td>
<td>0.371NS</td>
<td>0.860NS</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Vitamin C (mg/L)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental I</td>
<td>9.55 ± 1.21</td>
<td>10.93 ± 0.37</td>
<td>+ 1.38</td>
<td>3.709**</td>
<td>3.264**</td>
<td></td>
</tr>
<tr>
<td>Control I</td>
<td>9.21 ± 1.74</td>
<td>9.12 ± 1.69</td>
<td>- 0.09</td>
<td>0.137NS</td>
<td>0.137NS</td>
<td></td>
</tr>
<tr>
<td>Experimental II</td>
<td>8.94 ± 2.08</td>
<td>11.52 ± 0.74</td>
<td>+ 2.58</td>
<td>3.207**</td>
<td>3.559**</td>
<td></td>
</tr>
<tr>
<td>Control II</td>
<td>9.32 ± 2.68</td>
<td>9.14 ± 1.93</td>
<td>- 0.18</td>
<td>0.202NS</td>
<td>0.202NS</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Superoxide Dismutase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental I</td>
<td>0.704 ± 0.24</td>
<td>0.833 ± 0.25</td>
<td>0.129</td>
<td>1.598NS</td>
<td>0.063NS</td>
<td></td>
</tr>
<tr>
<td>Control I</td>
<td>0.843 ± 0.45</td>
<td>0.838 ± 0.23</td>
<td>- 0.005</td>
<td>0.045NS</td>
<td>0.045NS</td>
<td></td>
</tr>
<tr>
<td>Experimental II</td>
<td>0.581 ± 0.28</td>
<td>0.608 ± 0.16</td>
<td>0.027</td>
<td>0.291NS</td>
<td>0.291NS</td>
<td></td>
</tr>
<tr>
<td>Control II</td>
<td>0.73 ± 0.23</td>
<td>0.679 ± 0.15</td>
<td>- 0.024</td>
<td>0.361NS</td>
<td>0.361NS</td>
<td></td>
</tr>
</tbody>
</table>

The results revealed that the supplementation of carotino oil increased the beta-carotene, vitamin C and superoxide dismutase levels.

**Development and Evaluation of a Hypoglycemic Tablet with the Herb Salaciareticulata (Ekanayakam)**

A native herb of Tamil Nadu, *Salaciareticulata* was tested for hypoglycemic properties in the form of capsules and tea in Type II diabetic subjects, as per standard protocols. *Salacia* in the form of tea exhibited pronounced results when compared to capsules. Earlier sub-chronic toxicity as per Organization for Economic Cooperation and Development (OECD) guidelines was tested in rats and proved to be non-toxic.

**d) A Comparative Study on The Anti-Cancer Potential of Nano-Gelatin Encapsulated Glutathione Reductase and Lycopene Using Cancer Cell Lines**

Cancer is the most dreaded disease and is the second leading cause of death worldwide and accounted for 7.6 million deaths occurring in low and middle income countries. Based on the current rate of incidence, it is believed that one in every three persons will develop cancer at some time during his life.

The study was conducted with the specific objectives to develop and characterize nano-gelatin encapsulated GR and lycopene using nanotechnology and to compare their anti-cancer potential using MTT assay and flow cytometric analysis. The Extraction of GR from frozen tomato peel was done using enzyme extraction method and extraction of lycopene from processed tomato by using solvent extraction method. The synthesis of nano-gelatin encapsulated GR and lycopene was followed by the characterization of gelatin synthesized GR and lycopene nano-particles using UV-Visible spectroscopy, SEM and FTIR analysis. Cytotoxicity of the nano-gelatin encapsulated GR and lycopene in cancer cell lines (MCF-7 and A549) was done by MTT Assay. Evaluation and comparison of the anti-cancer potential of nanogelatin encapsulated GR and lycopene using the flow cytometric analysis process.
The presence of the extracted GR was confirmed using SDS-PAGE method from which the protein profile of the extracted GR was found to be similar to that of standard glutathione (reduced), by the presence of same molecular weight proteins. The results confirmed that the extracted enzyme is Glutathione Reductase. The identification of different pigments present in the crude pigment extract was confirmed using TLC analysis from which it was found that there were two pigments. The pigments were identified as J3-carotene and lycopene, whose Rf value was found to be 0.84 and 0.5 cm respectively. From the overall results obtained by cell cycle analysis, the percentage inhibition of cell cycle progression of nano-gelatin encapsulated lycopene on MCF-7 and A549 cell lines is higher than that of nano-gelatin encapsulated GR at different concentrations and at various phases of the cell cycle.

![Microscopic pictures depicting cytotoxic effect of lycopene on human breast adenocarcinoma cells](image)

**Figure No- 3**

**Microscopic pictures depicting cytotoxic effect of lycopene on human breast adenocarcinoma cells (Control, standard and nano-gelatin encapsulated)**

e) Evaluation of a Functional Food Supplement on Body Composition of Obese Young Adults and Influence of a selected PPAR Gamma Gene Polymorphism on its Outcome

A functional food supplement was prepared using traditional foods and tested for phytochemicals qualitatively and quantitatively. Further the functional food was supplemented to obese young adults and evaluated in terms of PPAR gamma gene polymorphism.
### Table VI - Mean Anthropometric Measurements of Subjects (N=130)

<table>
<thead>
<tr>
<th>Anthropometric Measurements</th>
<th>OBESE (N=43)</th>
<th>OVERWEIGHT (N=44)</th>
<th>NORMAL (N=43)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (N=23)</td>
<td>Female (N=20)</td>
<td>Male (N=22)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (in cm)</td>
<td>171.65 ± 7.37</td>
<td>154.90 ± 6.96</td>
<td>171.82 ± 7.69</td>
</tr>
<tr>
<td>Weight (in kg)</td>
<td>84.43 ± 11.52</td>
<td>67.49 ± 10.63</td>
<td>71.43 ± 6.49</td>
</tr>
<tr>
<td>Body Mass Index (BMI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waist to Hip Ratio</td>
<td>0.92 ± 0.04</td>
<td>0.86 ± 0.04</td>
<td>0.87 ± 0.02</td>
</tr>
</tbody>
</table>

### Table VII - Prevalence of Polymorphism Based on Phenotype and Gender

<table>
<thead>
<tr>
<th>Phenotype</th>
<th>OBESE (N=43)</th>
<th>OVERWEIGHT (N=44)</th>
<th>NORMAL (N=43)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (N=23)</td>
<td>Female (N=20)</td>
<td>Male (N=22)</td>
</tr>
<tr>
<td></td>
<td>N  %</td>
<td>N  %</td>
<td>N  %</td>
</tr>
<tr>
<td>Pro 12 Pro</td>
<td>18 78.3</td>
<td>15 75</td>
<td>17 77.27</td>
</tr>
<tr>
<td>Pro 12 Ala</td>
<td>5 21.7</td>
<td>5 25</td>
<td>5 22.73</td>
</tr>
</tbody>
</table>

Results revealed that a positive outcome on the dietary and physical activity intervention was observed among the obese adults. The difference in body fat mass of obese male and female genotypes with polymorphism showed a decline of around 3.36 to 3.96 kilograms.

### Table VIII - Coefficient of Correlation between BMI and Body Composition

<table>
<thead>
<tr>
<th></th>
<th>BMI</th>
<th>BFM</th>
<th>TBW</th>
<th>VFA</th>
<th>SLM</th>
<th>FFM</th>
<th>SMM</th>
<th>PBF</th>
<th>OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BFM</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.516*</td>
</tr>
<tr>
<td>TBW</td>
<td></td>
<td>-0.392</td>
<td>0.835**</td>
<td>-0.384</td>
<td>-0.372</td>
<td>-0.360</td>
<td>0.984**</td>
<td>0.717**</td>
<td></td>
</tr>
<tr>
<td>VFA</td>
<td></td>
<td>-0.153</td>
<td>1.000**</td>
<td>0.999**</td>
<td>0.995**</td>
<td>-0.532</td>
<td>0.792</td>
<td>0.906**</td>
<td></td>
</tr>
<tr>
<td>SLM</td>
<td></td>
<td></td>
<td></td>
<td>-0.141</td>
<td>-0.126</td>
<td>-0.107</td>
<td>0.792</td>
<td>0.906**</td>
<td></td>
</tr>
<tr>
<td>FFM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.999**</td>
<td>0.997**</td>
<td>-0.525*</td>
<td>-0.038</td>
</tr>
<tr>
<td>SMM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.513*</td>
<td>-0.026</td>
</tr>
<tr>
<td>PBF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
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<tr>
<td>Obesity Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.671**</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)
The prevalence of Pro 12 Pro was found to be 78.3 and 75 percent among male and female subjects. Subjects with Pro 12 Ala Polymorphism had a higher body weight and BMI at baseline when compared with Pro 12 Pro genotype. The functional food supplement proved the reduction in body weight, body fat percent and visceral fat area.

f) Impact of Interventions on the Iron Nutriture of Adolescent Girls (13 To 18 Yrs) And Young Women (19 To 35 Yrs) From Rural Coimbatore

In a rural area, Thondamuthuranemic girls were supplemented with functional food ‘Laddu’ after de worming. The local community was educated to grow home gardens/kitchen garden/ community gardens. The green leafy vegetables thus grown were by the mass to enhance iron nutritional status.

The mild and moderate levels of anaemia were prevalent among the adolescent girls and young women studied in rural Coimbatore. The dietary intake of micronutrients especially iron was low among the target population and lack of awareness on micronutrient foods and factors influencing their bioavailability.

Figure No- 4 Roof kitchen garden of green leafy vegetables maintained by SHG women
Further, the impact of interventions in terms of providing food supplement, nutrition education and promoting kitchen garden activity to three groups of anaemic adolescent girls and rural women showed significant improvement in terms of anthropometry, clinical picture, morbidity status and biochemical parameters. There was a tremendous improvement in knowledge, practice and attitude (KAP) regarding anaemia and the inclusion of micronutrient rich foods especially green leafy vegetables. Inclusion of micronutrient rich foods containing iron and other haemopoietic factors would enhance not only food security but also form a viable strategy to combat anaemia.

Conclusion

From the above studies, it is concluded that the selected functional foods namely black rice, sea weeds, nano-encapsulated lycopene, carotino oil, Salaciareticulata and other functional foods supplemented to human subjects or in animal based models proved nutraceutical properties in terms of anti-diabetic, anti-cancer, anti-microbial and iron nutriture enhancing properties. Inclusion of these foods will not only enhance food security but also compact lifestyle disorders.

References

6TH 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. BalKishanAnand, 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 6th Dr. B.K. Anand Memorial Award is given to Dr. S. Sucharita, Professor and Head, Clinical Physiology Unit, Department of Physiology, St. John’s Medical College, Bangalore, Karnataka.
6th Dr. B.K. Anand Memorial Award

Dr. S. Sucharita

Professor and Head Clinical Physiology Unit
Department of Physiology
St John's Medical College, Bangalore

THE RECIPIENT

Dr. Sucharita Sambashivaiah is a Physiologist with a research focus on understanding the role of nutrition in health and disease. She has completed her M.D and Ph.D. from St John’s Medical College, Bangalore. She is currently working as Professor and Head, Clinical Physiology Unit at Department of Physiology, St John’s Medical College, Bangalore. She has done her International research fellowship sponsored by Indian Council of Medical Research at National Hospital of Neurology and Neurosurgery and Imperial College, London. She has been trained in the Muscle Physiology at King’s College, London. She was awarded Dean Louis and May Monteiro Prize as the best researcher within institute twice. She is recipient of the Physiological society UK senior research fellowship, various international travel grants and Wellcome Trust/DBT Intermediate Fellowship. She has numerous national and international papers to her credit. She is also heading couple of studies focusing on Nutrition and Physiology. She has worked extensively on vitamin B12 status and its impact across lifecycle. She is also working on the role of lifestyle modification programs in the improvement of glycemia among prediabetes and type 2 Diabetes with special interest in the skeletal muscle.

PREVIOUS RECIPIENT

2014  Dr. Prema Ramachandran

2015  Dr. K. Satyanarayana

2016  Dr. Mario Vaz

2017  Dr. B. Sivakumar

2018  Dr. William Selvanurthy
DEBATE on “Is Coconut Oil Good for Health”

Moderator & Flagging the issues -  

Dr. B. Sesikeran  
Former Director, ICMR-National Institute of Nutrition, Hyderabad

For the motion -  

Dr. B. Lokesh,  
CSIR-CFTRI, Mysore  

&  

Dr. Rajmohan,  
Univ. of Kerala, Trivandrum

Against the motion -  

Dr. Ahmed Ibrahim,  
ICMR-NIN, Hyderabad  

&  

Dr. Sanji Kanjilal,  
CSIR–IICT, Hyderabad
Deciphering metastasis

Dr. Radhika Nair PhD
Ramanujan Faculty Fellow
Rajiv Gandhi Centre for Biotechnology,
Bio-Innovation Centre
Thiruvananthapuram, Kerala

Breast cancer is a complex disease and is currently the leading cause of female mortality in India. While we have made rapid progress in the treatment of primary tumors, the same is not the case once tumor cells spread to distant organs like the lung, liver, bone or brain. More than 80% of women will die once tumor cells spread from the breast via the process of metastasis. It is therefore imperative to understand the metastatic process in order to devise new therapies.

Our lab focuses on the cell intrinsic and extrinsic mechanisms that drive metastasis. In this talk, I will give you an insight into molecular pathways subverted by the Inhibitor of differentiation proteins (Id) leading to increased cancer associated phenotypes like proliferation and self renewal. We are exploiting our findings in a therapeutic context to more effectively eliminate tumor cells to give women currently living with metastatic breast cancer a better chance at life.

Genome Editing

Dr. Bhabatosh Das
Assistant Professor
Translational Health Science and Technology Institute
NCR Biotech Science Cluster
Faridabad – Gurgaon

Role of Gastrointestinal Tract Microbiome in Nutrition and Health

The human gastrointestinal tract (GIT) harbors complex microbial assemblages, which encode key functionalities that play important role in host metabolism, synthesis of nutrients and signaling molecules, xenobiotics metabolisms, maturation of immune systems and resistance against colonization of enteric pathogens. The composition and functions of the microbial species living in the GIT ecosystem varies between individuals and over-time. Extent of taxonomic and functional variations in GIT ecosystem is linked with dietary habit, pharmaceuticals usages, age, sex, body mass index, ethnicity, geography, altitude and civilization. Understanding a holistic picture of GIT microbiome of healthy people living across geography and identifying population specific 'keystone' taxa is of immense importance for identifying microbial species that may provide protection against chronic and metabolic diseases. India is the home of more than 1.36 billion people belonging to 2000 human communities residing in well distinct geography. We recently characterized gut microbiome of rural and urban healthy Indians living in low altitude and high altitude areas and reveal how dietary habits effect composition and functions of gut microbiome. We demonstrated that both bacterial and fungal members living in the GIT encode large numbers of metabolic functions that help in assimilation of nutrients from complex dietary components and help each other’s to subsist and endorse host health.
Can the beneficial microbes in diet protect us from *Helicobacter pylori* associated gastric diseases?

More than a million people die every year due to gastric cancer and peptic ulcer. *Helicobacter pylori* infection in stomach is the most important reason for these diseases. Interestingly, however, only 10–20% of the *H. pylori* infected individuals suffer from these gastric diseases and rest of the infected individuals remain asymptomatic suggesting that other factors are involved in the development and progression of diseases. Recent literature shows that several other bacteria also can colonize in human gastric mucosa, but their functions in relation to gastric diseases are not understood. Moreover, the significance of intestinal microbiome in the context of gastric diseases remains mostly unexplored. Our recent analysis revealed that infection with virulent *H. pylori* strain in stomach is necessary, but is not sufficient to cause gastric disease. Apart from *H. pylori* infection and other factors, human intestinal microbiome vastly contributes to determine the clinical status of infected individuals. Interestingly, it is well known that human intestinal microbiome depends on food habit. People from different geographical regions have very different food habits, which also include several unique fermented products of plant and animal origins. When consumed raw, the fermented foods bring in fresh inocula of microbes to gastrointestinal tract and several strains of these microbes, like *Lactobacillus*, are known probiotics with potent anti-*H. pylori* effect. In this talk we will discuss how human microbiome influences the gastric diseases and how natural probiotics present in traditional fermented foods and beverages may confer protections against *H. pylori* induced gastric diseases.

**Enzyme applications to improve food nutrient density and health.**

**Dr. Sreedevi A. Singh**  
Senior Principal Scientist  
CFTRI, Mysore

**Enzyme Applications to Improve Dietary Nutrient Density and Health**

In India, apart from energy and protein deficiencies, iron deficiency anemia and vitamin A deficiency are also prevalent in a significant population, especially children and women. In urban areas, undernutrition coexists with overnutrition and diet related non-communicable diseases like diabetes, cardiovascular disease and cancer. Undernutrition and overnutrition, both have led to high economic losses to the country and hindered development. The daily diet of Indians is predominantly plant based that is rich in antinutrients. Although, pulses and oilseeds are high in protein, the protein digestibility and quality is low. Enzymes are invaluable processing aids for the food industry and can help in increasing nutrition density of foods, improve digestibility and bioavailability. The major ingredient in plant foods, including plant supplementary foods, contain pre-gelatinized starch. Starch absorbs a large quantity of water during reconstitution of the food and decreases the nutrient density and increases its bulk. This ‘High Bulk’ limits the nutrient content of the food per unit feed and is a major constraint for intake of the requisite quantity of energy and protein by the younger children and toddlers. This is more so in the case of ‘second’ and ‘third degree’ malnourished children, who require about 600 calories and 200 g protein per day in the form of food supplements. Removal of antinutrients in preparation of high protein ingredients like protein concentrates and isolates helps in improved digestibility and bioavailability of proteins and minerals. Phytases can be of value in improving the bioavailability of minerals in food and feed. Hydrolyzed proteins are prepared to obtain ingredients with improved functional properties or bioactive peptides. Fractionated proteins or peptides may be a source of peptides rich in more or more amino acids that could find applications in specialty foods. Several such innovative ingredients and foods developed will be discussed.
## INDUSTRIAL SESSION

| 1. Pepsi Co India Holdings Pvt. Ltd. | “Improving choices across our portfolio”  
Ms. Ankita Marwaha  
Associate Director, Nutrition Science |
|-------------------------------------|-----------------------------------------------------------------------------------|
| 2. Marico Limited                   | “Can we manage Dyslipidemia through Edible Oils?”  
Dr. Sudhakar Mhaskar                |
| 3. Abbott Nutrition                 | “Diabetes- Medical Nutrition Therapy”  
Dr. Harita Syam                      |
| 4. California Walnuts               | “Walnuts-An excellent source of plant based Omega 3ALA”  
Dr. Anitha Mohan                    |
## YOUNG SCIENTIST AWARD SESSION
### JUNIOR AWARD IN COMMUNITY NUTRITION

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<td>JACN-01</td>
<td><strong>Ms. Mounika Pandey</strong>&lt;br&gt;Post graduate student&lt;br&gt;University of Mysore&lt;br&gt;Mysore</td>
<td>BODY COMPOSITION, DIETARY PRACTICE AND PHYSICAL ACTIVITY PATTERNS AMONG YOUNG ADULT WOMEN.</td>
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<td>JACN-02</td>
<td><strong>Ms. Aishwarya Vijaykumar Patil</strong>&lt;br&gt;Ph.D. Scholar&lt;br&gt;Food Science and Nutrition, Department of Food Science and Nutrition, College of Community Science, University of Agricultural Sciences, Dharwad</td>
<td>KNOWLEDGE AND ATTITUDE ABOUT OBESITY AND MENOPAUSE AMONG POST-MENOPAUSAL WOMEN</td>
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<td>JACN-03</td>
<td><strong>Ms. Tanisha Das</strong>&lt;br&gt;Student&lt;br&gt;Department of Foods and Nutrition&lt;br&gt;The Maharaja Sayajirao University of Baroda, Vadodara</td>
<td>AN INTERVENTION TRIAL TO MAKE MATERNITY HOMES OF VADODARA CITY “BABY FRIENDLY” AND IMPROVE IN THE NEW BORN BREASTFEEDING PRACTICES</td>
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## JUNIOR AWARD IN EXPERIMENTAL NUTRITION

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<td>JAEN-01</td>
<td><strong>Ms. Harsheen Kaur Chaudhary</strong>&lt;br&gt;Student&lt;br&gt;Department of Food Science &amp; Nutrition, SNDT Women University&lt;br&gt;Mumbai</td>
<td>DIETARY HABITS OF ADOLESCENTS, AGE 12-18 YEARS AND ITS RELATION TO BODY WEIGHT AND CENTRAL ADIPOSITY MEASURE- A CROSS SECTIONAL STUDY IN MUMBAI.</td>
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<td>JAEN-02</td>
<td><strong>Ms. Meena Kumari P.</strong>&lt;br&gt;Senior Research Fellow&lt;br&gt;Department of Biochemistry, Academy of Scientific and Innovative Research, CSIR-Central Food Technological Research Institute, Mysore</td>
<td>EFFECT OF PROBIOTIC CURD ON INFLAMMATORY MARKERS AND GUT MICROFLORA OF HIGH FAT FED MICE MODEL</td>
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BACKGROUND- Young adulthood is a vulnerable period for weight gain and health consequences for becoming obese. The importance of measuring body composition has increased to evaluate changes in nutritional status as it is directly related to perpetuity.

OBJECTIVE- To assess the body composition, dietary practice and physical activity patterns among young adult women and impact of nutrition education program (NEP) on selected subjects. MATERIALS AND METHODS- The present study design was a purposive sampling, involving 200 young adult women (20-35 yrs.) and were divided into groups of boarders, day-scholars and dietary habits. Anthropometric measurements, Socio-demographic profile, FFQ and physical activity profile were assessed through a self-reported questionnaire. Body composition was assessed using the BIA technique (Inbody 770). RESULTS- Based on the standard BMI classifications, subjects were categorized as 20.5%(41) overweight and 5.5%(11) obese, 14.5% (29) underweight and 59.5% (119) healthy. Body composition parameters found to be increasing with an increase in BMI and age. 78.5% (157) of the total subjects had a sedentary lifestyle and spent majority of their time in sleeping, using phone and working on computer, only (43) 21.5% had regular walk or yoga. A significant difference in BMI was observed among day-scholars and boarders (p<0.001), vegetarian and non-vegetarian (p<0.02). 85% of subjects reported that NEP imparted significant changes and indeed inculcated a healthy lifestyle.

CONCLUSION- Results revealed that age, type of diet and physical activity had a strong relationship with body composition. Physical activity level showed that the majority of the subjects were having a sedentary lifestyle, hence an increase in physical activity can decrease the risk of chronic diseases associated with obesity. Ideal body composition can be attained by increasing protein-rich foods and decreasing excess energy intake with moderate physical activity. KEYWORDS- Body composition, Dietary practice, physical activity BMI- Body mass index, FFQ- Food frequency questionnaire.

INTRODUCTION- Menopause is an inevitable milestone in womanâ€™s life with permanent cessation of menses, leading to decrease in ovarian hormones. Women all over the world now have to spend almost 1/3rd of their lives in menopausal years. Women aged 55â€“65 years; weight gain is one of their major health concerns. Therefore, menopause now is a concerning matter to maintain and improve womenâ€™s health. Hence the study was undertaken to assess the knowledge and attitude with regard to obesity and menopause among post-menopausal women. MATERIALS AND METHODS- The present study was conducted in Dharwad, Karnataka. About 30 post-menopausal women (>50y) were selected. A detailed questionnaire was formulated with general information, nutritional status and knowledge and attitude with regard to obesity and menopause. Pre and post-knowledge was assessed for retention and improvement in knowledge by using visual aid. RESULTS- The results revealed that majority of the post-menopausal women belonged to normal BMI (46.66%) followed by overweight (36.66%), underweight (13.33%) and obesity (3.33%). All the post-menopausal women suffered from pain viz., knee pain, ankle pain, back pain. About 83.33% women had hypertension followed by diabetes (46.66%), acidity (43.66%) and constipation (16.66%). Majority of women agreed that Obesity is caused by overeating (96.66%), causes diabetes (90%), consumption of fatty foods (100%) and eating vegetables, fruits and exercising regularly reduce weight (93.33%). Around 50% women donâ€™t know that obesity is result of genetic disorder and obesity causes cancer, hypertension and diabetes. Before giving knowledge session, majority of women belonged to low knowledge category followed by moderate and high. Whereas after intervention session majority of the post-menopausal women belong to moderate knowledge category followed by high and low. CONCLUSION- Hence, we can conclude that with education intervention there was significant improvement in knowledge. This can help the post-menopausal women to manage and overcome the symptoms of menopause.
JACN-03  An intervention trial to make maternity homes of Vadodara city baby friendly and improve in the new born breastfeeding practices
Tanisha Das The Maharaja Sayajirao University of Baroda tanisha260896@gmail.com
Prof. VanishaNambiar  Professor The Maharaja Sayajirao University of Baroda vanisha.nambiar-fn@msubaroda.ac.in

Background- The recent WHO and UNICEF™s Baby-friendly Hospital Initiative (BFHI) guidelines (2018) emphasize on implementation of its ten steps to successful breastfeeding to improve the maternal and child health (MCH). Aim- The present hospital based study focused on assessment of the BFHI status of Vadodara city maternity homes and impact of multiple interventions on the breastfeeding practices. Methods- Following ethical clearance and permissions, in Phase 1 (cross sectional study), all maternity homes of the city (n=61) were ranked based on BFHI (2018) self appraisal forms. Personal interviews to understand the breastfeeding practices were conducted with newly initiated mothers (n= 482) and key informant interviews with the nearest pharmacy (n=25) were done to elicit information on sale of infant milk substitutes (IMS). Phase II included interventions for promotion, protection and strengthening breastfeeding practices (BF) following which post data was collected after 6 months. Results- As per BFHI, only 10% hospitals were baby friendly, 52% mothers had early initiation of breastfeeding, type of delivery (cesarean) had a significant relationship with initiation of BF (p<0.001) and usage of IMS (72%). An alliance was formed by the Department of Foods and Nutrition and local members of FOGSI, IAP, 4 medical colleges of the city for sensitization and empowering the nursing and dietetics staff through 2 workshops (16 hours each) was well received and by its participants (n=120). Ten hospitals took a pledge for BFHI and non-significant improvement in increase in initiation of BF rates, kangaroo mother care (KMC) and reduction in IMS and prelacteals was noted. Conclusion- An integrated approach can help promote, protect and strengthen BF practices and help us achieve the global targets for improving MCH Keywords- baby friendly hospital initiative, cesarean section, breastfeeding, initiation, prelacteal

JUNIOR AWARD IN EXPERIMENTAL NUTRITION

JAEN-01  DIETARY HABITS OF ADOLESCENTS, AGE 12-18 YEARS AND ITS RELATION TO BODY WEIGHT AND CENTRAL ADIPOSITY MEASURE- A CROSS SECTIONAL STUDY IN MUMBAI
Harshleen KaurChaudhary ClinicalDietitian SNDT. harshleen1995@gmail.com

Nutrition transition has shown a major impact on the dietary pattern of adolescents and young adults. Traditional foods have been replaced with processed foods which has contributed to an increased prevalence of overweight and obesity in India especially, in 12-18 years of age. Adolescence experience a drastic change in eating pattern. Therefore, the aim of the study to describe the food consumption pattern and to identify a relation with body weight and central adiposity in the population groups of western suburbs of Mumbai. A self-administered semi-quantitative dietary assessment tool was developed to assess the dietary habits of adolescents. A total of 214 adolescents (aged 12-18 years) attending, private and government schools in Mumbai, India completed the survey. Overall it was observed that adolescents eating behaviours tend to change with an increase in age with older adolescents showing major impact of nutrition transition. Adolescents who preferred eating outside food 2-3 times/week had an increased waist circumference. A trend of increase in waist circumference with a decrease in eating lunch at home was observed. The study is an attempt to understand the eating behaviour and meal pattern of adolescents (12-18 years) in an urban environment and correlate it with the incidence of overweight and obesity. Healthy food choices during adolescent would help to reduce the risk of overweight and obesity. Key Words- Adolescents, Eating behaviours, Central Adiposity, Bodyweight.

JAEN-02  EFFECT OF PROBIOTIC CURD ON INFLAMMATORY MARKERS AND GUT MICROFLORA OF HIGH FAT FED MICE MODEL
MEENA KUMARI P SENIOR RESEARCH FELLOW DEPARTMENT OF BIOCHEMISTRY, Academy of Scientific and Innovative Research, CSIR-CENTRAL FOOD TECHNOLOG doctormeena1312@gmail.com PRAKASH M. HALAMMOUTHUKUMAR S. P. SENIOR PRINCIPAL SCIENTIST SENIOR PRINCIPAL SCIENTIST DEPARTMENT OF MICROBIOLOGY AND FERMENTATION TECHNOLOGY, AsSIR, CSIR-CFTRI, MYSURU DEPARTMENT OF BIOCHEMISTRY, AsSIR, CSIR-CFTRI, MYSURU prakashshalami@cftri.res.in muthukumar@cftri.res.in

Background- Obesity and metabolic disorders are closely linked to inflammation. High fat diet is found to be one of the main triggering cause by inducing low grade inflammation and dysbiosis of the gut microbiome. Probiotics are explored as one of the potential therapeutic targets for the prevention of these disorders. Therefore, this study focused at evaluating the immunomodulatory effects of probiotic curd with Lactobacillus fermentum MCC2760 in a high fat fed mice model. Materials and methods- 8 weeks old male C57BL6 mice were grouped into normal diet, high fat diet, normal diet with probiotic supplementation and high fat diet with probiotic supplementation. The control and treatment groups were supplemented with milk and probiotic curd respectively via oral gavage (0.2 mL/day) for 12 weeks. Weight gain and feed intake were measured during the experimental period along with the organ weight, serum biochemical analysis and expression of inflammatory markers in tissue (using real-time qPCR), bacterial translocation to adipose tissue, fecal microbiotal count, gut microbiota profiling by 16S metagenomics were performed post necropsy. Results- Probiotic curd intervened group showed significant reduction in weight, feed intake and relative organ weight. Similarly, the probiotic group displayed reduction in LDL-C, VLDL-C, total cholesterol, glucose. Bacterial translocation to adipose tissue was decreased in probiotic group whereas, fecal pathogen counts were increased in high fat fed group as contrast to probiotic group. 16S metagenomics data displayed the higher abundance of Firmicutes, high Firmicutes/Bacteroidetes ratio and lower Verrucomicrobia phylum in high fat fed group. High GLP-1, IL-10 and less TNF-Î± expression were observed in the adipose tissue of treatment groups. Conclusion- The above results establish the anti-inflammatory effect and gut barrier function of probiotic curd with L. fermentum MCC 2760 which may help in the improvement of health and prevention of diet related disease.
# YOUNG SCIENTISTS AWARD SESSION

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<td>PUBLIC SERVICE DELIVERY OF MID-DAY MEAL SCHEME IN NORTHERN KONKAN DIVISION OF MAHARASHTRA- CHALLENGES AND SOLUTIONS</td>
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<td><strong>Mrs. Harshada Ketan Thakur</strong>&lt;br&gt;Research Scholar (UGC SRF)&lt;br&gt;Symbiosis School of Biological Sciences, Symbiosis International (Deemed University), Pune.</td>
<td>ASSOCIATION OF PREMENSTRUAL SYNDROME WITH BODY COMPOSITION AND LIFESTYLE BEHAVIOURS AMONG YOUNG WOMEN- A CROSS-SECTIONAL STUDY</td>
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<td><strong>Mr. Syed Mahfuz Al Hasan</strong>&lt;br&gt;Graduate Student&lt;br&gt;Department of Public Health, Faculty of Medicine, Kagawa University, Kagawa, Japan</td>
<td>TEMPORAL TRENDS IN ENERGY AVAILABILITY IN INDIA- A JOINPOINT REGRESSION ANALYSIS OF FAO’S FOOD BALANCE SHEET DATA FROM 1961 TO 2013</td>
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<td><strong>Ms. Deeksha Naik</strong>&lt;br&gt;Phd Scholar, Department of Food Science and Nutrition, College of Community Science, University of agricultural sciences, Dharwad</td>
<td>NUTRITIONAL STATUS OF NOMADIC TRIBAL WOMEN AND NEONATAL CARE PRACTICES EXISTING AMONG NOMADIC TRIBES</td>
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<td><strong>Ms. Babita Upadhyay</strong>&lt;br&gt;Research Scholar&lt;br&gt;Department of Food Science and Nutrition, Banasthali University, Rajasthan</td>
<td>NUTRITIONAL STATUS OF CHILDREN CONSUMING MID DAY MEAL (MDM) IN SCHOOLS IN DELHI</td>
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<td><strong>Ms. Richa Srivastava</strong>&lt;br&gt;Research Scholar&lt;br&gt;Department of Food Science and Nutrition, BanasthaliVidyapith, Rajasthan</td>
<td>SOCIOECONOMIC VARIABLES AND THEIR ASSOCIATION TO OUTCOMES OF CANCER IN CHILDREN</td>
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<td>SAEN-01</td>
<td>Ms. Khushboo Singh&lt;br&gt;Research Scholar&lt;br&gt;Food and Nutrition&lt;br&gt;Punjab Agricultural University, Ludhiana</td>
<td>DEVELOPMENT AND SENSORY EVALUATION OF ANTIOXIDANT RICH POMEGRANATE PEEL INFUSIONS</td>
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<td>SAEN-02</td>
<td>Ms. Vaishali Vivek Kasture&lt;br&gt;PhD. Student (DST-Inspire SRF)&lt;br&gt;BharatiVidyapeeth (Deemed to be University), Interactive Research School for Health Affairs (IRSHA) Pune</td>
<td>EFFECT OF MATERNAL OMEGA-3 FATTY ACIDS AND VITAMIN E SUPPLEMENTATION ON PLACENTAL APOPTOTIC MARKERS IN A RAT MODEL OF EARLY AND LATE ONSET PREECLAMPSIA</td>
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<td>SAEN-03</td>
<td>Ms. Rishika Jadai&lt;br&gt;Ph.D. SRF (DST INSPIRE)&lt;br&gt;Cell and Molecular Biology Division, National Institute of Nutrition, Hyderabad</td>
<td>COWPEA ISOFLAVONES AND VITAMIN D ROLE IN OPG-RANKL PATHWAY BY MG-63 OSTEOBLASTS- AN ESTROGEN DEPENDENT IN VITRO STUDY.</td>
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<td>Ms. Jijnasa Bordoloi&lt;br&gt;DBT-senior research fellow&lt;br&gt;Biotechnological science and technology group&lt;br&gt;CSIR-North East Institute of Science &amp; Technology, Jorhat, Assam</td>
<td>BENEFICIAL EFFECT OF VITAMIN K ON LOWERING HYPERLIPIDEMIA-INDUCED INFLAMMATORY PATHOPHYSIOLOGY VIA DOWN-REGULATING MCP-1/ICAM-1/CCR2/CD11A PATHWAY OF MONOCYTE-HEPATOCYTE ADHESION</td>
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<td>Dr. Reetapa Biswas&lt;br&gt;Assistant Professor&lt;br&gt;Department Of Food And Nutrition West Bengal State University&lt;br&gt;Kolkata</td>
<td>HYPOGLYCEMIC AND HYPOLIPIDEMIC EFFECTS OF LINOLEIC ACID RICH WATERMELON SEED KERNEL OIL ON STREPTOZOTOCIN INDUCED DIABETIC RATS</td>
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<td>SAEN-06</td>
<td>Ms. Anindita Ambika Nandi&lt;br&gt;Ph. D. student (UGC-SRF)&lt;br&gt;Department of Mother and Child Health, Interactive Research School for Health Affairs (IRSHA), BharatiVidyapeeth (Deemed to be University), Pune</td>
<td>ASSOCIATION OF VITAMIN D WITH FATTY ACIDS IN PREGNANCY</td>
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SENIOR AWARD IN COMMUNITY NUTRITION

SACN-01

DEVELOPMENT AND SENSORY EVALUATION OF ANTIOXIDANT RICH POMEGRANATE PEEL INFUSIONS

Khushboo Singh  Research Scholar Punjab Agricultural University, Ludhiana khush16.1990@gmail.com
Dr. Harpreet Kaur Dr. Kiran Bains  Assistant professor Professor and Head Punjab Agricultural University, Ludhiana P. Kaur@pau.edu

Pomegranate processing industries generate large amount of peels which has higher concentration of natural bioactive compounds than the edible portion. Improper management of this by product exerts an influence on environment and can be utilized to meet increasing demand of functional foods. Pomegranate fruit of Mridula variety was processed to form peel powder. Peel powder was analyzed for bioactive compounds (total phenols, flavonoids and anthocyanins) and nutrient antioxidants (vitamin C and E). The peel infusions were prepared by placing the peel powder in fixed amount and spice powder inside the infusion bags. Twelve variations were developed by using the peel powder at three different levels i.e. 2, 3 and 4 grams along with three different spice powders (cardamom, ginger and cinnamon). The most acceptable formulation was evaluated for antioxidant activity (DPPH and FRAP) and compared with four commercial brands of green tea available in the market. The results showed that peel contains 155.78 mg GAE/g and 59.09 mg QE/g of total phenols and flavonoids, respectively. The values for the anthocyanins, vitamin C and vitamin E were 175.03, 19.22 and 6.05 mg per 100g, respectively. All the formulations were acceptable; no significant difference was noticed among the three levels of the peel powder. However a significant difference was observed in acceptability of infusions with the spice powders. Cardamom spiced infusion was most liked by the panelists followed by ginger and cinnamon. The DPPH values of peel infusion and green tea brands ranged from 69.44 to 75.88 and 52.03 to 71.27 (% inhibition). The corresponding values for FRAP were 34.19 to 45.36 and 28.16 to 43.57 (µmolFe2+/g), respectively. The antioxidant activity of the peel infusions found to be at par when compared with the green tea brands. Thus, it can be a substitute for commercial beverages as it has superior sensory characteristics, loaded with natural antioxidants and economical.

SACN-02

ASSOCIATION OF PREMENSTRUAL SYNDROME WITH BODY COMPOSITION AND LIFESTYLE BEHAVIOURS AMONG YOUNG WOMEN- A CROSS-SECTIONAL STUDY

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Introduction- Premenstrual syndrome (PMS) is a cyclical late luteal phase disorder whereby the daily functioning of women is affected by emotional and physical symptoms which substantially interfere their quality of life. The occurrences of symptoms affect many women of childbearing age. Several biological and lifestyle related factors have shown association with occurrence and severity of PMS. Objective- This study aimed to determine occurrence and severity of PMS among young women in India and clarify its association with body composition, dietary habits and lifestyle behaviours. Method- A total of 330 women participated. Their information on menstruation, dietary habits, and physical activity was collected using structured questionnaire. PSST and Moose re™s questionnaire were used for the diagnosis and categorization of PMS. Body composition analysis was done by measuring 4-site skinfold thickness and bioelectrical impedance analysis. Results and Discussion- About 46.8% had mild PMS, 37.1% had moderate and 16.1% had strong PMS. The most common symptoms reported were anxiety and irritability. Though mean basic metabolic index (BMI) was within normal range (22.25±5.01Kg/m2), the mean body fat percentage was 32.97±5.65% which is above the normal cut-off for young women. Body fat percentage, total body water, muscle mass and waist circumference correlated significantly with incidence and severity of PMS. Intake of energy, protein and essential micronutrients were significantly low than recommended dietary allowance (RDA) in the studied group of women. To the contrary intake of fat was significantly higher. The results showed a significant correlation between the severity of PMS and dietary habits (consumption of foods high in calorie, fat, sugar, salt), while salad consumption and better physical activity level was found to be protective against PMS. Conclusion- It was observed that there is an inter-alius relation between parameters of body composition and dietary habits with occurrence and severity of PMS symptoms among young women.
TEMPORAL TRENDS IN ENERGY AVAILABILITY IN INDIA- A JOINPOINT REGRESSION ANALYSIS OF FAO’s FOOD BALANCE SHEET DATA FROM 1961 TO 2013

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Background- This research aimed to analyze the temporal trends and significant changes in energy and macronutrient availability in the Indian diet from 1961 to 2013. Material and Methods- Due to the lack of long-term national dietary intake dataset, this study used dataset derived from the FAO’s food balance sheets. We used joinpoint regression analysis for analyzing the temporal trends in energy and macronutrient availability. The annual percentage change (APC) was computed for each segment of the trends. Moreover, we calculated the average annual percent change (AAPC) as a summary measure of the trends over the period from 1961 to 2013.

Results- Energy availability (kcal/day/person) in India increased by 22.3% from 1961 (2010 kcal/day/person) to 2013 (2459 kcal/day/person) with an average annual change of 0.4%. From 1961 to 1976, energy availability trend was almost stable with variability that ranged from 1923 kcal/day/person to 2111 kcal/day/person. Since the mid-1970s the energy availability has increased significantly in India except from 1999 to 2003 (APC = -1.53). Carbohydrate availability showed almost similar changing patterns like energy and increased by only 1.14 times from 1961 to 2013 (AAPC = 0.3). Protein availability in the diet showed a zigzag trend; where during the 1980s (APC = 1.37) and since mid-2000s (APC = 1.26), availability showed increasing trends. Moreover, protein availability trend in the apparent diet was mostly shared as well as determined by the plant sources. Since the early-1970s, fat availability showed an upward trend with two different increasing rates until 2013 (APC = 1.60 until 1997 and APC = 1.12 from 1997 to 2013).

Conclusion- The structural change in energy availability in India mostly determined by carbohydrate availability. Fat availability trend in the Indian diet increased since the early-1970s while after 1980, the trend in the availability of protein increased though mostly shared and determined by plant sources.

NUTRITIONAL STATUS OF NOMADIC TRIBAL WOMEN AND NEONATAL CARE PRACTICES EXISTING AMONG NOMADIC TRIBES

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Nomads are a group of communities who travel from place to place for their livelihood. They do not have a fix settlement. Investigation was carried out with an objective to assess nutritional and health status of women of nomadic families in North Karnataka. Nomadic tribal families migrated from different states to North Karnataka were selected for the study. Six districts namely Dharwad, Hubli, Bijapur, Bagalkot, Gulbarga and Yadgiri of North Karnataka is the study location. A total of 30 women of 18-45 years (n=30) were selected for the study. Nutritional status of women was assessed based anthropometry, dietary assessment, biochemical, and their health status. Neonatal care practices existing were enquired using structured questionnaire. More than half (53.34 per cent) of the nomadic tribal women had ideal BMI, 40 per cent of the subjects belonged to underweight category and 87% of nomadic tribal women were anemic. In general this study clearly revealed that women of nomadic tribes are in poor nutritional status. The type of environment in which these families are residing is very poor. They have no security. Breastfeeding was initiated at birth by 63.33 % of women. Majority (63.33 %) of the women discarded colostrums. So it is alarming situation, immediate measures are to be taken for upliftment of these tribes, so that they can also lead a decent life. The need for food supplementation programmes and long term nutritional education intervention is required to improve the nutritional status of women. Intensive skill developmental programmes can be planned to improve their socio-economic status and standard of living.
SACN-05
NUTRITIONAL STATUS OF CHILDREN CONSUMING MID DAY MEAL (MDM) IN SCHOOLS IN DELHI
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Background- MDM Scheme is one of the biggest programmes launched by the Government of India which provides meal to children at schools. Assessment of nutritional status of children for public health strategy to combat malnutrition, is the primary need. The objective of the present investigation was to assess and analyze the nutritional status of children taking mid day meal. Material and methods- An analytical cross sectional study was conducted in Government primary and middle school (NDMC schools) in south Delhi. A total of 600 students, 355 boys and 245 girls studying in 1st to 8th standards were selected randomly from primary and upper primary classes (age- 4 years to 15 years). Anthropometric measurements viz height, weight and MUAC were measured with the help of standard techniques. Body mass index for age (BMI for age) was calculated. WHO (2006) criteria were used to categorize the subjects for their nutritional status. NCHS standard was used to categorize the subjects for MUAC. Age was recorded from their classroom register. Result- Result revealed that the mean weight, mean height and mean BMI for age of the children of age group of 4 yrs to 6 yrs and 7 yrs to 9 yrs was significantly higher (P<0.00) than the WHO standards. Mean weight, mean height and mean BMI for age of the children of age group of 10 yrs to 12 yrs and 13 yrs to 15 yrs boys were lower than the WHO standard for both groups and this difference was found to be significant at P<0.000. Results showed that for weight for age, 84.8% children were normal and 15.13% were underweight out of which, 8.76% were moderately underweight and 6.37% were severely underweight. 58.69% children were normal as per height for age and as high as 41.30% were found to be stunted (11.37% were moderately and 29.93% were severely stunted). As per BMI for age, 67.16 % subjects were normal, 13.16 % were overweight and 19.33 % were found to be overweight. There was no significant difference found between boys and girls in their nutritional status when analyzed for any of the indicators and also in any of the age groups. Key Words- Nutritional Status, Anthropometry, WHO standards, Mid Day Meal (MDM).

SACN-06
SOCIOECONOMIC VARIABLES AND THEIR ASSOCIATION TO OUTCOMES OF CANCER IN CHILDREN
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Background- Multiple inter-related factors are responsible for poorer outcome of childhood cancer in India. This study was an attempt to analyze the baseline socioeconomic profile and finding out association of different variables with outcomes of disease, viz. overall oncology outcome (OS) and event free survival (EFS). Methods- This was a prospective analytical cross sectional study conducted in the pediatric oncology outpatient department (AIIMS), from October 2012 to April, 2018. A total of 700 cancer subjects were enrolled and after attrition, 626 subjects were analyzed for results. Questionnaire cum interview schedule was developed to collect information on socio demographic, economic profile and health practices. To establish the association with outcomes (overall survival and event free Survival) the subjects were categorized as per their types of cancer as OC (overall cancer), Acute Lymphoblastic Leukemia (ALL), Acute Myeloid Leukemia (AML), Sarcoma, lymphoma and Others Solid Tumors(OST) as per their diagnosis and further for different variables. Results- Results of the present study showed that, reporting for treatment was significantly more from younger children of urban areas and by educated mothers (65.00% p=0.000, 54.10% p=0.000 respectively). Vaccinated children’s reporting for treatment was found to be significantly higher (p=0.00). There was significantly higher event free survival in the children whose mothers were educated (12th- HR=1.90,95% CI=.984-3.69, p= 0.012 and U.G and above- HR=2.28,95% CI=1.19-4.34, p= 0.002). Event Free Survival (EFS) was significantly higher in subjects who received vaccination (HR=1.173,95% CI=1.25-2.39, p= 0.001) and had good hygiene practices (HR=1.637,95% CI=1.27-2.100, p= 0.001). Results showed significantly higher 5- years Overall Survival (OS, p=0.047) and EFS (p=0.000) in subjects from urban area, in children with mothers having more education (p=0.000) for overall cancer. 5- years OS was significantly higher for sarcomas (p=0.037), other solid tumors (p=0.025) and overall cancers (p=0.000) in the subjects who maintained good hygiene practices. Conclusion- Findings of the present study highlight the significant association of type of community, education of the mother, vaccination history of the subjects and good hygiene practices with reporting for treatment, overall survival and event free survival.
Background- Adequate maternal nutrition is critical for a healthy pregnancy outcome and poor maternal nutrition is known to be associated with pregnancy complications like preeclampsia. We have earlier demonstrated an imbalance in the levels of micronutrients (folate and vitamin B12) along with low levels of long chain polyunsaturated fatty acids (LCPUFA) and high homocysteine levels in women with preeclampsia. Homocysteine is known to increase oxidative which in turn is known to upregulate placental apoptosis. Placental development is influenced by apoptosis during trophoblast differentiation and proliferation. Omega-3 fatty acids have antioxidant properties and can influence placental apoptosis. The current study examines the effect of maternal omega-3 fatty acids and vitamin E supplementation on apoptotic markers at two time points (d14 and d20) across gestation in a rat model of preeclampsia.

Materials and Methods- Pregnant Wistar rats were randomly assigned to five groups viz. control; early onset preeclampsia (EOP); late onset preeclampsia (LOP); early onset preeclampsia + omega-3 fatty acid + vitamin E supplementation (EOP + O + E) and late onset preeclampsia + omega-3 fatty acid + vitamin E supplementation (LOP + O + E). L-Nitroargininemethylester (L-NAME; 50 mg/kg body weight/day) was used to induce preeclampsia. Data was analysed using SPSS/PC+ package (Version 20.0, Chicago, IL) Results- Protein levels of proapoptotic markers like Bcl-2 associated X-protein (BAX) (p<0.05), caspase 8 and 3 (p<0.01 for both) and malondialdehyde (MDA) (p<0.01) were higher only in the EOP group as compared to control. However, the antiapoptotic marker, Bcl-2 levels were lower in both the subtypes of preeclampsia (p>0.01 for both). Conclusion- Our findings suggest that supplementation was beneficial in reducing the caspase-8 and 3 levels in the early onset preeclampsia group although it did not normalize BAX and Bcl-2 levels. This has implications for reducing placental apoptosis in preeclampsia.

Osteoporosis (OSP) a bone metabolic disorder apart from age and post menopause, arises mainly due to imbalance in the bone remodeling process. Bone remodeling is a recurring and uninterrupted biological process, which safeguards the preservation and renewal of the bone environment by two cells namely Osteoblasts and Osteoclasts. Osteoprotegerin (OPG), RANKL (Osteoprotegerin ligand) and RANK a tri-molecular structure also majorly helps in supporting the remodeling of the bone by maintaining proper balance. Plant based compounds specially isoflavones as the natural dietary source, are widely gaining importance in the treatment of major health indispositions like osteoporosis (OSP) due to their lesser side effects and remarkable health benefits. Hence in the present study, MG-63 cells, the widely studied human osteoblasts which resemble human fibroblasts, are experimented with isolated active compounds of cowpea i.e. daidzein and genistein [CP- (VignaUnguiculata , Fabaceae family)] and vitamin D (VD) along with synthetic grade daidzein (Dz), genistein (Ge), as positive controls individually and in combinations and 17-ースtradiol (17-PE) to determine the expression levels of proteins namely, OPG, RANKL and RANK, both at protein level, functional level and at mRNA level with or without inhibitor. The levels of the OPG and RANKL which were upregulated initially, didn’t show any change in the expression levels after an estrogen antagonist ICC 182 780 exposure, at protein level but diminished levels were observed at mRNA level. Thus, functional isoflavones isolated from cowpea help in improving the OPG and RANKL expression therefore helping in proper bone remodeling.
SAEN-04

BENEFICIAL EFFECT OF VITAMIN K ON LOWERING HYPERLIPIDEMIA-INDUCED INFLAMMATORY PATHOPHYSIOLOGY VIA DOWN-REGULATING MCP-1/ICAM-1/CCR2/CD11A PATHWAY OF MONOCYTE-HEPATO CYTE ADHESION

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Background- Vitamin K (VK), a well-known antihemorrhagic vitamin is gaining attention due to its role in various hemostasis-related health disorders. This study examines the hypothesis that VK deficiency may be associated with hyperlipidemia induced inflammation and VK supplementation might reduce the hepatic inflammation via activating VK-dependent Gla proteins. Methods- Subjects with hyperlipidemia (n=28) and age-matched healthy controls (n=19) attending clinic at CSIR-NEIST have been included in this study. The plasma levels of triglyceride, total cholesterol, VK1, and ICAM-1 were measured in all subjects. Moreover, by using palmitic acid (PA, 0.75 mM)-treated and GGCX silenced monocytes and hepatocytes, this study examined the effect of VK1 on preventing the PA-induced hepatic injury. Biochemical assays, immunoblotting, ELISA, and fluorescence staining were performed for conducting this study. Data were analyzed statistically by using Sigma Stat statistical software. Results- Circulating VK1 was found to be lower in subjects with hyperlipidemia. Interestingly, VK1 showed a significant negative correlation with plasma lipid levels and ICAM-1 in hyperlipidemic subjects, which suggests that VK1 supplementation might play an important role in management of hypelipidemia induced inflammation. Further cell culture studies demonstrated that VK1 supplementation (10 nM) reduced the intrahepatic lipid accumulation and expression levels of MCP-1 and ICAM-1 in PA-treated hepatocytes. Moreover, VK1 also reduced the expression of CCR2 and CD11A by monocytes under high PA-exposure resulting in inhibition of monocyte-hepato cyte adhesion and ALT leakage leading to prevention of PA-induced hepatic injury. GGCX silencing demonstrated that the beneficial role of VK1 is mediated via VK dependent Gla proteins. Conclusion- This study for the first time demonstrates the beneficial effect of VK supplementation in preventing hyperlipidemia associated hepatic inflammation. The outcome of the study will be helpful for the development of a novel adjuvant therapy for better management of hyperlipidemia thus improving the lives of the hyperlipidemic patient population.

SAEN-05

HYPOGLYCEMIC AND HYPOLIPIDEMIC EFFECTS OF LINOLEIC ACID RICH WATERMELON SEED KERNEL OIL ON STREPTOZOTOCIN INDUCED DIABETIC RATS

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Background- Diabetes mellitus is such a lifestyle related disorder which is engulfing the Nation. In this present scenario this is the high time to exploit the unconventional, cheap, thrown away and locally available food sources for achieving good nutrition. There is no experimental report on the effect of the C. vulgaris seed kernel oil (which is round in shape, has dark green coloured rind and red pulp which is sweet in taste), on different physiological systems of animals or humans. Thus, the hypoglycemic and hypolipidemic effects of linoleic acid rich watermelon (Citrullus vulgaris) seed kernel oil was analyzed in streptozotocin (STZ) induced diabetic rats. Material and Methods- 12 male albino rats were assigned into 3 groups, (n = 4). The control group was fed with the stock diet, containing groundnut oil. Normoglycemic rats (fasting blood glucose level of 75 Â± 5 mg/dl) were injected with STZ at a dose of 7 mg/0.5 ml of physiological saline/100 g body weight / rat for developing severe diabetes. Diabetic STZ-C and STZ-WMSKO group of rats were fed with the stock diet and the experimental diet containing watermelon seed kernel oil respectively. Lipid profile parameters, fasting blood glucose level and liver glycogen were analyzed. Result- Hypoglycemic response was exhibited by the significant (p < 0.01) decrease of the blood glucose level and the significant (p < 0.01) increase of liver glycogen among the STZ-WMSKO group of rats compared to that of the control and STZ-C group of rats. Hypolipidemic activity was confirmed by the significant (p < 0.01) decrease of the cholesterol, TG, VLDL, LDL and AI among the STZ-WMSKO group of rats compared to that of the control and STZ-C group of rats. Histological analysis revealed the ameliorative effect of linoleic acid rich Citrullus vulgaris seed kernel oil on the aorta and pancreas of streptozotocin (STZ) induced diabetic rats. Conclusion- High linoleic acid content of watermelon seed kernel oil made it capable to fight against Diabetes mellitus and CHD, which is known to be the extended complication of long term Diabetes.
ASSOCIATION OF VITAMIN D WITH FATTY ACIDS IN PREGNANCY

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Background and Objectives- Preeclampsia is a pregnancy complication, associated with an increased risk of maternal and neonatal morbidity and mortality. The etiology of preeclampsia is not yet fully understood, although the current literature indicates an up regulation of inflammatory mediators. Vitamin D is known to have anti-inflammatory properties and influence vascular function. Fatty acids are also known to regulate inflammation in pregnancy. Materials and Methods- This study was carried out to explore the association of maternal vitamin D and fatty acids in pregnancy. The present study includes 69 normotensive control (NC) and 50 women with preeclampsia (PE). Results- Maternal and cord serum 25-hydroxyvitamin D [25(OH)D] levels were lower (p<0.01 for both) in women with PE compared to NC women. Maternal plasma total polyunsaturated fatty acids (PUFA) levels were lower (p<0.05) while levels of total saturated fatty acids (SFA) and total monounsaturated fatty acids (MUFA) were higher (p<0.05 for both) in women with PE. Cord erythrocyte PUFA levels were higher (p<0.01) in PE women. Maternal 25(OH)D levels were negatively associated with maternal systolic and diastolic BP (p<0.01 for both). Maternal 25(OH)D levels were positively associated with maternal total PUFA (p<0.01) and negatively associated with maternal total SFA (p<0.05), total MUFA (p<0.01). This study for the first time demonstrates an association of maternal vitamin D with fatty acid levels in pregnancy. Conclusion- Our results suggest that vitamin D and fatty acids may work in concert to regulate fetofetal growth.

Oral Free Communication

Clinical Nutrition

MEALWISE GLYCEMIC RESPONSE OF FINGER MILLET AND WHITE RICE DIETS ASSESSED USING CONTINUOUS GLUCOSE MONITORING SYSTEM IN ASIAN INDIAN ADULTS

Shobana Shanthu

Background- A recent study has shown that overall 24 h glucose response of finger millet (FM) based diets is not significantly different from white rice (WR) based diets. There is a need to understand and improve the meal-wise (main course with accompaniment) glycemic response (GR) of FM preparations as compared to WR. The study examines the post meal GR of various FM and WR based meals using Continuous glucose monitoring system (CGMS). Materials and Methods- In a crossover trial, 14 healthy participants (males and females) aged 25-45 years with normal BMI (<22.9kg/m2)] consumed randomized iso-caloric diets (2000kcal/day) consisting of similar FM or WR based meals (for breakfast, lunch and dinner) for five consecutive days and the 24 h interstitial glucose concentrations were recorded using (CGMS, iPro 2a, e) Post meal GR in terms of Incremental Area Under the Curve (IAUC) was evaluated. Results- Breakfast meals showed higher GRs. FM, WR flakes upma with coconut chutney and sambar (Breakfast) showed the highest IAUC (IAUC 320.6Â±177.6, 285.5Â±171.2 mg*min/dL respectively) while, FM and WR adai with mint coriander chutney (dinner) showed the least (IAUC 50.9Â±31.2, 42.0Â±29.4 mg*min/dL respectively). Amongst breakfast, FM balls with legume gravy and WR pongal with brinja masiayal sambar, onion chutney showed the lowest (IAUC 118.4Â±76.2, 93.6Â±72.6 mg*min/dL respectively). Conclusions- Most of the FM meals (despite higher fibre contents) showing higher GR as compared to similar WR meals, signposts the importance of quality of fibre. Incorporation of whole grain legumes in meals can be an effective strategy to lower meal GR of FM and WR foods.
CLN-O-03 IMPACT OF NUTRITION EDUCATION PROGRAMME ON END-STAGE RENAL DISEASE PATIENTS UNDERGOING HAEMODIALYSIS

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Background- End-stage renal disease (ESRD) necessitates peritoneal dialysis, hemodialysis, or transplantation. Patients affected by ESRD or in hemodialysis are at risk for developing hypertension, anemia, bleeding, susceptibility to infection, medication side effects and oral manifestations. Dietary management plays crucial role in combating, hence a nutrition intervention on end-stage renal disease patients undergoing haemodialysis was done and tabulated. Materials and Methods- 50 subjects with ESRD undergoing hemodialysis irrespective of age and gender willing to cooperate at Super specialty Hospital, Kollam, Kerala were considered for the study. Pre test data regarding their demographic variables, knowledge of diet and fluid management during hemodialysis in ESRD patients were collected. Audio-visual assisted nutritional education covering diet and fluid management was delivered to the patients. Post test data was collected accordingly. The results were consolidated and subjected to statistical analysis. Result- Demographic data showed 50% of ESRD patients were below 50 years of age. Men were prone to renal disease compare to woman as the study showed 80% of male subjects. The ESRD subjects belonged relatively to low income and middle income group. Around 85% of the subjects had accompanying diseases. The knowledge scores of pre-test of the subjects were poor. 70% of the subjects had inadequate knowledge regarding diet and fluid management. However, after intervention, 95% of the subjects were able to gain knowledge. Conclusion- The study focused on impact of nutrition education on ESRD patients undergoing Hemodialysis. It was concluded that nutrition intervention helps in improving the diet and fluid management of renal disease patients. Key Words- End-Stage Renal disease, Pre and Post test, Fluid management, Hemodialysis

CLN-O-04 TITLE - CORRELATION OF DIETARY PATTERN WITH AUTOANTIBODIES (RF AND ACPA) AMONG SUBJECTS WITH RHEUMATOID ARTHRITIS - A CROSS-SECTIONAL CASE-CONTROL STUDY.

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Background- Rheumatoid arthritis (RA), a chronic autoimmune disease of complex origin, genetic and environmental factors are responsible for etiopathogenesis and disease progression. Smoking or gut dysbiosis are major environmental risk factors. Gut dysbiosis can be caused by faulty dietary pattern and lifestyle. Our main aim was to correlate dietary pattern with disease and auto-antibodies (RF and ACPA) in RA subjects. Methodology - A total of 226 RA subjects were recruited strictly following ACR criteria. Age, sex matched healthy individuals from same ethnicity were recruited as controls (n=228). Approval was taken from NIN and NIMS and informed written consent was taken from participants. Dietary pattern was collected using a semi-quantitative FFQ. RF and ACPA estimation from blood was done using ELISA technique. Results- Mean values for RF were 663.32 ± 618.88 IU/ml and 324.37 ± 441.72 IU/ml and 26.91 ± 49.80 IU/ml, ACPA were 324.37 ± 441.72 IU/ml and 146.18 ± 273.12 IU/ml for cases and controls respectively. Analysis showed that 70 foods were significantly associated with RA. Cases consumed more of plain rice, red meat and tea. Controls had more intake of cereals, dals, fruits, vegetables, milk and milk products, snacks, bakery products and sweets. Consumption of red meat (OR=1.45 CI 95% 1.01-2.08) and alcoholic beverages (OR=1.00 CI 95% 0.7735,1.2955) increased RF values. Red meat (OR=1.12 CI 95% - 0.83,1.52) and milk and milk products (OR=1.0024 CI 95% 0.9742,1.0315) consumption also increased ACPA values. Intake of cereals, pulses, fruits and vegetables resulted in lowering RF and ACPA values. Conclusion- Consumption of a healthy balance diet has beneficial effect on development as well as progression of RA. Cases consumed more of plain rice, red meat and tea as compared to controls. India has vast dietary diversity and geographical variations therefore more studies needed to conclude on role of diet in RA.

CLN-O-05 A CORRELATION STUDY OF DIETARY DHA INTAKE ESTIMATED BY A FOOD FREQUENCY QUESTIONNAIRE AND PLASMA DHA LEVELS IN CHILDREN AGED 7 TO 12 YEARS.

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Background- Docosahexaenoic acid (DHA), an Omega-3 essential fatty acid, cannot be synthesized in the body and must be obtained through diet. It is a structural constituent of membranes and is particularly important for optimal nerve cell development, neurotransmitter release, cell signaling, neurogenesis, and neuroinflammation which have an important role in cognition and behavior in children. The aim of this study was to correlate dietary DHA intake with plasma DHA levels in children. Methodology- A total of 148 healthy subjects, aged 7 to 12 years were recruited from two different schools from Hyderabad. The dietary DHA intake was estimated using a DHA-specific, semi-quantitative food frequency questionnaire. DHA concentrations in plasma were measured using standard gas chromatography. Spearman correlation coefficient was used to assess the correlation between intakes of DHA and its concentrations in plasma. Results- In our study subjects, 91.2% were non-vegetarians, rest were ovo-lacto-vegetarians and vegetarians.

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Among the non-vegetarians, 82% of the subjects were consuming freshwater fish and shellfish. The average daily dietary DHA intake in overall subjects was found to be 29.47mg/day (SDÂ±16.31). When plasma DHA levels were analyzed, mean DHA concentration among overall subjects was found to be 1nmol%. Correlation between dietary DHA intake and plasma DHA levels was found to be positively correlated [Spearman correlation coefficient was rho=0.49 (p<0.01)]. Conclusion- The DHA-specific, semi-quantitative FFQ appears to provide adequate information on DHA intake in relation to corresponding plasma DHA levels. Low intakes of DHA and low levels of plasma DHA levels were found in this study population. The dietary intake of DHA in these children was only 1/7th of adequate intake (AI) i.e., 200mg/day as recommended by FAO/WHO, 2008. This study suggests that a food frequency questionnaire can be used as a tool to assess the dietary intake of DHA which is simple, non-invasive and cost-effective.

**CLN-O-06**

**MANAGEMENT OF ISOVALERIC ACIDEMIA (IEM) WITH INDIAN VEGETARIAN DIET**

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Background- Isovaleric Acidemia is an inherited autosomal recessive disorder, characterized as an abnormal leucine metabolism due to deficiency of Isovaleryl-CoA 4Â– dehydrogenase (IVD), which is required during the biochemical pathway of digestion of â€œ LEUCINE. This case is of late onset of a male child (14 months), admitted in hospital with febrile illness. GC and TMS test indicated high concentration of Isovalerylâ€œ glycine, confirming ISOVALERIC ACIDEMIA. Following stabilization during acute phase, the child was put on a Low LEUCINE DIET. Methodology- Dietary Management- RDA for this case is 20g protein/day. Following is the diet in divided doses- 10 grams of natural protein (50% of RDA) for normal growth Glycine (2.7g/day) 1 Valex powder, a Leucine free protein powder providing 10g protein equivalent(50% of RDA). Detailed list of foods, eaten regularly as a part of staple food, is prepared, for which values of protein/100gram, leucine(mg)/gram Nitrogen are referred. Low leucine foods like - Rice, potatoes, arrowroot, tapioca, sago etc. are included. High protein (leucine) foods are totally avoided. Result- The child growth till now as per his age, (current age-3 years) is satisfactory and normal. His body has responded well to the low leucine dietary management. No recurrence of metabolic acidosis observed after the low leucine diet was followed. Conclusion- IVA can be well managed by Indian Vegetarian Diet, which is high in carbohydrates and low in bioavailability of plant-based proteins. Low leucine diet has helped the child to grow as per his age, like proper recognizing and responding, proper walks and talks, desire to eat variety of food, regular attendance at school, being stable and suffered only 1 acute phase of metabolic Acidosis since birth.

**CLN-O-07**

**COMPARATIVE STUDY ON NUTRIENT INTAKE, WEIGHT LOSS AND RELATIVE EFFICACY IN DIABETES REMISSION IN BARIATRIC SURGERY PATIENTS**

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Background- Obesity is a global epidemic. Bariatric surgery is gaining popularity in treating morbid obesity and its co-morbidities. There are many concerns raising regarding the post-surgery weight management. The study was performed to estimate the nutritional status, weight reduction and to assess the relative efficacy in diabetes remission post-surgery. Methods- A total of 50 subjects who have undergone bariatric surgery were selected randomly from a corporate hospital in Hyderabad by taking a written consent. All the patients were assessed at admission by nutritional assessment tool MUST. With help of pretested questionnaire, data was collected from the subjects comprising dietary habits, nutrient intake, food frequency, type of surgery performed and co-morbidities. The data was analysed by standard statistical procedures such as meanÂ± Standard Deviation. Pre- and post-surgery details were analysed using modified t-test. Results- A total of 50 patients including 44% (n= 22) male and 56% (n= 28) female, whose meanÂ±SD for BMI were 42Â±4.47 and 44Â±3.37 respectively. The mean intake of energy, protein and fat pre surgery were 3048Â±485,101Â±17.02, 156.09Â±137.1 respectively. About 48% of the subjects were diabetic. It was found that 60%, 36% and 4% of patients have lost their weight 10 to 20%, 21 to 30% and 31 to 50% respectively post-surgery were significant (p>0.001%). The meanÂ±SD of energy, protein and fat was significantly decreased post operatively (p<0.001%) to 1400Â±99, 69.9Â±3.69, 30.9Â±6.49 respectively. The percentage remission of diabetes post-surgery was 75% as the surgery alters the gut hormone glucagon like peptide 1(GLP-1) which can increase insulin production. Conclusion- The findings in the study advocates a close monitoring and tailored supplementation pre and post-surgery to prevent micro nutrient deficiencies. The primary take home message is ideal expected weight loss can be achieved with compliance to dietary advice, adequate physical activity, regular review and follow up.
CLN-O-08

COMPARISON OF THE ACUTE GLYCEMIC AND INSULINEMIC RESPONSE OF FOSSENCE® , WHEN ADDED/SUBSTITUTED INTO A CARBOHYDRATE CHALLENGE- AN ACUTE, RANDOMIZED, CROSS-OVER, DOUBLE BLIND CLINICAL TRIAL

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Background- Prebiotic fibers demonstrate a range of human health benefits including attenuation of postprandial glycaemia. The objective of this study is to determine whether, FossenceTM , a sweet tasting, soluble non-viscous short chain fructo-oligosaccharide (scFOS), attenuate postprandial blood glucose and insulin levels when added to high carbohydrate food (white bread-WB) challenge or when substituted for 30% of available carbohydrate in food. Material & Methods- The study used a randomized controlled cross-over design for which 25 healthy adults (40±14years) were recruited. On separate days, each subject received, in randomized order, either WB containing 50g available carbohydrate (50WB), WB containing 50g of available carbohydrate plus 15g FossenceTM (50WB+15FOS- addition), or WB containing 35g of available carbohydrate plus 15g FossenceTM (35WB+15FOS- substitution). Blood samples (finger prick method) were collected at fasting and 15, 30, 45, 60, 90 and 120 min after the start of the test meal ingestion. Plasma glucose and serum insulin were analyzed utilizing standard methods. Results- Addition of FossenceTM to carbohydrate challenge (50WB vs 50WB+15FOS) resulted in no significant difference in glucose or insulin IAUC, or incremental glucose or insulin levels at any time point. Substitution (30%) of available carbohydrate by FossenceTM (50WB vs 35WB+15FOS) resulted in significantly lower glucose IAUC (p<0.0001) as well as insulin IAUC (p<0.0001). Substitution of FossenceTM also reduced incremental plasma glucose at 60, 90 and 120min and serum insulin levels at 30, 45, 60, 90 and 120 min compared to 50WB meal. Conclusion- Addition of FossenceTM to a complex carbohydrate challenge (WB) when available carbohydrate levels are kept constant did not modulate postprandial glucose or insulin levels. However, when Fossence®, was used to replace the available carbohydrate (by 30%), postprandial glucose and insulin levels are significantly attenuated. FossenceTM may be suggested for individuals advised to reduce sugar intake.

CLN-O-09

A CASE STUDY ON NUTRITIONAL MANAGEMENT OF PAEDIATRIC ONCOLOGY DIAGNOSED WITH PILOCYTIC ASTROCYTOMA AND DIENCEPHALIC SYNDROME

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Diencephalic Syndrome also known as Russells Syndrome is an uncommon cause of failure to thrive in early childhood which is characterised by marked severe emaciation despite normal or slightly decreased intake, locomotor hyperactivity, vomiting, and absence of obvious neurological signs and loss of subcutaneous fat. Its presentation is usually chronic, exclusively seen in cases of brain tumor Background- We herein report three case series of diencephalic syndrome with confirmed diagnosis of Pilocytic Astrocytoma/Low garde Glioma based on histopathology report under the age group of 3 years suffering from malnourishment and neurological deficits. Endocrine and ophthalmology test revealed hypocortisemia in one out of the three cases; nystagmus in two and one had no visual fixation or perception of light. All the three cases received institutional protocol which includes 52 weeks of vincristine-carboplatin. Abnormal neurological signs were reported in two cases, one with vomiting and seizure,and the other one presented with difficulty in walking and imbalance in gait, whilst the third case exhibited failure to gain weight and typical symptoms of marasmic child. Methodology For nutritional rehabilitation in view of poor oral intake with nutritional status below -3SD all the 3 cases were started with enteral feeds along with oral intake,On follow up basis feeds were gradually stepped up as per tolerance with multiple occasions of tube displacement. Throughout the treatment none of the cases reported major complains of frequent vomiting or diarrhoea. Results- It was observed that post 13 weeks of chemotherapy, MRI showed decrease in tumor in two cases, while there was no significant decrease in the one other. They even showed improvement in neurological deficit and a gradual overall progression in nutritional status was observed. On the other hand one case showed mild improvement in anthropometric measurements towards the end of the treatment despite consuming 100% of the nutritional requirement throughout the chemotherapy. Enteral feeds were weaned off gradually to oral feeds on reaching moderately malnourished state Conclusion- From our study two out of three patients demonstrated objective shrinkage in tumor size and both of the patients showed favourable increase in weight from severe to moderate malnourishment, from which we can infer that increase in weight is mostly observed in patients who experience decrease in tumor suffering from diencephalic syndrome. keywords- failure to thrive, diencephalic syndrome, weight gain, tumor.
COMPARATIVE STUDY OF THE IMPACT OF DIFFERENT TYPES OF COMMON HONEY BEE ON BLOOD GLUCOSE LEVEL OF STREPTOZOTOCIN-INDUCED DIABETIC RATS.

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Background- because of its contents from fructose, it was hypothesized that honey might have hypoglycemic effect. This study aimed to identify the exact impact of most common honey on blood glucose and HbA1c among diabetic rats. Material and Methods- Three kinds of honey bee; alfalfa honey, Ziziphus honey and honey mixed with Royal jelly were used in the study. Forty-eight male Sprague Dawely rats weighing 220 â€“ 280 grams were randomly allocated to two main groups; diabetic group (40 rats), and normal group (8 rats). Diabetes was induced by intraperitoneal injection of STZ (75 mg/kg). All rats were fed standard diet along the experiment, while the aqueous solutions from metformin and honey were orally administered to rats (2 ml/day). The diabetic rats were subdivided into five sub-groups (8 rat for each); diabetic control (distilled water), metformin group (100 mg/kg), alfalfa honey group (2 g/kg), fruits honey mixed with Royal jelly (2 g/kg), and Ziziphus honey group (2 g/kg). After 28 days, all rats were anesthetized and blood samples were collected for determination of glucose, HbA1c, BUN, creatinine, uric acid, ALT, AST, blood lipids, T3 and T4. Samples of kidney, pancreas, and eyes were taken for histopathological examination. Results- It was clear that the alfalfa honey and Ziziphus honey had negative effects on blood glucose (358.7±51.2 and 324.4±65.6 mg/dl respectively) and HbA1c (8.9±1.2 and 7.9±1.6% respectively). While honey mixed with Royal jelly had hypoglycemic impact as it decreased blood glucose and HbA1c (115.4±24.4 mg/dl and 6.1±0.5% respectively). Furthermore, the three types of honey had no effect on HDL, but in comparison with normal group, the ziziphus honey had positive effects on total cholesterol, triglycerides and LDLc concentrations. Conclusion- These findings denied the advocate that either alfalfa honey or Ziziphus honey had hypoglycemic effects, and prove it for honey mixed with royal jelly.

GYCEMIC CONTROL AND SURGICAL OUTCOME AMONG THE SELECTED LOWER LIMB INJURED TYPE II DIABETIC SUBJECTS

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Chronic musculoskeletal co-morbidities are more commonly prevalent among the diabetics and pre and postoperative malnutrition also increases the morbidity rate and length of hospitalization for various types of surgical diabetic patients. Postoperative hyperglycemia is the most important risk factor for surgical site infection which is a common and often an extensive surgical complication among orthopedic and vascular surgical patients. Individualized MNT (Medical Nutrition Therapy) during hospitalization focused on optimizing glycemic control before and after surgery and to provide adequate macro and micro nutrients to meet metabolic demands, for the prevention of post operative complications such as hyperglycemia and surgical site infection. Hence the present study focused on the glycemic control through the incorporation of soy protein isolate in the formulated health mix which was used for the preparation of selected breakfast recipes for the post operative lower limb injured Type II diabetic subjects. Impact of intervention on glycemic control and surgical outcome were analysed and results revealed that the selected participants of control group had higher mean HbA1C level (10.68±1.05) compared to experimental group who had reduction in the HbA1C (8.95±2.8) after intervention along with hypoglycemic effect among experimental group (n=40) with the significant difference between mean PPBG level (p-value 0.011). Improved surgical outcome also observed through the rise in the mean level of TLC (26.08±4.75) with an incremental value of serum albumin level to 3.58±0.25 from 2.91±0.38 among the participants of experimental group. Increase in prealbumin level and reduced surgical site infection and length of stay (p<0.05) in hospital were also proved that MNT is an essential component of inpatient which was usually unrecognized among orthopedic inpatients within a tertiary hospital.
LONGITUDINAL VITAMIN D STATUS IN WOMEN WITH PREECLAMPSIA AND ITS ASSOCIATION WITH BLOOD PRESSURE AND BIRTH OUTCOME- REVAMP STUDY

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Background- Vitamin D deficiency has been associated with risk of developing pregnancy complications like preeclampsia. Preeclampsia is characterized by high blood pressure and proteinuria and is a major cause of morbidity and mortality. The current longitudinal study aims to examine the maternal vitamin D status in women with preeclampsia and compare it with normotensive control women. The association of maternal vitamin D status with blood pressure and birth outcome are also examined. Methods- This study is a part of the REVAMP (Research Exploring Various Aspects and Mechanisms in Preeclampsia) funded by ICMR. This study includes data on 66 normotensive women and 51 women with preeclampsia. Maternal vitamin D was estimated at four different time points(V1= 11-14 weeks, V2= 18-22 weeks, V3= 26-28 weeks and V4= delivery). Serum vitamin D was estimated using enzyme-linked immunosorbent assay (ELISA). Results- Maternal blood pressure and BMI were significantly higher (p<0.01) in women with preeclampsia. Serum maternal vitamin D levels were found to be lower in women with preeclampsia (16.93Â±8.22ng/ml) as compared to normotensive control women (19.99Â±11.27ng/ml) at the time of delivery. There was a negative association of maternal vitamin D levels at V3 with systolic blood pressure (p<0.05) and maternal vitamin D levels at the time of delivery with systolic and diastolic blood pressure (p<0.01). There was a positive association of vitamin D levels at V1 with head circumference of the neonate (p<0.05). Maternal vitamin D at V2 and V3 was negatively associated with placental/fetal weight ratio (p<0.05). Conclusion- Women with preeclampsia have lower Vitamin D levels as compared to normotensive women. Vitamin D status in early pregnancy influences fetal growth and development.

DIETARY HABITS OF ADOLESCENTS, AGE 12-18 YEARS AND ITS RELATION TO BODY WEIGHT AND CENTRAL ADIPOSITY MEASURE- A CROSS SECTIONAL STUDY IN MUMBAI

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Nutrition transition has shown a major impact on the dietary pattern of adolescents and young adults. Traditional foods have been replaced with processed foods which has contributed to an increased prevalence of overweight and obesity in India especially, in 12-18 years of age. Adolescence experience a drastic change in eating pattern. Therefore, the aim of the study to describe the food consumption pattern and to identify a relation with body weight and central adiposity in the population groups of western suburbs of Mumbai. A self-administered semi-quantitative dietary assessment tool was developed to assess the dietary habits of adolescents. A total of 214 adolescents (aged 12-18 years) attending, private and government schools in Mumbai, India completed the survey. Overall it was observed that adolescents eating behaviours tend to change with an increase in age with older adolescents showing major impact of nutrition transition. Adolescents who preferred eating outside food 2-3 times/week had an increased waist circumference. A trend of increase in waist circumference with a decrease in eating lunch at home was observed. The study is an attempt to understand the eating behaviour and meal pattern of adolescents (12-18 years) in an urban environment and correlate it with the incidence of overweight and obesity. Healthy food choices during adolescent would help to reduce the risk of overweight and obesity. Key Words- Adolescents, Eating behaviours, Central Adiposity, Bodyweight.
"GLOCAL™ APPROACH TO NUTRITIONAL SECURITY - A SEARCH FOR SOLUTION THROUGH BLENDING TECHNOLOGIES

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Glocal refers to the blending of global with local phenomena, with pro-local approach, be it a skill and/or technology. To meet the greed, the human with ever improved technological interventions in environment has been poignant exponentially. The food resources get depleted due to depletion of environment leading to the narrowing of biodiversity and food basket of the household of the poor. The homocentric attitude of nutritional security, therefore, intends to go for innovative technological revolution for procurement, processing and preserving food materials without losing their nutritional value. The concept of nutritional value of food among the local communities the local often do not go hand in hand with the scientific explanation. Due to communication technology and agricultural extension of Home science coupled with periodic training and demonstration along with changing crop production, there has been an increasing trend in intended changing perception and thus the blending help of global tenets of nutritional security suitably integrated to the local existing technology help communities to enhance intake of nutritional value. This paper is all about technological intervention, the outcome of which has a positive contribution on human health as evidenced from the anthropometric measurements undertaken in an eastern India’s multi-caste rural village wherein agricultural resource distribution remains very much uneven. It ascertained that where the communities are intervened to change their perception on their food production and the nutritional value of what they eat and how they do eat, the nutritional security remains positive, however, it is controlled by given ecology and culture.

TASTE ACCEPTABILITY OF SPECIALLY DESIGNED FOOD PRODUCT FOR CHILDREN WITH SEVERE ACUTE MALNUTRITION

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Background- Community-based strategies using energy-dense food similar in nutrient composition to F-100 is essential to ensure catch-up growth and tackle the burden of uncomplicated severe acute malnutrition in Indian children. A therapeutic food that is cost-effective, culturally acceptable and prepared with locally available foods with minimal preparation and adequate shelf life is desirable. Materials and Methods- Three flavours (Apple-cardamom, Cardamom, and Regular) of a specially designed food product was tested for acceptability among severely malnourished children aged 6 months to 59 months in the district of Raichur and Bengaluru. The products reconstituted as porridge were fed for three consecutive days. Outcomes measured included the amount consumed in 15 minutes and time taken until the child stopped eating. The product was considered acceptable when 60% of the food (at 150 kcal/kg/day) was consumed. Mother’s rating on sensory parameters of appearance, aroma, flavour, and consistency, and her perception of the child’s liking for the product was recorded on a 5-point hedonic scale. Results- Within 15 minutes and at the end of observation, 78.6% and 94.3% consumed over 60.0% of regular, 68.6% and 82.6% of cardamom, 54.8% and 80.8% of apple-cardamom flavours respectively. The time taken for completion of the product was 27.5 ± 14.3, 27.5 ± 12.1 and 27.0 ± 15.3 minutes for regular, cardamom and apple-cardamom respectively. The rating of the food product by the mother’s and her perception of the child’s liking was around 4 to 5 (â€œlike it a littleâ€ to â€œlike it a lotâ€) for the various parameters. Conclusions- The designed food was found to be acceptable and will be further used to evaluate the effectiveness of the food product in promoting weight gain in severely malnourished children before scaling up.
CMN-O-05

LIFE SATISFACTION AND STRESS AMONG WORKING AND NON-WORKING WOMEN

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BACKGROUND- Indian families are undergoing rapid changes due to the advancement of urbanization and modernization. Indian women belonging to all classes have entered into paid occupations. Due to changing world, everybody is affected by stress regardless of age, gender, profession, social or economic status. Because of these rapid changes, people live most of their lives under stress. Therefore, the notion of stress has become a widely recognized problem in all aspects of life. Hence, the present study was taken to assess the life satisfaction and stress among working and non-working women.

MATERIAL & METHODS- The present study was conducted in local areas of Dharwad, Karnataka. About 60 Subjects in 2 groups (30 working and 30 non-working women) were selected (40-55y). A detailed questionnaire was developed with regard to general information, nutritional status, stress and life satisfaction.

RESULTS- The study revealed that about 63.33% of working women belonged to normal category and 36.66% of non-working women were overweight. Majority of working women and non-working women were slightly satisfied (76.66% v/s 60%) with their life. Majority of working and non-working women belonged to high-level stress category (96.66% v/s 80.00%) and rest belonged to average-level (3.33% v/s 20.00%). There was significant difference between the working and non-working women on life satisfaction scale and stress (p<0.05). There was positive association (p<0.05) between age and life satisfaction among working women whereas there was no significant association between age and life satisfaction.

CONCLUSION- There was positive and significant association between age with stress and life satisfaction among working and non-working women. Both the groups had high stress level followed by average-level stress due to the workload and household responsibilities and traditional roles which is demanded by the society.

CMN-O-06

HEALTH PROFILE OF NURSES IN KERALA

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BACKGROUND- The nursing population is very vulnerable to problems related to physical and mental health, occupation, nutrition. The dual burden of workplace and home are seen to affect their family and life style. Most of the times nurses work in challenging work environments, where they have to deal with a great amount of stress both professionally and personally. The objective of this study is to assess the stress level and various hazards nurses faced in their daily work life and also to ascertain the nutritional status of these professionals.

Methods- This is a cross sectional, comparative study, using purposive sampling technique. The sample consisted of registered female nurses (N=500) aged 25-45 years working in government and private hospitals selected from rural and urban areas of Thiruvananthapuram city. General health questionnaire and Nursing stress scale were used to assess the level of stress and psychological distress. Anthropometry, biochemical, dietary and clinical assessment methods were used to elicit their nutritional status. Two major criteria for the selection of sample were 1) minimum of 5 years of professional experience 2) nurses working on shift from the day of joining their duty. Results-Stress of nurses were observed to be moderate to high, in both sectors. They were also exposed to various occupational hazards. The nurses had poor dietary practices along with high prevalence of underweight and abdominal obesity. Biochemical analysis of blood samples indicated the prevalence of anaemia, diabetes, hypercholesterolemia and hypertension. Conclusion- This study has identified there is a large lacuna in the health profile of nurses. There is an urgent need by hospital managements and policy makers to ensure quality nursing service through staff development and training programs. A more congenial work environment will be more cost-effective in the long term.

Key words- Female nurses, BMI, Stress, occupational hazards.
CMN-O-07

INCIDENCE AND CORRELATES OF OBESITY AND AWARENESS USING E-CONTENT AMONG SCHOOL CHILDREN IN PRIVATE AND PUBLIC SCHOOLS

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Background- Childhood over nutrition is a serious public health problem, with consequences that extend into adulthood affecting the quality of life. Studies concerning obesity in rural areas are less which gains significance. The first step in prevention and management of obesity is identifying contributing risk factors. Hence the aim of the study was to determine the incidence and correlates of obesity and awareness using E-CONTENT among school children in private and public schools. Methods- 200 children of age group (6-12), 50 each from the government and private schools of urban and rural areas were selected for the study. Interview Schedule was used for data collection on socio economic status and demographic factors. Anthropometric, clinical and dietary methods were used for assessing the nutritional status. Nutritional status was determined using WHO age and gender specific BMI-for-age. Scoff tool was used to assess the eating disorders. E-content was developed for imparting awareness in school children on balanced diet. Results- Twenty percent of children were obese. Obesity was prevalent among the age group (6-8), 38% of the children in private urban schools were obese followed by 24% obese children in government urban schools. Only 6% children of the Govt. rural schools were obese and incidences (50%) of underweight children were higher. Low physical activity, lower consumption of fruits and vegetables and convenience foods intake were found to be the risk factors for obesity. Conclusions- The prevalence of obesity determined in this study is high and is a public health concern, with girls particularly at risk of becoming obese. Obesity was higher among children of private schools in urban areas due to increased facilities like canteen, transportation and luxury life. Awareness should be created to promote a healthy balance of food and physical activity within and outside the school.

CMN-O-08

FORMULATION OF LOW GLYCEMIC INDEX BASED PASTA FOR TYPE II DIABETES

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Objective- The objective of this study is to formulate millets, cereal and pulses based pasta with low glycemic index and glycemic load value for Type II diabetes patients. Such pasta can be low glycemic index ready to eat food. It is suitable for diabetes, pre-diabetics and health conscious consumers. Method- The study focused on the use of millets, pulses along with other flour to produce ready to eat pasta. Three variations were prepared by the roasting method. The organoleptic qualities of pasta sample were analyzed by 25 semi-trained panelist by score card method. The most acceptable variation was selected for the calculation of glycemic index and glycemic load. Ten healthy subjects (20-30 years) were recruited for the study. Subjects were given this formulated pasta and a standard food (glucose), on separate occasions, each containing 50gm of carbohydrate. Blood glucose was determined after overnight fasting (0 hours) and at 30, 60, 90 and 120 minute intervals after the consumption of each food (test food and pasta). For pasta, the glycemic index value was calculated geometrically by expressing the incremental area under the blood glucose curve (iAUC) as a percentage of each subjectâ€™s average (iAUC) for the standard food. As per the food and agriculture organization, glycemic index cut off value are as follows- Low < 55, Medium = 56-69, both inclusive, High > 70. The formulated pasta was classified as medium to low glycemic food. Result- It was found that millets, cereal and pulses incorporated pasts were found nutritious and showed hypoglycemic effects. The organoleptic evaluation also suggested a high degree of acceptability. Conclusion- This indicated that this combination has low glycemic index and load value and it is suitable for type II diabetic subjects.

CMN-O-09

TRADITIONAL PUDDINGS AND NUTRITIONAL SECURITY BY BLENDING TECHNOLOGY WITH CEREMONIAL FOODS

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Every place has its own culture, tradition of food. Bihar too has its own authentic and mouth watering cuisine. The cuisine of Bihar is predominantly vegetarian, fish, chicken and mutton are taken sparingly. Some dishes for which Bihar is famous includes khir, Makhana, Malpua, Dal pitha, Thekua/ khajuriya, Dal puri, Pedokiya/ gujiya, Tarua, Dahi chuda, satu bhunja, Litti, Chokha. Bihar
khichdi, Tilauria, Badi, Muthia, Rasia, Lai, kadhi badi, Ramrus dhokla, Sag, Mahua and Sweet potato etc. Dietary habit of people in different region is governed mainly by the availability of foods and practices. Foods cultivated locally become the food habit. Satisfaction of hunger is the main criteria for food intake. There are many factors responsible for the food intake. Diet are predominantly based on cereals. The primitive people always tried to mix cereals either with fruits, roots, beans and predominantly jaggery. The state of Bihar has a mixed culture ranging from Mithila in North to Gangetic plain of west to east Bihar and predominantly tribal, South Bihar. The various puddings listed above are prepared from locally available raw materials and mixing it with varieties of items which enhance the nutritive value of that pudding. Starting from khir to Mahuwa and Sweet potato. Khir is a blend of rice, milk sugar / jaggery and dry fruits enhance the biological value, essential amino acid availability and many more. Apart from khir there are many puddings blended with technology can be a tool of removing nutritional deficiency and strengthening nutritional security. By blending with technology in other puddings can ameliorate nutritional status. Conclusion - so avoid junk and other non tested food and return to local seasonal and regional food especially puddings used in various seasons have hopes. chronic problem of protein calorie and other nutrient deficiency can well be fought by adopting traditional puddings.

CMN-O-10

CROSS-SECTIONAL ASSOCIATION BETWEEN DIETARY PRACTICES, ANTHROPOMETRY AND DEPRESSION AMONG ADOLESCENTS OF MUMBAI

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Background - Depression among adolescents, if left unattended, can lead to prolonged physical and mental health problems in later life. A recent systematic review has confirmed relation between unhealthy dietary patterns and poor mental health in adolescents who are considered to be a nutritionally vulnerable segment of the population in India, thus, suggesting diet as a modifiable factor in the prevention of depression. Objectives of the study were to assess the 1) Prevalence and levels of depression among adolescents; 2) Dietary practices & body composition of adolescents diagnosed with depression. 3) Association of anthropometry, body composition, lifestyle, nutritional and socio-economic profile of adolescents with levels of depression. Materials & Methods - A total of 143 adolescents (13-15 years) residing in Mumbai were screened. A questionnaire-cum-interview schedule was used to elicit information on dietary practices, socio-demographic, family and lifestyle profile. Anthropometric measurements were recorded using standard procedures and evaluated. Screening of depression was done using the Patient Health Questionnaire-9 items. The Beck’s Depression Inventory-II was used to assess the severity of depression among participants, both tools were assessed by expert psychologists. Result - A staggering number (45.5%) of participants were identified with depression (17.5% mild, 21.7% moderate and 6.3% severe). There was a significant correlation of the severity of depression with family history of depression (p<0.05). A higher percentage of participants (33.3%) with severe depression skipped meals as compared to those with minimal depression (10.3%), however this difference was not significant. The PHQ-9 scores of boys and the screen time, HC, MUAC, muscle mass, daily calorie intake, had significant correlations. In boys, frequency of consumption of a high fat foods and family income were significant associated with BDI-II scores (p<0.05). Conclusion - The prevalence of depression among adolescents is high and this study highlights the importance of diet and its potential role in preventing depression in adolescents.

CMN-O-11

REPRODUCTIVE TRACT INFECTIONS- A PREVALENCE REPORT IN TIRUPATI RURAL AREAS

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Reproductive tract infections (RTIs) are a hidden epidemic leading to enormous health and economic consequences worldwide. They have huge repercussions on health mainly in the form of pelvic inflammatory disease, pregnancy related issues and congenital infections. The present study was planned to assess the reproductive tract infections among migrant women in rural areas of Tirupati, Chittoor district. The study was a cross sectional design, 200 female construction migrant workers were purposively selected with symptoms of reproductive tract infections from 600 women. Majority of respondents were in the reproductive age group that is above 25 years, half of the women respondents were married at the age of 22 years and above. All 200 sample were construction labor, 80 percent of are in nuclear family system, 30 percent of sample having 1 to 2 children and 28.5 and 17.5 percent were having 2 to 3 and 3 children and above respectively. 67 percent of the respondents adopted minimum hygiene and 15 percent maintaining good personal hygiene practices during menstruation. 40 percent of the sample had regular periods and half of the respondents had irregular menstrual cycle. 73 percent of migrant women lower back pain and 70 percent had lower abdomen pain. The dietary consumption pattern was not satisfactory. Mean height, weight and body mass index (BMI) of migrant women were found to be poor when
compared with ICMR Standards. There is a need to educate migrant women about reproductive health issues and importance of the nutrition in treatment of reproductive tract infections.

**CMN-O-13**

**PREVALENCE OF METABOLIC SYNDROME AMONG RURAL WOMEN IN WEST BENGAL, INDIA- A COMMUNITY BASED STUDY**

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**Background**- In India, rapid rise of Metabolic Syndrome (MS) is becoming pandemic very fast. Metabolic Syndrome (MS) is a constellation of risk factors of cardiovascular disease and type 2 diabetes. A number of researchers have been reported that Asian Indian particularly women are to be at higher risk of developing metabolic syndrome. The aim of this study is to estimate the prevalence of metabolic syndrome (MS) and its selected known determinants among rural adult women of West Bengal, India. 

**Material & Methods**- A cross-sectional community based study was conducted in four villages of Nadia district, West Bengal in which 161 rural adult women (20-60 yrs) recruited through multistage systematic random sampling. Demographic data were collected through a pretested questionnaire. Anthropometric measurements and blood pressure were measured. Biochemical tests were performed on blood sample collected after overnight fasting. According to National Cholesterol Education Program/ Adult Treatment Part III (NCEP/ ATP-III) guidelines with modified waist circumference for Indians and International Diabetes Federation (IDF) criteria for metabolic syndrome was addressed. Result- The prevalence of metabolic syndrome was 27.33% among adult women (20-60 yrs). Significant elevated levels (p-value < 0.01) were observed in cardio vascular disease parameters viz. cholesterol (total, mg/dl), HDL cholesterol, triglycerides and blood pressure (systolic and diastolic) among women with metabolic syndrome. Women with metabolic syndrome were significantly from higher age group (p-value < 0.01). WC, an important measure of obesity was found higher among women with metabolic syndrome. Conclusion- There was a high prevalence Metabolic Syndrome (MS) in rural women population in West Bengal indicating a large proportion of women at risk for the development of CVDs.

**CMN-O-14**

**KNOWLEDGE ATTITUDE AND PRACTICE OF NUTRITIONAL KNOWLEDGE AMONG RURAL AND URBAN ADOLESCENT GIRLS IN INDORE, INDIA.**

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**BACKGROUND** Adolescence is the age of growth and development. This is a comparative study between rural and urban adolescent girls about the knowledge of nutrients in food groups, healthy eating habits and nutritional deficiency diseases and its effect on growth and development in all stages of life. METHOD The study was conducted in Indore district of Madhya Pradesh. A sample of 500 was taken for each rural and urban adolescent girls of age 16 -19 years for the study. A pre structured questionnaire was used to assess their knowledge about nutrients in different food groups, healthy eating habits , nutritional deficiency diseases , malnutrition and its effect on all stages of life. RESULT The data interpretation shows that 89% of rural adolescent girls lack in awareness about the knowledge of nutrients, food groups and 77% were not aware of diseases caused due to nutritional deficiency . 52% of rural adolescent girls had poor appetite due to poor eating habits. 62% of urban adolescent girls were found to have knowledge about nutrition and 89% about food groups but 48% due to negligence and poor eating habits of urban girls were having nutritional deficiency. CONCLUSION We have concluded from this study that the knowledge of rural girls was very limited and the awareness in urban girls was less about the nutritional needs and its deficiency diseases. To eradicate malnutrition in adolescent girls and to know the importance of nutrition in all stages of life, effective awareness programmes and education about the importance of nutrition in all stages of life should be conducted regularly at school and college levels. The programmes for providing health related services should be implemented. Survey in health sectors for planning and monitoring nutritional interventions by government. Policies to eradicate nutritional deficiency diseases must be developed and implemented at all levels as strengthening adolescent health is making step forward for healthy nation.
CMN-O-15

SOCIO-ECONOMIC DETERMINANTS OF MILD STUNTING AMONG THE ADOLESCENT SCHOOLGIRLS IN VIJAYAPURA, KARNATAKA, INDIA- A SCHOOL-BASED CROSS-SECTIONAL STUDY

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Background: About 38% of children under-five years of age in India are stunted. Stunting is the most prevalent form of under-nutrition, yet it goes largely unrecognized in children as well as in adolescents. This study was aimed at assessing socio-economic factors associated with nutritional status based on the anthropometric assessment of adolescent school girls in Vijayapura district of Karnataka State, India. Material and Methods: For this school-based cross-sectional study, 374 adolescent girls aged 12â€“19 years were included in the study. Simple random sampling technique was used to select the adolescent schoolgirls. An interviewer-administered questionnaire and anthropometric measurement were used to collect data. The anthropometric measurements of each participant were converted to the indices of nutritional status (Z-score based) using World Health Organization Anthro Plus software.

Results: The mean height for age Z-score and BMI for age Z-score of the adolescent schoolgirls were -1.06 and -0.75, respectively. About 12.8% of the adolescent schoolgirls were thin and 8.0% were found as overweight. The overall prevalence of mild stunting among these adolescent girls was as high as 42.5%. Adolescents living in rural areas (AOR = 2.21; 95% confidence interval- 1.51, 3.49) and adolescents who were from nuclear family (AOR = 1.63; 95% confidence interval- 1.04, 2.54) were found to be more mildly stunted. In contrary, among these adolescentsâ€™ class, age, parentâ€™s occupation, and education were not found significantly associated with mild stunting. The lower income of the family was found as a risk factor for mild stunting as well among these adolescent girls (OR = 2.11; 95% confidence interval- 1.16, 3.18). Conclusion: Mild stunting is highly prevalent among these adolescent schoolgirls in Vijayapura. Place of residence, family pattern and family income were significantly associated with mild stunting among these adolescent girls.

CMN-O-16

COGNITIVE FUNCTION IN A NEXUS WITH NUTRITIONAL STATUS IN OLD AGE- A CROSS-SECTIONAL STUDY

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Background: Cognitive impairment mainly found in old age, though it is not a normal part of ageing. Mild cognitive impairment which is characterized by mild memory loss is a preclinical state of dementia and may lead to dementia in future. Cognitive decline is associated with malnutrition and nutritional support can be a preventive measure for dementia. Therefore the objective of the study was to assess the cognitive function of the older adult women and finding its relationship with nutritional status. Materials and Methods: A cross sectional study was conducted in between March, 2011 â€“ December, 2014 among 365 older adult women (Age â€“ 60 years) who were either inmates of old age homes or living in their own houses. Cognitive function was assessed by Mini Mental State Examination (MMSE) or Folstein test and nutritional status was assessed by the long version of Mini Nutritional Assessment (MNA). Result: According to MMSE scores 70.4%, 15.9% and 13.7% of the total participants were normal, suffering from borderline cognitive impairment and impairment, respectively. Significant positive correlation (p< 0.05) was found between MNA and MMSE. Significant association (p< 0.05) between nutritional status and cognitive function was also found from chi-square test and regression analysis. Conclusion: Impairment in cognitive function can cause malnutrition or vice versa among older women participants.

CMN-O-17

NUTRITIONAL STATUS AND COGNITIVE ABILITIES OF RURAL ORPANS

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Background & Objectives- The research on nutritional status and cognitive abilities of rural orphans was conducted in the year 2016-2018 in Dharwad taluka of Karnataka state with objective to know the nutritional status and cognitive abilities of rural orphans. Nutritional status was assessed using nutritional anthropometry, the BMI of the school age boys and girls were compared with the WHO standards (2007),WISC III was used to assess cognitive abilities of orphans and self-structured questionnaire was used to collect auxiliary information about orphans. Materials & Methods- Prevalence of orphans in the age range of 6-18 years was carried out in Dharwad taluk of Karnataka state. From the prevalence, about 124 orphans were randomly selected in the age range of 6 to 18
years to know their nutritional status and cognitive abilities. Result- Results revealed that almost equal percentages of the orphans were in under weight (51.6 %) and normal category (48.4 %). None of the orphan children were in over weight and obese category of BMI. There was significant association between gender and nutritional status. There was significant difference found between age groups with respect to nutritional status, mean scores indicated that 10-15 years and 16-17 years old children had better nutritional status compared to 6-9 years old children. There was significant difference between type of orphans and nutritional status. According to mean scores maternal orphans and double had better nutritional status than paternal orphans. Age and birth order were found to be the significant predictor of nutritional status and explained about 26.0 per cent of variation in the nutritional status of rural orphans. About 53.8 per cent of orphan children were in the average level of IQ category followed by low average and high average. Boys were having high IQ in verbal, performance as well as full scale intelligence. There was no significant relationship between nutritional status and cognitive abilities. Conclusion- Majority of the orphan children were in underweight category and average level of IQ and there was no significant relationship between nutritional status and cognitive abilities of orphans. Keywords- Orphans, Children, Nutritional status, BMI, Height, Weight, Cognitive abilities, IQ.

CMN-O-18

MATERNAL DETERMINANTS OF LOW BIRTH WEIGHT IN A RURAL BLOCK OF HARYANA- A COMMUNITY BASED STUDY

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ABSTRACT Background- LBW is universally used as an indicator of health status and is an important subject of national concern and a focus of health policy. LBW is the strongest determinant of infant morbidity and mortality in India. DLHS-4 in Haryana found that the prevalence of LBW was as 12.7%. Objective- To know the prevalence and its associated factors of low birth weight in rural area of Haryana. Methodology- The study was a community based and carried out in CHC Dighal of block Beri, district Jhajjar, Haryana. The CHC Dighal (Jhajjar) has 20 sub-centers, out of these sub-centers, 10 S/C was selected by simple random sampling. From these selected sub-centers, 800 women who delivered during the study period were included in the study. Results- A total of 800 subjects were included in the study and maximum women were in 19-28 years group. 84.5% subjects were house wife. Only 0.4% women were delivered at home. Prevalence of low birth weight baby was 17% and most common reason of LBW was anemia in mothers. After applying univariate analysis, various determinate like age, education of mother, number of children caste, socioeconomic status, and occupation of mother was found statically significant. Conclusions- The Prevalence of LBW is decreased by health and nutrition education, iron and folic acid supplementation, effective management of complication. Keywords- IFA, LBW, Occupation, Socioeconomic status

CMN-O-20

EFFECT OF PLAYING DIGITAL GAMES ON PHYSICAL,PSYCHOLOGICAL,SOCIAL AND NUTRITIONAL HEALTH AMONG ADOLESCENTS

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Background- The old proverb says "All work and no play make Jack a dull boy". But in this digital world, the famous formerly games have been replaced by the modern games. Digital games have become more and more popular among young generation. Apart from entertainment prolonged playing of the digital games effect the health of the gamer. Children that spend more time in-front of screen have negative effect on their health. Methodology- Study design- A community based. Location- Urban and Rural areas of Ludhiana. Sample size- 320 adolescents from rural (53.3%) and urban (46.7%) area. The sample was drawn from six Government Schools. Self structured questionnairre was used to assess the effect of digital gaming on physical, psychological, social and nutritional health of the adolescents. Results-Overall 88.2% of the adolescents were playing digital games. 81% of the adolescents used mobile phones for playing games and only 2.8% used laptop or computer. Strain in eyes (48.3%) was the commonly reported by adolescents followed by back pain (47.4%). It was observed that 45.5% of the adolescents felt calm after playing games; 40.8% felt irritated and restless when they were unable to play games.76.3% of adolescents fall under healthy category. 29.6% adolescents were skipping either of three meals for gaming. It was seen that 54.8% of adolescents had normal appetite. 35.8% lost weight and 20.9% suffered loss of appetite due to gaming. 28% took to unhealthy eating behaviors as a side effect of gaming. It was also found that 51.7% of the adolescents argued with their parents and siblings when they were asked to stop to take unnecessary snacking while playing games. Conclusion- Prolonged playing of digital games lead to strain in eyes, back pain, loss of appetite, unhealthy snacking, restlessness and irritability among adolescents.
CMN-O-23

UTILIZATION OF MATERNAL HEALTH SERVICES AND DIET PRACTICED DURING PREGNANCY BY RURAL WOMEN OF LUDHIANA

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BACKGROUND—Antenatal Care (ANC) is one of the crucial factors in ensuring healthy outcomes in women’s reproductive health. Nutrition education and counselling is an integral part of maternal health. This study assesses the utilisation of health care services and diet practiced during the last pregnancy by women in rural areas of Ludhiana, Punjab. OBJECTIVE—To examine the determinants for utilisation of maternal health services and diet practised during pregnancy. Methods—A house to house survey was conducted in 5 villages of Ludhiana district. Data was collected from 229 women (aged 15 to 45 years) who delivered 12 months prior to the survey. Information on socio-demographic characteristics, utilisation of antenatal care and diet practiced during pregnancy was collected. Intake of Iron and folic acid (IFA), Tetanus Toxoid (TT) injection and breastfeeding advice were also recorded. The data was statistically analysed by using the software SPSS 20.0. Result—There were 26.6% women below 25 years and 59% were in the age group of 26-35 years. 173 (75.5%) had ≤2 children and 149 (65.1%) were from joint family. Out of 229 women, 132 (57.6%) and 81 (35.4%) had availed public and private health services, respectively. IFA tablets were taken by 61.1% respondents on regular basis during their pregnancy. Majority of respondents (94.3%) had TT vaccination during pregnancy. 26.2% women from lower SES could not have even one glass of milk per day. Interestingly only 3.0% women received nutritional counselling and 43.2% had breastfeeding advice during their antenatal period. Economic status was significantly correlated with intake of IFA, number of children and fast food consumption. Conclusion—Utilisation of maternal health was significantly correlated to low economic status and level of education. Nutrition counselling and breast feeding advice was provided to very minimal respondents.

CMN-O-24

CONSUMPTION PATTERN OF FAST FOOD ITEMS AMONG THE ADOLESCENTS OF LUDHIANA CITY

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Background—Fast food consumption among adolescents is trending now-a-days. Consumption of fast food has several adverse effects on health and nutritional status. The purpose of this study was to assess the consumption pattern of fast food by adolescents and their knowledge about its ill effects on health. Methods—Study design—A population based study; Location—Ludhiana city, Punjab; Sample size—254 Adolescents aged 11 to 18 years; Data collection—Self-administered questionnaire was used to assess the consumption of various fast food items along with respondents knowledge regarding fast food consumption. Height (cm) and weight (kg) were also recorded. BMI criteria—WHO classification for Asians. Analysis—By using statistical software SPSS version 20.0. Results—Out of 254 adolescents, there were 95 (37.4%) in the early age (10-13 years) and 74 (29.1%) in the late age (17-19 years) of adolescence. A total of 254 adolescents were interviewed for fast food consumption of which 240 (94.5%) adolescents were consuming fast food. Consumption of fast food was found to be higher among males (59.7%) than females (33.9%). The preference pattern of fast food among the adolescents was in the order of Burger>Pizza>Golgappa>Chocolate>Maggie. It is observed that 95 (37.4%) of adolescents were consuming fast food every week. 18.5% of adolescents spend about ₹100 on weekly basis to purchase fast food items. 125 (49.2%) of adolescents had habit of skipping either of three meals to consume fast food. Prevalence of stomach infection after consumption of fast food was found to be 32.6%. Conclusion—The study showed that though 84.6% adolescents had adequate knowledge regarding ill effects of fast food consumption yet they still preferred to consume fast food instead of traditional nutritional food.

CMN-O-25

PREVALENCE OF URINARY ABNORMALITIES AMONG FEMALES IN SLUMS OF LUDHIANA

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Prevalence of urinary abnormalities among females in slums of Ludhiana Background—Poor sanitary conditions and illiteracy are root causes of prevalence of various chronic diseases including urinary tract infections (UTI) and kidney problems. Urinalysis by dipstick method offers an easy and cheap approach for screening diseases linked to under-dwelled and less resourceful areas such as slums.
With this consideration, the present study was conducted to check prevalence of urinary abnormalities among females living in slums of Ludhiana. Methods- The present cross sectional study was conducted in females of various age groups (above 11 years) in slums of Ludhiana. The data pertaining to age, education, occupation, medical history, weight(kg) and height(cm) were recorded on self-structured questionnaire. BMI was calculated and WHO criterion for Asians was used for classification of obesity. Urine samples collected in sterile specimen bottle were analyzed by urine dipstick method. VDRL, blood group were also analyzed. The data was statistically analyzed by using the software SPSS 20.0. Results- A total of 207 females were randomly selected for screening urinary abnormalities. Out of 207, 42 (20.2%) females had no urinary abnormalities. Proteinuria, leukocyturia, glucosuria and hematuria were present in 55%, 13%, 1.9% and 3.8% of subjects, respectively. Subjects aged>45 years had 66.6% proteinuria followed by 59.5% and 44.3% in subjects aged 25-45 years and <25 years, respectively. Leukocyturia was seen in 17.9% of subjects aged >45 years followed by 13.4% and 8.8% in females aged 25-45 and <25 years, respectively. The prevalence of proteinuria (p=0.177) and leukocyturia (p=0.326) was non significant with respect to age. There were 79.3% underweight females below 25 years of age and 61.5% obese above 45 years of age and the difference was found to be statistically significant (p=0.001). Conclusions- Urinary abnormalities such as proteinuria and leukocyturia were more prevalent among females in slums of Ludhiana. Age was found to be positively correlated to BMI.

CMN-O-26

NUTRITIONAL AND IMMUNIZATION STATUS OF PRESCHOOL CHILDREN OF RURAL AREAS OF LUDHIANA, PUNJAB

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Background- Nutritional and immunization status of preschool children is of great importance. Preschool children are more vulnerable to the effect of under nutrition because of their rapid growth. Their nutritional status is considered to be an effective indicator for public health. Objective- To assess nutritional and immunization status of preschool children of rural areas. Materials & Methods- Study design- Community based; Location- Eight villages of district Ludhiana, Punjab; Sample size- 300 preschool children aged 2-5 years; Data collection- Self-structured questionnaire was used to obtain information on age, sex, socio-economic status, parentâ€™s education, diet & hygiene pattern and vaccination schedule. Height(cm), weight(kg), waist(cm) & hip circumference(cm) and MUAC(cm) were also measured. IAP growth monitoring method was used for growth assessment of children. Results- Out of 300 children studied, 156(52%) were male and it was found that 63% children were having short height for their age. Weight for age status showed that 125(41.7%) were under nutrition children. It was seen that 47.7% female children had higher W-H ratio. MUAC showed that 109(36.3%) were found at acute malnutrition stage. Parents of more than 70% of children were not getting health check-up done on a regular basis for their children. Further, 62.7% children usually fell sick once in a month. Majority i.e. 239(79%) of children were taken to PHC during illness. 197(65.7%) of children were attending Anganwadi, of which 73(24.3%) did not consume supplementary food provided by AWCs. 85% children did not have deworming dose. Surprisingly, there were 6.7% children unimmunized and 15.0% partially immunized. Conclusion- Above 50% children had stunted growth according to age and 38.3% were at acute malnutrition stage.

CMN-O-27

BLOOD GROUP AND EPIDEMIOLOGICAL CORRELATES OF DIABETIC ADULTS- A POPULATION BASED STUDY IN LUDHIANA, PUNJAB

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Background- Diabetes is a common public health problem associated with significant morbidity and mortality. The etiology of diabetes is complex and genetics plays a crucial role for its occurrence. Like many other traits, blood group is also genetically inherited. Keeping this in view, the present study was aimed to determine the association of blood group with diabetes. Material and methods- A cross sectional study was carried out in Ludhiana city of Punjab. The study included 210 diabetic adults (100 males and 110 females). A self-structured questionnaire was used to record the demographic profiles and lifestyle factors. ABO blood groups were identified by performing standard slide agglutination test. Height(cm) and weight(kgs) were recorded. BMI was categorized according to WHO classification for Asians. Blood pressure (BP) was measured using digital BP apparatus. Data was analyzed using statistical software SPSS version 20.0. Results- Of 210 adult diabetic subjects, 14 (6.7%) were â‰¥ 40 years of age and 83 (39.5%) â‰¥ 61 years. The prevalence of diabetes was 42.4% among subjects having blood group B followed by O (32.8%), A (13.8%) and
AB (10.9%). Distribution of diabetes was found to be independent of gender among all blood group types (p = 0.874). Prevalence of obesity was highest (54.7%) among diabetic adults aged 41â€“60 years. Hypertension was 5.2%, 49.5% and 45.2% among age groups ≤ 40 years, 41 â€“ 60 years and ≥ 61 years, respectively. Conclusion- Diabetes was observed to be predominant in blood group B. Middle and elderly age group subjects were found to be more hypertensive.

CMN-O-28
TOBACCO CONSUMPTION AND NUTRITIONAL STATUS IN SLUM POPULATION OF LUDHIANA- A COMMUNITY BASED STUDY

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Background- Tobacco, smoked or chewed, is an important determinant of health and a major source of morbidity and mortality in India. Tobacco use also exerts a strong influence on nutritional status. This study aims to measure (i) the prevalence and pattern of tobacco use (ii) the effect of tobacco consumption on nutritional status and its association with food cravings. Material and Method- Study design- A community based; Location- Slum areas of Ludhiana city, Punjab; Sample size- 508 males aged 12 years and above; Data collection- measurement of height (cms) and weight (kgs), Self-structured questionnaire to obtain information on age, education, occupation, consumption pattern of tobacco and food cravings; Criteria for BMI- WHO classification for Asians; Analysis- By using statistical software SPSS version 20.0. Result- Out of the 508 respondents, 326 (64.2%) were consuming one or the other form of tobacco, of which majority (85.6%) were adults. It was observed that 48.0% were consuming smokeless tobacco, 37.6% smokers and 21.4% used both forms. The influence of age (p=0.002), occupation (p=0.001) and education levels (p=0.001) was significantly associated with tobacco consumption behaviors. Educational level was seen to be negatively associated with tobacco consumption. 20.9% tobacco users were overweight (BMI <18.5) as compared to non-users (6.6%). There were 12.1% and 22.5% non-users and 10.4% and 15.3% users who were overweight and obese, respectively. A significant association (p=0.001) was observed between tobacco consumption and food craving. 27.6% of sample subjects had food cravings, of which 77.9% were tobacco consumers. Conclusion- Tobacco users had significantly higher proportion of food cravings and poor nutritional status.

CMN-O-29
FACTORS AFFECTING STREET FOOD CONSUMPTION AND ITS ASSOCIATION WITH BMI AND HEALTH PROBLEMS AMONG ADOLESCENTS OF LUDHIANA,PUNJAB

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Background- Adolescence is a period of transition between childhood and adulthood. There is a dramatic increase in energy and nutrient requirements during this stage affecting food choices and further, nutritional status. Street Food(SF) consists of out-of-home consumption of energy dense food with high sugar/salt/fat content and low nutrient value in terms of proteins, fibers, vitamins and minerals, is quite popular in this age group. Objective- To assess the factors promoting SF consumption by adolescents and its association with BMI. Methodology- This community-based cross-sectional study was undertaken in 179 rural and 121 urban households of Ludhiana. Age based IAP definition of adolescent was used. A structured interview based questionnaire was administered for collection of data pertaining to consumption of SF, opinions regarding SF safety and sanitation and health problems. A total of 328 adolescents were contacted, of which 300 participated in study. Results- Out of 300 adolescents, 73(60.3%) and 62(34.6%) were early aged adolescents in urban and rural area, respectively, 93.3% rural and 100% urban subjects were consuming SF. Although adolescentâ€™s families did not favor SF consumption(U=83.5%;R=74.3%), they were consuming SF for over 4 years(U=74.4%;R=64%) with familyâ€™s companionship(U=71.9%;R=53.9%) and financial support(U=81%;R=58.7%). While 39.5%(U) and 47.1%(R) consumed all types of SF, burger consumption stood an exclusive preference(U=32.2%;R=31%). Prevalence of obesity was significantly higher in rural area. Urban subjects (51.2%) perceived that SF had low nutritional value while rural subjects(45.5%) believed SF as more satisfactory(22.9%). Tasty and cheap(U=79%;R=70.3%) was cited as major reason of SF intake. Non-availability of homemade food(U=27.3%) and more variety(R=23.3%) were other factors for SF consumption. Interestingly, majority(U=97.5%;R=80.8%) subjects opined homemade food as better over SF. 59.5%(urban) and 34.1%(rural) subjects suffered one or other health problem(s) post SF consumption. Conclusion- SF is widely consumed both in urban and rural areas. Easy availability, tasty, cheap and more satisfaction were the predominant reasons for its higher consumption.
CMN-O-30

BODY COMPOSITION PARAMETERS AS INITIAL MARKER FOR METABOLIC SYNDROME AMONG OVERWEIGHT AND OBESE ADULTS

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PURPOSE- Overweight/Obesity is alarmingly increasing among the Indians which is not a good sign on the Health prospect. The overweight/obesity of an individual changes the Body Composition (BC) of that person. The objective of the present research is to analyse BC parameters, Metabolic Syndrome (MetS) criteria among overweight/obese individuals & if BC parameters can be used as an initial marker to screen, identify & prevent them from falling into risk of MetS. METHODS- A retrospective study was conducted to determine BC parameters & MetS criteria among overweight/obese adults. This study was conducted with available data from Clinical Nutrition OPD. Anthropometric measurements of height & weight were noted & Body Mass Index was calculated. BC parameters of %Body Fat, Skeletal Muscle Mass (SMM), Visceral Fat (VF), Waist Circumference & Obesity degree were assessed for these overweight/obese adults. The National Cholesterol Education Program-Adult-Treatment-Panel-III (2005) & International Diabetes Federation (2006) defined MetS criteria- central obesity, high fasting blood sugar (FBS), hypertension, reduced high density lipoprotein (HDL), & elevated serum triglycerides (TG) were also noted. Standard scales, techniques & multi-frequency-BIA equipment were used. The obtained data was analysed using SPSS24. RESULTS & DISCUSSION- A total of 564 (N) adults- 256 Male & 308 Female of age 20-59 year visited the Clinical Nutrition OPD. Among them 74%- 417 adults (n) adults- 168 males & 249 females were overweight/obese. As per NCEP-ATPIII & IDF MetS definition 19.5% of n=81 adults- 24 males & 57 females had MetS. 2 criteria of MetS were present in 40% of n=167 adults- 63 males & 104 females. Central Obesity being common in both MetS & BC was observed in 88% of n=365 adults- 131 male; 234 female. Data were considered statistically significant at p<0.05. Central Obesity had significant positive correlation to hypertriglyceridemia. Overweight & Obese adults. Statistically significant correlation was observed between % body fat, VF, obesity degree & central obesity & hypertriglyceridemia. Slight correlation between % body fat, obesity degree & elevated FBS & hypertension was found in obese than compared to overweight adults. The reduced HDL level had a significant correlation with low SMM & high VF. CONCLUSION- Overweight/obese adults with MetS had a significant relation between few MetS criteria & BC parameters. Its revealed that hypertriglyceridemia was associated with high % body fat, VF, obesity degree & central obesity among these overweight/obese adults. Elevated BC parameters might add to the risk of being MetS. It is observed that high BC parameters might put these adults into MetSrisk if they are having 1 or 2 MetS criteria. Timely lifestyle adaptations through holistic approach by modifying Nutritional habits, physical activity initiation & stress-free habits might normalize BC parameters & also equally reduce them from being MetS. However, more research is needed to reveal whether BC parameters can be considered as an initial marker to screen, identify & prevent individuals from being at MetS risk.

CMN-O-32

FOOD ENVIRONMENT AND FOOD AND NUTRITION SECURITY IN CHILDREN FROM ELITE SCHOOLS OF URBAN VADODARA

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Background- Easy accessibility to processed foods (characterized by high fat sodium and added sugar) coupled with extensive media promotion of such foods has led to increased consumption of such foods at the cost of fruits and vegetables among adolescents. Moreover, living in a food secure household does not ensure dietary adequacy. Hence, a cross-sectional study was undertaken to study the Food Environment and its impact on Food and Nutrition Security among children (aged 12-14 years) from elite schools of urban Vadodara. Methods- Students from elite schools (12-14 years of age) from urban Vadodara were enrolled for the study. A pretested questionnaire was used to assess the food environment in and around homes and at school, nutritional status was assessed by anthropometry, dietary diversity, food variety score and food consumption scores were calculated. Results- The prevalence of overweight (22.01%) and obesity (12.73%) was more among the subjects than thinness (5.03%). Fifty percent of the subjects had normal nutritional status. All the subjects were food and nutrition secure (dietary diversity scores) however, food variety score identified 57.82% of the subjects as having poor dietary adequacy due to low consumption of fresh fruits and vegetables. Packaged and un-packaged foods high in energy density were consumed for breakfast and recess time in the school. Packaged foods namely, extruded products and un-packaged foods like puff, veg rolls, samosa were available at the school canteen. Food outlets (67.90%) as well as fruit vendors (59.42%) were accessible and available in the neighborhood food environment. Most families could afford to
purchase fruits and other healthy foods yet, the utilization of processed foods was higher due to its organoleptic properties. Conclusion- There is a need to raise awareness regarding healthy food choices and improving access to healthy foods in and around schools.

CMN-O-33

LIFE STYLE ASSOCIATED FACTORS OF WORKING WOMEN IN PUNJAB

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LIFE STYLE ASSOCIATED FACTORS OF WORKING WOMEN IN PUNJAB Shikha Bathla*, Manoj Sharma and Renu Bala Krishi Vigyan Kendra, SBS Nagar-144516 Punjab Agricultural University, Ludhiana *Corresponding Author-shikha_bathla@yahoo.com Background Assessment of lifestyle factors responsible for anxiety among working class women is paramount to prevent health issues. The present pilot study was carried out to estimate the relationship between lifestyle associated factors among adult working women of Punjab. Material & Methods The study was carried out from April, 2019 to July, 2019 and included 131 participants randomly selected from different blocks & cities of Punjab state. Life style associated factors of women having the age between 21-55 years were analyzed by self report and incorporated percentage of body mass index, daily exercise, food habits, sleeping habits, and metabolic disorders etc. Correlation between different anxiety causing variables were also calculated. Results The results showed that only 29 % of working women were indulged in daily exercise, 74.80 had habit of eating meals regularly out of which 25.19 % had habits of skipping breakfast, 11.45% skipped lunch and 6.10% skipped dinner, respectively. 83.20% of working women had the habit of took mid morning meals, while 22.90% take early morning tea with biscuits and 45.03% take evening tea with snacks. 22.90% women had habit of taking regular lemon water. 83.20% of working women had the habits of taking tea and 58.77 include sugar in tea. Only 87.78% women had habits of taking regular sleep of 6-8 hours and 76.33 had habit of drinking water at regular interval. All the respondents were suffering from anxiety due to no sound sleep and having work stress. The results further showed that 53.43 % feel free in discussing with family members, 50.38 % with both relatives and friends, 13.74% with colleagues and rest 5.34% with relatives, etc. The results further elucidated that none of the working women were suffering from diabetes. Only 6.87% were suffering from blood pressures problem, 3.05% from frequent fever and 5.34% were from urinary tract infections. Only 23.66% women had normal Body Mass Index and 41.22% were pre-obese due to sedentary life style. Conclusion There was positive co-relation found between age with exercise, sleep with exercise, diet with sleep and satisfaction of life with sleep. The study concluded that healthy diet with regular exercise and having sound sleep of eight hours reduces the incidence of anxiety. Keywords- diet, life style, sleep, women

CMN-O-34

EFFECT OF TRADITIONAL SUPPLEMENTARY SNACK ON UNDER WEIGHT CHILDREN

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Effect of Traditional supplementary snack on under weight children Jyothi H.*, L. Prema** and Mini Joseph* *Assistant Professor in Food and Nutrition, Department of Homescience Government College for Women, Trivandrum, Kerala, India; ** Retd Professor of Food & Nutrition, KAU, Vellayani, Trivandrum. ABSTRACT Background and objective.- The period of pre-school children is an important stage for formation and preservation of health in the future. (Bergier et al., 2016). The period of pre-school children is an important stage for formation and preservation of health in the future. The aim of this research is to study the effect of a developed traditional supplementary snack on underweight pre-schoolers. Materials and methods- The sample comprised of preschool children of 42-48 months, from the rural areas of Malappuram district, Kerala. Normal weight for age children formed the control group and underweight children constituted the experimental group. The traditional supplementary snack was made from Barley, green gram, sesame seeds, jaggery and ghee. It provided an additional 1/3 calories for the experimental group. Two balls (100gm) rich in macro and micronutrients (439 calories, 7.8 g protein, 96.5mg calcium, 133mg phosphorous and 2.41 mg iron) were supplemented daily for a period 3months. The cost was Rs 4.25 /ball. Results- - The supplementary snack was highly effective as a means of combating macro nutrient deficiency among low weight for age preschool children of 42-48 months age groups. There was a significant increase in growth rate as seen in the anthropometric measurements (weight, chest circumference and MUAC) in the experimental group. Conclusion- The present study indicated that blending traditional supplementary food can improve the growth rate of underweight preschool children and help catch up and reach normal standards. KEYWORDS- Preschool children, supplementation, supplementary snack, weight for age, underweight, Barley, green gram, sesame

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CMN-O-35

LINKAGES OF AGRICULTURE, MARKETS AND NUTRITION WITH RESPECT TO QUALITY FOODS IN BIHAR, INDIA

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Background- It is critical to understand linkages of food security with agricultural production and consumption, particularly with quality foods like milk, chicken, eggs, green leafy vegetables and pulses, to improve the nutritional status of a population. In this study, our objective was to examine linkages in agriculture, markets and nutrition with respect to quality foods. Methods- We conducted a qualitative study in two districts of Bihar, India. Focus group discussions (FGDs) were conducted with producers and non-producers of quality foods to examine availability, accessibility, affordability and linkage to production and consumption. Key informant interviews (KII) were conducted to construct distribution chains for quality foods. Data analysis was done using NVivo 9. Result- Almost all 271 participants from 27 FGDs perceived that consumption of quality foods was consistent among its producers. Despite challenges in production among producers and resource constraints for production among non-producers, intention to produce quality foods was strongly related to consumption. Poor livelihood options among non-producers made affordability a major barrier to consumption of all quality foods. Non-producers perceived production of quality foods as a high-income generating occupation and a most likely source of its consumption. The distribution chains constructed through 69 key informant interviews identified the different pathways from production to consumption of quality foods. Key players for quality foods in markets mainly attributed challenges in pricing or spoilage resulting in loss, particularly when demand was low. Availability and accessibility were not noted as barriers to consumption. Preference was shown for quality foods that were available closer to consumers villages. Conclusion- Supporting production of quality foods among producers and promoting production among non-producers can lead to increased consumption. After validating these results through further quantitative and qualitative studies, these findings could be applicable to populations mainly dependent on their own agricultural production for consumption.

CMN-O-36

INSILICO STUDIES USING PHYLOGENY TO IDENTIFY PHYTOCHEMICAL INHIBITORS OF EBOLA VIRAL PROTEIN-35

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BACKGROUND- Ebola is a fatal contagious viral disease caused by a single stranded non-segmented negative sense RNA Virus. VP-35, one of the structural and multifunctional proteins, plays a major role in viral replication, transcription and acts as a RNA silencing suppressor (RSS) in host cells by disrupting its overall antiviral defence machinery. The phytochemicals obtained from amaryllidaceae have been known to possess a wide range of biotherapeutic properties including anti-viral properties as well. According to statistics, the prevalent medications and vaccination for Ebola is a costly affair for the intended population. Members of family amaryllidaceae are indigenous to Africa, where the pandemic is most prevalent. MATERIALS AND METHODS- The metabolites and phytochemicals of amaryllidaceae members were obtained from Knapsack and Dr. Duke Phytochemical and Ethnobotanical Database. Phylogenetic analysis was used as a screening tool to bioprospect potential phytochemicals from members of amaryllidaceae using MEGA-X10.0. Comparative docking study analysis was performed on VP-35 with the screened phytochemicals using Autodock-Vina and IGEMDOCKv2.1. ADME-tox properties of the ligands were computed using admet-SAR module. RESULTS- Comparative molecular docking simulation analysis among the screened compounds, Lycoramine A, Lycorine, Gossypetin-3-galactoside and 1-O-Acetylcorynine showed promising docking scores, binding energies and strong polar interactions with VP-35. ADME-Tox studies on these ligands have also shown promising results. CONCLUSIONS- Our study attempts to screen the phytochemicals that could be used as a potential lead for designing and developing a cost-effective plant-based herbal drug formulation that disrupts the viral assembly and virulence of the Ebola virus. However, in vitro and in vivo studies as well as animal model studies on this work will be instrumental in determining the efficacy of these molecules against Ebola virus. KEYWORDS- Ebola, VP-35, Phylogeny, Molecular Docking, Phytochemicals and Drug Formulation
**CMN-O-37**

IN VITRO ANTIOXIDANT AND ANTIBACTERIAL EFFICACY OF MATTI BANANA (MUSA SP. CULTIVAR MATTI)

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**ABSTRACT**

Background - Matti banana have been widely used as a potential remedy for constipation among infants in southern part of Tamil Nadu. The present study aims to investigate the antioxidative and antibacterial activity of Matti banana, to identify its potential health benefits.

Material and Methods - The DPPH radical scavenging assay and phosphomolybdenum reduction assay were performed to identify its antioxidant potential and were compared with the reference standard, ascorbic acid. The antibacterial activity of Matti banana was carried out by well diffusion method using nutrient broth agar medium and was assessed against Gram positive bacteria such as Bacillus subtilis, Micrococcus luteus and Staphylococcus aureus as well as Gram negative bacteria such as Escherichia coli, Proteus vulgaris and Shigella flexneri. Result - The IC50 of DPPH radical scavenging activity of aqueous Matti banana extract was 15.78 µg/mL concentration which was compared with the standard ascorbic acid (2.88 µg/mL). Similarly, phosphomolybdenum reduction activity of aqueous Matti banana extract was identified as 11.19 µg/mL concentration which was compared with standard ascorbic acid (5.54 µg/mL). The results of the study is statistically significant at p<0.01. The aqueous Matti banana extract exhibited moderate inhibitory activity against Staphylococcus aureus (MTCC 96) of 13 mm at concentration of 500 µg/mL. Conclusion - Aqueous extract of Matti banana (Musa sp. cultivar matti) showed good antioxidant and antibacterial activity which in turn possess various health benefits and numerous bioactive compounds. The antioxidant compounds present in Matti banana synergistically act to reduce the increasing risk of degenerative diseases. Therefore, Matti banana can be used for both nutritional and therapeutic drugs instead of synthetic ones.

**CMN-O-38**

SUNLIGHT EXPOSURE, ISLAMIC DRESS CODE AND CONSUMPTION PATTERN OF VITAMIN D FORTIFIED FOODS AMONG MUSLIM WOMEN IN COIMBATORE CITY

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Background - Muslim women worldwide follow the Islamic traditional dressing in outdoor. Studies have revealed high incidence of vitamin D deficiency in Muslim population living in countries with abundant of sunshine indicating the influence of other factors other than availability of sunlight. Hence, the present study was conducted to find the association of sunlight, Islamic traditional dress and consumption pattern with vitamin D nutriture of Muslim women.

Material & Methods - 200 Muslim women between the age 25 to 45 years from different areas in Coimbatore city were selected by purposive sampling. Details of lifestyle pattern, socioeconomic background, Islamic dress code, sunlight exposure pattern, use of sunscreens, clinical symptoms and consumption of calcium and vitamin D fortified foods were collected with the help of a interview schedule. A market survey on the local availability of vitamin D fortified foods was conducted. Result - 28 percent of the women were between 25-35 years and 72 percent were between 35-45 years. 59 percent wore Burqa, 10 percent wore Niqab and 31 percent wore Hijab. Among them, 90 percent followed black Islamic dress while remaining ten percent wore other colour Islamic dress. 39.5 percent were exposed to sun less than 30 minutes per day. 10.5 percent of the women used sunscreen products. Dietary intake of calcium was -110.75% below recommendations. Vitamin D fortified foods were available in the market but their consumption was minimum. Conclusion - Sunlight exposure has a positive correlation with types of Islamic dress code and back and bone pain. Muslim women were highly prone to bone pain due to vitamin D deficiency arising from lack of sunlight exposure and low consumption of calcium in diet. Low consumption of fortified foods was due to lack of knowledge. Keywords - Muslim women, vitamin D nutriture, sunlight exposure, Islamic dress code, vitamin D fortified foods
**CMN-O-39**

**ABSTRACT**
A study on nutritional status of elderly was conducted to assess the nutritional status and its associated functional disability among 180 rural and urban elderly aged 60 and above during 2018-2019 in Ranebennur Taluk of Haveri district, Karnataka. A self-structured schedule was used to collect the general information, nutritional status was measured by anthropometric measurements and Mini Nutritional Assessment (MNA) scale. Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL) are the measures of functional status of older persons. Katz Index of Independence in Activities of Daily Living (ADL) and Lawton Instrumental Activities of Daily Living (IADL) scales were used assess the functional status. The results revealed that majority of the rural respondents (72.20 %) had normal nutritional status followed by at risk of malnutrition (22.20 %) and malnourished status (5.60 %). Similar trend was observed among urban elderly where, most of them (55.60 %) had normal nutritional status followed by at risk of malnutrition (40.00 %) and malnourished status (4.40 %). A significant association and difference between locality and nutritional status of elder was observed. It indicating better nutritional status of rural (25.51) elders compared to urban elders (24.07). The elderly with normal nutritional status and at risk of malnutrition groups were better on activities of daily living compared to malnourished. With regard to instrumental activities of daily living, the elderly with normal nutritional status were better compared to at risk and malnourished group. Nutritional status was highly significant and positively correlated with activities of daily living and instrumental activities of daily living (functional status). Keywords- Elderly, Nutritional status, Locality, Activities of daily living, Instrumental activities of daily living.

**CMN-O-40**

**ABSTRACT**
Richness of papaya fruit in different vitamins, minerals, antioxidants and fibre makes it a highly nutritious fruit. It has a wide range of pharmacological effect. It is locally available in all seasons and has low cost. Development and popularization of its products may helpful to the society for its effective usage. Methodology The study was carried out with the objective of developing ripe papaya based products and popularizing them among mothers of school children. Twenty products (jam, jelly, gulab jamun, custard, pudding, ice-cream, cream souffle, cake, halwa, ladoo, sweet ball, payasam, kheer, kesari, ada, kumbilappam, kozhukatta, lazi, shake, juice) were developed using papaya as the major ingredient. A scorecard was developed for the organoleptic evaluation of the products. Sensory evaluation was carried out with the help of 10 panel members. Costs of the products were also calculated to find out the affordability. Popularization and nutrition education were done among mothers. Using ANOVA, five best products were selected. Vitamin A and vitamin C content of the selected products were analysed. Results All the developed products have got high score for organoleptic qualities. The mean score for appearance, colour, texture, flavor and taste were 4.6, 4.7, 4.5, 4.6, 4.8 respectively. Cost of the products ranged from Rs 2.84/100gm to Rs 8.36 /100gm. The best selected products were halwa, payasam, shake, kumbilappam and jam. The Vitamin A content of the selected products varied from 412mcg/100gm (shake) to 289mcg/100gm (halwa) and Vitamin C content varied from 39mg/100gm (shake) to 21mg/100gm (payasam). Conclusion The developed products were economical and acceptable to the subjects. Nutrient analysis revealed that all the selected products have got high Vitamin A and good vitamin C content. Response of the participants included in nutrition education revealed that their knowledge improved after education and it was a success.
CMN-O-41

NUTRITIONAL ASSESSMENT BASED ON ANTHROPOMETRIC PARAMETERS AND DIETARY HABITS OF SCHOOL GOING CHILDREN (5 - 12YRS) IN CHENNAI

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Nutritional Assessment based on anthropometric parameters and dietary habits of school going children (5 - 12 yrs) in Chennai Supriya.V, Saranya.U. Assistant Professor, Dept of Clinical Nutrition, Sri Ramachandra Institute of Higher Education and Research (DU), Email- supriya.v@sriramachandra.edu.in Saranya.U, M.Sc, MDFSM, IGNOU Aim- To assess the nutritional status of 5 â€“ 12 years school going children based on anthropometric parameters and dietary habits. Methods- A school based study with a prospective observational design was adopted. The study was carried out on 837 subjects belonging to upper middle class group using simple random sampling method. Height, weight and MAC of the children were measured. Dietary habits were assessed using a formulated questionnaire. Comparison of the anthropometrical parameters using WHO z-score standards was done and through nutrition education program dietary habits were attempted to be modified. Subsequently, a reassessment was done on anthropometrical parameters and dietary habits of the subjects. Results- The study enrolled 837 subjects, comprising of 51.6% boys and 48.4% girls. Nutritional status on assessment of height and weight showed significant difference (p<0.01) on comparing with WHO z-score standards. The present study showed highly significant association (p<0.01) of dietary habits like meals and snacks intake, type of outlets they choose to eat, fruits and vegetables intake, duration of watching TV and snacks nibbled during TV hours, type of beverages, desserts and sweets intake respectively. Conclusion- Promoting healthy dietary habits through effective nutrition education is an effective preventive method.

CMN-O-42

IMPACT OF NUTRITION STATUS ON WELL-BEING AMONG MIDDLE AGED WOMEN

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Assessing nutrition status and to know the influence of well-being of middle aged menopausal women. Differential research design was used to test the difference between working and non-working women in well-being and correlation design was used to find out the relationship between nutrition status on well-being of working and non-working middle aged menopausal women. Nutritional status was assessed by anthropometric measurements and ICMR Subjective well being developed by Sell and Nagpal (1992). The results revealed that According to BMI, 43-47 per cent of rural women belonged to overweight category followed by 35 per cent of non-working women had obesity, 20 per cent of working women had ideal body weight as well as obese and 7-12 per cent of the women belonged to underweight category. Whereas among urban women, 40 per cent belonged to overweight followed by 32.50 per cent obesity while 41.64 per cent of non-working women belonged to obese category followed by 30.83 per cent of them had overweight and only 4-10 per cent of urban women were underweight. Nearly 1/3rd (31-45 %) of the respondents of rural working and non-working women belonged to take care-2 category while 27-32 per cent of them belonged to action category according to waist to height ratio classification. With reference to lean body mass index that it was noted that, 39-50 per cent of working and non-working women of rural and urban area belonged to obese category while 19.26 per cent of rural women and 24-34 per cent of urban women suffered from energy deficiency. Majority (46.15 %) of the women reported high well-being belonged to ideal body weight as against 33 per cent and 25 per cent of women were belonged to overweight and obese category respectively. Findings also revealed that there was negative significant relationship between working and non-working women from rural and urban area. Key words- Menopause, nutritional status, well-being

CMN-O-43

DIETARY FATTY ACID PROFILE OF SOUTH INDIAN ADULTS AND ITS ASSOCIATION WITH TYPE 2 DIABETES-CURES 151

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Background- Both the quantity and the quality of fat are major determinants of chronic diseases risk. This paper looks at the fatty acid composition of Indian foods reported in the diets of urban Asian Indians and its association with type 2 diabetes. Subjects and
Methods- Adults aged 20-80 years (n=1688) were selected from the Chennai Urban Epidemiological Study. The dietary intake of the study subjects was assessed using a validated food frequency questionnaire. The fatty acid profile of common foods reported by the population was measured from pooled food samples and substituted in nutrient database for calculation of daily foods, nutrient and fatty acid intake. Statistical analysis was performed using SPSS software. Results- Of the foods tested potato chips and Indian sweet "mysorepak" had the highest amount of fat 46.7g and 42.2g/100g respectively while the Indian sweet "sweet pongal" had the lowest fat of 3.9g/100g. Palmitic acid in saturated fat (SFA), oleic acid in monounsaturated fat (MUFA) and linoleic acid among polyunsaturated fatty acids (PUFA) were commonly reported fatty acids in most foods. Dietary fats provided almost 1/4th of the daily caloric intake of the subjects. Compared to national recommendations, the intake of MUFA and alpha linolenic acid was very low. Higher intake (>median) of calories (%E) from SFA (p=0.007) and PUFA (p=0.008) were associated with an increased risk of type 2 diabetes whereas MUFA (p=0.017) showed an inverse association. Conclusion- Improvement of the dietary fat profile in our population can be achieved by formulating and propagating guidelines on the selection and appropriate use of cooking oils, and increased consumption of nuts and oilseeds.

CMN-O-44

STUDY DESIGN AND METHODS FOR A RANDOMIZED CROSSOVER TRIAL TO ASSESS THE EFFECT OF ALMOND SUPPLEMENTATION ON INSULIN RESISTANCE, GLYCEMIC MARKERS, INFLAMMATION AMONG OVERWEIGHT ASIAN INDIAN ADULTS

GAYATHRI RAJAGOPL Ph.D Scholar and Sr. Research Officer -Dietetics University of Madras and Departments of Foods Nutrition and Dietetics Research, Madras Diabetes Research Foundation, Chennai, Tamil Nadu, India, Background- Almond is a rich source of MUFA. Western studies have shown the positive health effects of almond on satiety, insulin sensitivity, improved glycemic, lipids and inflammatory markers. Earlier studies in India have shown that consumption of MUFA is low. However, such well-designed studies with population at risk for diabetes and CVD in Asian Indians are sparse. Objectives- This study describes the design and methods of a trial to assess the effect of almond supplementation on insulin resistance, glycemic markers and inflammation among overweight Asian Indian adults Rajagopal Gayathri M.Sc2., Kalpana N M.Sc2., Kavitha N B.Sc2., Geetha GunasekaranM.Sc2, Vasudevan Sudha M.Sc2, Ranjit Mohan Anjana MD, PhD1, Ranjit Unnikrishnan1 MD, FRCP, Ganesh Jeevan M.Sc, Ph.D2., Kamala Krishnaswamy MD2, PhD1, Annette Beatrice PhD1 Rajendra Pradeepa PhD1 Viswanathan Mohan 1 MD, PhD Departments of Diabetology, 2Foods Nutrition and Dietetics Research, Madras Diabetes Research Foundation, Chennai, Tamil Nadu, India, Background- Almond is a rich source of MUFA. Western studies have shown the positive health effects of almond on satiety, insulin sensitivity, improved glycemic, lipids and inflammatory markers. Earlier studies in India have shown that consumption of MUFA is low. However, such well-designed studies with population at risk for diabetes and CVD in Asian Indians are sparse. Objectives- This study describes the design and methods of a trial to assess the effect of almond supplementation on insulin resistance, glycemic markers and inflammation among overweight Asian Indian adults Methods- This is a parallel arm randomized controlled trial being conducted in Chennai, India. The feasibility and cultural appropriateness of this type of intervention in the local environment is also examined. The study will include 400 overweight volunteers aged 25-65y with a body mass index ≥23kg/m2. Results- The participants in the intervention group will receive 43g of almonds per day for 90 days, while the control arm participants will be on their habitual dietary patterns and without any nuts. All other lifestyle habits are not changed. The anthropometric, clinical and diet data of the participants will be assessed periodically. The plasma percent fatty acid of the participants will be assessed at base and end of the study as a measure of participant compliance. As almonds are known to improve satiety, the effect of almonds supplementation on inflammatory markers such as adiponectin, IL6 will also be assessed Currently, 150 participants are recruited for the study and there was no significant difference in age, sex, body mass index as well as glycemic and lipid parameters between participants in the intervention and control group. Conclusion- If the study findings are positive this could help to improve the MUFA intake by a single supplementation of almonds daily to meet the dietary guidelines of 15% of total calories of MUFA but also aid in prevention of obesity related chronic diseases such as diabetes and cardiovascular diseases.

CMN-O-45

PRODUCTION OF GALACTAN EXOPOLYSACCHARIDE BY WEISSELLA CONFUSA- AN APPROACH OF BY-PRODUCTS UTILIZATION

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Background- Demand of natural polymers for their novelty, health benefits and industrial applications has led to an interest in exopolysaccharide (EPS) production. Their biocompatible and biodegradable nature has led to immense food and pharmaceuticals use.
Therefore, it is imperative to produce economically from unutilized inexpensive sources to minimize production cost. This study evaluates to produce galactan EPS by lactic acid bacterium Weissella confusa KR780676 from bio waste.Material & methods- An exopolysaccharide producing strain was isolated from Idli batter. Different carbon sources were assessed for production of EPS (g/L). Certain fermentation parameters, such as concentrations of carbon sources, time, temperature and inoculum volume (Cfu/mL) were analyzed. EPS was extracted by heating the cell suspension and subsequently centrifuged to remove biomass. EPS was precipitated with chilled ethanol. Precipitate was collected and quantified by phenol sulphuric acid method. Result- EPS yield in all carbon sources increases with increasing concentrations and time from 2 to 20 % and 12 to 72 hours respectively. EPS yield contributed by different sources varies follows the order ranging from maximum to minimum (g/L), Sucrose > mixture of coconut water and sucrose > molasses > coconut water. The highest yield 36.56 g/L was obtained from sucrose as carbon source at 5 % inoculum at 25 Â°C, as compared to 10 % and 15 % inoculum contributes 16.66 and 27.25 g/L at 25Â°C and 30 Â°C respectively. Mixture of coconut water and sucrose affords maximum 19.31 g/L at 30 Â°C and 10 % inoculum for 72 hours. Molasses contributes 2.84 g/L at 2 % in comparison to 20 % obtained 9.30 g/L for 72 hours. Coconut water affords least 3.61 g/L at 10 % inoculum at 30 Â°C for the period of 72 hours. Conclusion- The study suggests there could be significant reduction in food waste by efficient utilization for EPS production. Novel food products can be added to sizeable amount for food industry. Besides that effective use of bio waste can reduce detrimental environmental pollution. Key words- Galactan EPS, extraction, by-products, fermentation parameters

CMN-O-46
MICRONUTRIENT MALNUTRITION STATUS OF REPRODUCTIVE WOMEN IN INDIA -AN IDEA OF IRON FORTIFICATION INTO CEREALS TO PREVENT MICRONUTRIENT MALNUTRITION - A REVIEW

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Micronutrient malnutrition status of reproductive women in India- An idea of Iron fortification into cereals to prevent Micronutrient malnutrition - A Review- 1Savitha V. Jamnanakatti, 2Prashnath, S. J 1 Research scholar, Dept. of Food Processing & Nutrition, Karnataka State Akkamahadevi Womenâ€™s University, Vijayapura â€“ 586 108, Karnataka, India 2 Associate Professor, Dept. of Food Processing & Nutrition, Karnataka State Akkamahadevi Womenâ€™s University, Vijayapura â€“ 586 108, Karnataka, India Abstract Nutritional status is the indication of the overall wellbeing of a population. Dietary intake pattern plays a significant role in human health. Inadequate dietary intake pattern especially in women of reproductive age have resulted in the deficiency of essential nutrients especially during pregnancy and lactation. Malnutrition poses threat to Physical, mental and social wellbeing of women. Adequate nutritional status of women is important for good health and increased work capacity of women themselves as well as for the health of their offspring. The common Micronutrient deficiency seen amongst reproductive women are Iron Deficiency Malnutrition (IDM). 56.2% of women suffer from anemia, and have lower than normal levels of blood haemoglobin. Anemia has increased in ever-married women from 1998-99. Among pregnant women, anemia has increased from 50% to almost 58%. 8[National Family Health Survey- 2005-06]. Iron is part of the hemoglobin molecule whose main function is to carry oxygen from the lungs to the tissues. The total amount of iron in the human body is 4.0 grams with 2.5 grams in hemoglobin, 0.5 grams in myoglobin and enzymes and 1.0 gram as a reserve. For women in the childbearing age, iron requirements are about 1.3 mg per day, due to menstrual losses. In pregnant women this rises even further to 3.0 mg per day. In the period of growth the need for iron is also high. Food fortification has been considered to be the best way to increase iron intake of a population. As Cereals like Rice and Wheat are considered as staple food of India, Iron fortification in cereals would be more beneficial. Universal iron fortification of foods certainly results in some beneficial effects in the needy population.

CMN-O-47
IMPACT OF COW BREEDS AND METHOD OF PROCESSING ON FATTY ACIDS, FLAVOR AND CHOLESTEROL OXIDATION PRODUCTS IN GHEE

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Abstract- There is a resurgence in the popularity of ghee amongst consumers as well as nutritionists. Though ghee is projected as anâ€™oneâ€™ product, its ayurvedic roots suggest a multitude of products with different health benefits. Though most commercial ghee is made from a mix of cow and buffalo milk, there are brands selling â€“desiâ€™ cow ghee with the breed mentioned on the pack.
Another category of claims pertains to the method or process used for making ghee. While most commercial ghee is manufactured from cream, Ghee made from butter obtained from churning curd is becoming popular due to increased awareness and shift towards traditional Indian knowledge of Ayurveda. Ghee is a unique fat because of its varied fatty acids and flavor profile. The volatile components of ghee are influenced by the breed of the cow and method of processing used. Cholesterol oxidation products (COPs) are formed in ghee as it is exposed to high temperature during its processing. There is a need to understand whether using a particular cow breed and processing method will impact texture, fatty acids, flavor profile and formation of cholesterol oxidation in ghee. Milk from three different cow breeds, two desi cows (Deoni and Malnad Gidda) and one crossbreed Holstein Friesian (HF) were used for making ghee using traditional (fermented) and creamery butter method (unfermented). Fatty acids, flavor compounds and cholesterol oxidation products were identified using GC-MS. Keywords- Ghee, fatty acids, flavor, cholesterol oxidation products.

CMN-O-48

INFLUENCE OF PARENT NUTRITIONAL KNOWLEDGE AND HOME FOOD ENVIRONMENT FACTORS ON EATING HABITS OF 10-12 YEAR OLD CHILDREN

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Background- Home food environment presents a convenient setting to shape dietary behaviors and foster healthy eating habits among children. Parents’ nutritional knowledge influences home food environment and ultimately the food choices and consumption patterns of the children. This cross sectional study was conducted to assess the nutritional knowledge of parents, understand the home food environment (HFE) factors and determine their associations with children’s consumption pattern. Methods- 125 child-parent pairs participated in the study. Children studying in grade 6 and 7 were selected from 2 private schools and 1 government school in Mumbai using random sampling method; the parents who provided consent to participate were recruited. The parents completed an interviewer designed ‘nutritional knowledge questionnaire’ comprising of 22 questions about knowledge of food groups, nutrients and healthy eating recommendations; several home food environment factors and demographic characteristics were reported. HFE factors included ‘availability’ of 16 ‘healthy’ and ‘unhealthy’ foods at home, ‘visibility’ of foods at home, ‘sugary drinks’, ‘sweet snacks’, ‘salty snacks’, ‘fresh fruits’ and ‘low fat snacks’ at home, family dietary habits such as ‘how often does your family usually eating out at restaurants’ and ‘have meals together as family’. Parent feeding styles (instrumental, control, emotional and encouragement feeding). The consumption pattern was assessed using a 21 item food frequency questionnaire, administered for the child-parent pairs. Descriptive and linear regression analyses were done with SPSS ver 20. Results- Three fourth of the parents were mothers, the mean age of children was 11.8 ± 0.74 years and 45% attended private schools. One fourth of the parents reported to have meals with their family, is a widely used ingredient in most of the ayurvedic formulations due to its abundant pharmacological properties. The taste of turmeric is considered as Katu in Ayurveda, which means Bitter. Modern science suggests that the bitter taste is due to the

CMN-O-49

A COMPARATIVE STUDY ON THE PHYTOCHEMICALS OF CURCUMA LONGA BASED ON BITTER PRINCIPLES- AN INSILICO MODEL

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Background- A well known traditional Indian Medicinal System, known as Ayurveda, dates back to 2000 years. As per Ayurveda, classification of foods are based on the rasa (taste) of them; whereas, in modern science, foods are classified based on the biomolecules such as carbohydrates, proteins and fats. Curcuma longa (Haridra-Sanskrit; Turmeric-English), from the Zingiberaceae family, is a widely used ingredient in most of the ayurvedic formulations due to its abundant pharmacological properties. The taste of turmeric is considered as Katu in Ayurveda, which means Bitter. Modern science suggests that the bitter taste is due to the
The bitter taste receptors (T2Rs) are a seven-transmembrane G-protein coupled receptors. T2Rs are more than 25 in number which is possible due to low selectivity of a few receptor members. Materials and methods- The phytochemicals from Curcuma longa were obtained from IMPPAT and Dr. Dukeâ€™s Phytochemical and Ethnobotanical database. Two bitter receptors were considered for the docking process, Taste receptor type 2 member 10 and taste receptor type 2 member 1, which were modelled using threading model build using I-TASSER and were validated using Ramachandran Plot (DS visualize 2.5). Autodock Vina 1.1.2 was used for the docking and visualized using LIGPLOT 1.4.5 and Discovery studio visualizer. Results- Docking studies revealed that Letestuianin A, Demethoxycurcumin and Curcumin as the top 3 bitter molecules for T2R10; whereas, Curcumin, Demethoxycurcumin and Letestuianin A as the top 3 bitter molecules for T2R1. Conclusion- Curcumin, Demethoxycurcumin and Letestuianin A showed best binding results to both the receptors. These molecules could be used to elucidate the potential pharmacological properties such as anti-asthmatic and anti-fertilityility properties. Studies also indicate that bitter molecules act as inhibitors of tumor growth and proapoptotic agents in cancer cells. Hence, these molecules could be potential anti-cancerous drugs in the near future.

CMN-O-51

EFFECT OF SUPPLEMENTATION OF QUINOA AND METHI CHAPATTI ON THE ANTHROPOMETRIC MEASUREMENTS OF POST-MENOPAUSAL WOMEN

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Aim and Background- The objective of this study was to determine the effect of supplementation of Quinoa and Methi chapatti on the anthropometric measurements of post-menopausal women. Quinoa, a pseudo cereal, is a low glycemic index carbohydrate and an important source of proteins of high biological value. Materials and Methods- The study design comprised of a pre-test and post-test experimental design with a control group. Convenience sampling was used to identify twenty three post-menopausal women for the study. Two freshly prepared Quinoa and Methi chapattis were given to the subjects in the experimental group for a period of sixty days. An interview schedule was used to elicit information regarding socio-economic, demographic, health related details, dietary and physical activity pattern of the subjects. Anthropometric measurements such as height, body weight, Body Mass Index, waist circumference, and body fat percentage were recorded for all subjects before and after the supplementation period. Results- For subjects in the experimental group (11 subjects), a significant decrease (p<0.05) in body weight and body fat percentage was observed after the supplementation period. A non-significant decrease in waist circumference and body mass index was also observed. For subjects in the control group (12 subjects), a significant increase was seen in body weight (p<0.05) after the supplementation period. The other parameters had also shown a non-significant increase. Conclusion- Supplementation with quinoa and Methi chapatti had brought about a favourable change in the anthropometric measurements, waist circumference and body fat percentage of post-menopausal women.

CMN-O-52

KNOWLEDGE ATTITUDE AND PRACTICE OF ADULT ENTERAL NUTRITION IN CRITICALLY ILL AMONG HEALTHCARE PROFESSIONALS- A DESCRIPTIVE STUDY

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Background- Adequate nutrition is required for patients to improve and maintain their health. Healthcare professionals are in one of the best positions to ensure adequate nutrition because of their holistic caring role. The aim of this study is to describe the HPs level of knowledge attitude and practice on adult enteral nutrition for critically ill patients. Methods- The target population was the HPs managing patients with EN in a secondary care hospital. A cross sectional descriptive study design was carried out amongst 86 HPs including Doctors and Nurses. Nutrition knowledge, attitude and practice were assessed using a modified-validated questionnaire which was statistically analyzed using SPSS version 16.0. Descriptive statistics were used to summarize data. Results- Mean nutrition knowledge, practice and attitude scores were 29.19± 6.07, 25.02 ± 2.47 and 39.71± 2.66 respectively. Consultants had better EN knowledge with a higher mean score of EN knowledge (36.80±7.43) compared to Residents (33.41±3.87) and Nurses (26.68±4.47) (p=0.045). Nurses (69.5%) practiced the protocol of effective communication on nutritional management of patients during ward rounds and 91.4% documented the nutrition support. Among the HP, 94% perceived that it was the Dietitians’ role to help bridge the gap. Conclusion- It was found that medical practitioners had better EN knowledge and the nurses were effective in their communication and documentation of nutrition support. Since there was a significant knowledge gap among nurses, a continuous nutrition education programme will help to enhance EN knowledge about the current guidelines and evidence based protocol and will help bridge the gap.
CMN-O-53

Consumption pattern of foods high in fat, salt and sugar (HFSS) in the adult population of urban Vadodara, Gujarat, India- A cross sectional study.

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Background- Traditionally known for malnutrition, Indians now report more frequently with overweight, obesity, and their consequences. Diets have tilted from traditional eating to foods high in fat, salt and sugar (HFSS). Thus, this study was carried out to elicit information regarding the consumption pattern of HFSS foods. Material and Methods- This cross sectional study was carried out on a sample size of 400 adults of urban Vadodara, in the age group 25-50 years. Data was collected with respect to socio-economic status, medical history, anthropometry and biophysical parameters, physical activity, dietary pattern, food purchasing pattern, quantitative food frequency and 3 day 24 hour dietary recall. Frequency distribution, percentages, means, standard error, correlation and regression were calculated for the trends observed. Result- The subjects reported strong family history of diabetes, hypertension and hyperlipidemia. 18% of the subjects were overweight and 40% were obese. 90% of the subjects were found to be abnormally obese. Majority of the subjects (78%) were physically inactive. Nearly half of the subjects consumed three meals a day and higher cases of meal skipping were observed among the overweight and obese. Almost all the subjects consumed HFSS foods in varied frequency and the dominant reason reported for consumption was taste followed by the availability. The most frequently consumed HFSS foods were wafers, puff, samosa, ice cream, papad, soft drinks, bun, etc. It was observed that advertisements manipulated the purchasing practices for 34.3% subjects. The 3 days 24 hour dietary recall disclosed that the energy intake increased by 203 kcal during weekends compared to weekdays. The mean per capita intake of oil, salt and sugar was 56.15g, 12.69g and 32.05g respectively. Conclusion- The consumption of HFSS foods was higher among overweight and obese as compared to normal subjects. Results call for raising consumer awareness through various strategies which would enable the population to make healthier food choices.

CMN-O-54

Nutritional value and consumer preference of meat from Slow and Fast-growing Chicken Genotypes

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Background- Poultry meat is the most economic source of protein in India. Nowadays, consumers prefer the meat of slow-growing broilers over fast-growing broilers because of perceived taste and nutrition. Nutritional data on slow-growing genotypes is not well studied. Hence, this study was performed to provide the nutritional information on different types of broiler meats. Material & Methods- Approval of Institutional Animal Ethical Committee was obtained. All birds were sourced from Indbro Research and Breeding Farm. Birds were hygienically dressed and meat from thigh and breast portions was used. Fat and cholesterol were determined by using soxhlet apparatus and gas chromatography respectively. Different sensory tests were conducted to assess the consumer preference. The data obtained from different replications (N=6 birds) were subjected to analysis of variance tests and significant difference was calculated at 95% level. Result- Overall, the fat content (g/100g meat) was 4 to 8 % and cholesterol content was 33 to 71 mg/100 g meat. The breast meat contain 31% less fat and 38% less cholesterol than thigh meat. Thigh meat from slow growing broilers had 14% less fat and 31% less cholesterol than thigh meat from fast growing broilers. However, breast meat of broilers had 11% less fat and 17% less cholesterol than Indbro breast meat (P<0.05). The interaction between meat type and birds type was significant (P<0.05). About 67% of consumers preferred the meat and meat products from slow-growing birds and only 32% consumers preferred the meat from commercial broiler meat. Preference test indicated consumerâ€™s higher degree of liking for slow-growing broiler meat. Conclusion- Results of this study will help the consumer to make an informed choice of selecting the broiler meat available in the Indian market.

CMN-O-55

NUTRITIONAL ASSESSMENT AND EFFECTIVENESS OF COUNSELLING ON PREGNANT WOMEN WITH GESTATIONAL DIABETES MELLITUS

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The study entitled â€œNutritional Assessment and Effectiveness of Diet counselling on women with Gestational Diabetes Mellitusâ€ was carried out to assess the nutritional status of pregnant women with GDM, assess the nutritional knowledge among the selected subjects and assess the effectiveness of the diet counselling among the selected subjects. For the present study, the sample consisted of 100 pregnant women with GDM from Government medical college, Kottayam. Survey method was used for the collection of data. Interview schedule comprised of questions related to personal details, socio-economic status, nutritional
assessment, medical history and lifestyle pattern. Majority of the subjects belonged to age 30-35 year age group. Nuclear family was found to be most common. Anthropometric measurements were done among respondents. Mean weight gain was analyzed. It was noted that majority of them had a normal Hb, blood pressure and pulse rate. Regarding the health status majority of the subjects had good health status and no food allergy. Comparing with RDA, mean nutrients intake of the respondents was low. On statistical analysis, correlation test showed that, there was no correlation between the serum Hb level and Iron intake of the subjects and testing the correlation between weight gain and energy intake in 2nd and 3rd trimester, found out there was no correlation between weight gain and energy intake in 2nd and 3rd trimester and also a correlation between FBS and PPBS with nutrients in 2nd and 3rd trimester found out that there was no association between FBS and PPBS with the nutrients in 2nd and 3rd trimester. Dietary habits of the respondents indicated that all the subjects take cereals, pulses, fruits, other vegetables, milk & milk products and caffeinated beverages daily. Food preferences of the respondents indicated that majority of them preferred baked products as a snack between the meals and include milk as a health drink in their diet. Regarding the medical history of the respondents, majority of them had their first delivery. None of them had a live baby with health problems. All of them take mineral tablet. Majority of the subjects were aware of the impact of diabetes on pregnancy and the baby. It was noted that all the respondents follow a low carbohydrate, no added sugar meal plan. All the subjects had support from their family members and health care providers for managing GDM. Regarding the present management of GDM in all of them the GDM was diagnosed in the 2nd trimester. Majority of them managed GDM through diet only. On analyzing the lifestyle pattern of the subject, it was found that there was effectiveness occur on nutrition awareness and diet counselling among respondents.

CMN-O-56

PREVALENCE OF OVERWEIGHT AND OBESITY AMONG YOUNG WOMEN WORKING IN GARMENT FACTORIES OF MYSORE

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Background- India is the second most populous country in world with women constituted 48.5% of total population. As per National Development Council, unorganized women labour constitutes about 93% of the workforce in India and vastly they are found to be in garment factories or industries. The health and wellbeing of women has a profound impact on a community. As per earlier studies, garment workers suffer from double burden of malnutrition i.e. underweight and overweight. In the present study, an attempt has been made to study the prevalence of overweight and obesity among women working in garment factories. Material & Methods- A cross-sectional, community based study was carried out on two hundred young women working in garment factories in and around Mysore city. Self-developed questionnaire was used to collect socio-demographic information, health and nutritional profile of the young women. Anthropometric measurements such as height, weight, waist circumference, hip circumference, skin fold thickness were recorded using standard methods and techniques. Result- The findings revealed that cent percent of the young women were found to be non-vegetarians consuming non-vegetarian foods weekly. Most of the young women consumed varieties of junk food throughout the month. As per the Body Mass Index [BMI], 41.5% of the young women were found to be overweight followed by 8.5% in obese grade-1 and 1.5% in obese grade-2. As per the Waist-Hip ratio [WHR], 38% of the young women were at risk of abdominal obesity. The higher percent of the young women aged <30 years (58.3%) were found to be overweight/obese and at risk of abdominal obesity (45.4%) than the young women aged <30 years (21.7% and 29.3%) respectively. Significant association was found between BMI and WHR classification with age groups of young women. Conclusion- It may be concluded that the young women working in garment factories are at risk of overweight and obesity. There is a need for in-depth study on women working in garment factory especially focusing on working environment, life style and facilities extended to working women by management. The lifestyle intervention needs to be conducted to prevent and control overweight and obesity among women working in the factories.

CMN-O-57

THE PREVALENCE OF OVERWEIGHT AND OBESITY AMONG YOUNG MARRIED WOMEN

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Background- Nowadays overweight and obesity has become global epidemic problem and widespread among young women of reproductive age. According to the World Health Organization (2018) 39% adults aged 18 years and older (39% of men and 40% of women) were overweight (i.e., had a body mass index (BMI) above 25 kg/m2) while 13% of them (11% of men and 15% of women) were obese and 11% and 15% of adult males and females, respectively, were obese (i.e. they had a BMI over 30 kg/m2). Women of
reproductive age have higher rates of overweight and obesity and are more adversely affected by obesity related complications than men. In the present study, an attempt was made to study the prevalence of overweight and obesity among young married women along with understanding their food pattern. Materials and Methods- A cross-sectional study was carried out. A total of two hundred and twelve (212) young (20 to 40 years of age) married women from Pandavapura taluk of Mandya district of Karnataka state selected as subjects using random sampling technique. The self-developed interview schedule was used to collect the data on socio-demographic conditions, food pattern, physical activities and anthropometric measurements were recorded. Result- The findings revealed that 51.4% (N=109) of the subjects were observed under overweight (26.42%) and obesity (25.0%) category. Higher percentage of overweight/obese women (64.2%) were of 30-40 years of age and they were not working/ or housewives. With regard to physical activity, less than 10% of overweight/obese women engaged in morning walking (9.2%) while nearly 25% of overweight/obese engaged in evening walking (24.8%) for about 35 minutes. Less than 5% of overweight/obese women were occupied with morning jogging (4.5%) and evening jogging (2.8%) for about 25 and 55 minutes per day respectively. A higher percent of overweight/obese women were daily consuming outside calorie rich foods (like gobi, samosa etc.) and beverages (like coke, pepsi) than non-obese women. Conclusion- Thus the study recommends for life style intervention i.e. involving nutrition education, physical activity to bring down the BMI levels especially in overweight/obese young married women.

CMN-O-58

PHYSICAL GROWTH AND NUTRITIONAL STATUS- A COMPARATIVE STUDY BETWEEN LOW BIRTH WEIGHT AND NORMAL BIRTH WEIGHT SCHOOL CHILDREN

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Background- Low birth weight is a global public health problem, predominantly prevalent in least developed and developing countries. As single most important factor, it determines mortality and morbidity of neonates, infants and children along with restrained growth and development. Low birth weight children have varying degrees of social, medical and environmental risks that negatively affect the outcomes across the continuum of low birth weight and it is apparently noticed during school age and adolescence. In the present study, it was aimed to assess the physical growth and nutritional status of school children born with low birth weight and normal birth weight. Materials and methods- A total of two hundred and fifteen (215) school children of 6+ to 10+ years of age living in Mysore city were recruited as subjects using purposive sampling technique. Both schools and households visit was carried out to recruit the subjects born during 2008 to 2012 year. A self-developed questionnaire was administered to the parents especially to mothers to collect the data on socio-demographic conditions and birth history of children. The anthropometric measurements of children were recorded using standard methods and techniques. The anthropometric data were further used to calculate indices such as BMI-for-age, Height-for-age and Weight-for-age according to child growth reference of World Health Organization. Both quantitative and qualitative analysis was done. Result- The findings indicated that nearly equal percent of low birth weight (51% and 75%) and normal birth weight (55.7% and 69.6%) children were seen under mild to severe level of stunting and underweight. Highly considerable percentages of low birth weight children (11.0% and 25%) than normal birth weight children (8.7% and 9.6%) were observed under severe level of stunting and underweight respectively. As per BMI-for-age, larger percentages of low birth weight children were observed under moderate (17.0%) and severe (25.0%) level of undernourishment than their counterparts (11.3% and 8.7%) respectively. Significant association between children of low birth weight and normal birth weight children regarding their level of malnutrition was noticed. Conclusion- Overall, the present study concluded that birth weight determine the physical growth and nutritional status of children in later years i.e. at school age period. The study suggests the implementation of Intervention programs/stimulating programs to bring down the long-term consequences for infants who are born low birth weight.

CMN-O-59

PREVALENCE OF MALNUTRITION AMONG ADOLESCENTS OF HASSAN

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Background- About 1.2 billion people i.e. one in six of the worldâ€™s population and about 21% of Indian population are adolescents aged 10-19 years. Adolescence is a period of transition between childhood and adulthood, marked by a rapid phase of growth and development during which health care and nutritional requirement is relatively high. Its inadequacy can put them at high risk of chronic diseases particularly if combined with other adverse lifestyle behaviours. In the present study, an attempt was made to assess the physical growth and nutritional status of adolescents living in urban and rural areas of Hassan Taluka of Karnataka State. Materials and Methods- A total of 300 adolescents of 13+ to 15+ years of age group studying selected high schools in town and
villages of Hassan taluka were selected as sample using random sampling technique. Self-developed questionnaire was used to collect socio-demographic information and anthropometric measurements were recorded using standard methods and techniques. Further anthropometric data were used to calculate indices such as Height-for-age, Weight-for-age and BMI-for-age as per child growth reference of World Health Organization. Result- The findings indicated that majority of the adolescents were living in nuclear families (72.0%) especially of rural areas (64%) with monthly income ranges between Rs. 11,000/- to 20,000/-. They were non-vegetarian (93.3%) with the frequency of consumption of weekly (55.0%) and monthly (31.3%). Adolescents skipped their regular meals. Substantial percent of the adolescents were observed under mild to severe level of stunting (32.0%) and underweight (28.7%). As per BMI-for-age, 11.7% of the adolescents were observed under mild to severe grade of chronic energy deficiency. Higher percentage of males (46.7%) than girls (17.3%) were suffering from stunting and vice-versa result was noticed with regard to underweight (Girls=34.0% and Males=23.3%). Higher percentage of adolescents aged 13+ years (46.0%) were suffering from stunting while higher percentage of adolescents aged 15+ years were suffering from underweight than their counterparts. Conclusion- The prevalence of malnutrition is widespread among adolescents of the present study mainly due to low income strata, locale of residence and irregularity of food consumption among adolescents. The multiple intervention programmes is needed to address multiple cause of malnutrition in adolescents.

CMN-O-60
ASSOCIATION OF DIET AND DISEASES WITH AGE RELATED SARCOPENIA AMONG ELDERLY PEOPLE

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Background- Sarcopenia is an age-related progressive decline in muscle mass and function that contributes to increased physical disability, morbidity and mortality among the elderly people. Nutrition plays an important role in the sarcopenia. Exercise (both resistance and aerobic) is combination with adequate protein and energy intake is the key factor for the prevention and management of sarcopenia. Objective- To study the association of diet and disease condition among sarcopenic subjects. Methodology- A hospital based observational study was carried out on 100 patients who are admitted to a hospital. The required data was collected referring the case records of patients. A structural questionnaire was prepared. The selected subjects were interviewed during data collection. Demographic details was elicited. Dietary recall method was collected using a dairy technique. Percentage of sarcopenia and Nutrient adequacy level was calculated. Result- The findings shows that arthritis and chronic kidney disease patients are comparatively more sarcopenic. Inadequate intake of protein might have lead to sarcopenia condition. As per the adequacy level, only 65% of protein was their average daily consumption. Conclusion- This study shows that diet plays an important role in sarcopenia condition. Adequate protein helps to maintain muscle mass. As the body becomes vulnerable to the disease condition with age, sarcopenia may also increases in its progression.

CMN-O-61
A STUDY ON THE ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND HEALTH AWARENESS, NUTRITIONAL KNOWLEDGE OF THE DYSLIPIDEMIA PATIENTS

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Background- Dyslipidemia is one of the major modifiable risk factor for atherosclerosis and related cardiovascular diseases. Evaluating health behavior patterns after diagnosis may help improve lifestyle interventions for the management of dyslipidemia. Materials and Methods- The study was carried out in Public sector company hospitals in Bangalore city, Karnataka. The total of four hundred samples (male-n=306 and female-n=96) aged between 30 to 60 years with Dyslipidemia was randomly selected from public sector company hospitals. Diagnosis of Dyslipidemia cut of value of Total Cholesterol more than >200 or Low density lipoprotein cholesterol (LDL) more than >130. The structured questionnaire was developed to collect the data under the headings of demographic profile, anthropometric measurements and nutritional knowledge and health awareness. Health Awareness comprising of 14 statements and nutrition knowledge measured using 16 statements. Results- Most of the dyslipidemic patients had unfavorable health awareness level (59%) followed by moderate level (41%) of Health Awareness. 60% of the respondents had inadequate level of Nutritional knowledge followed by moderate level (40%). Most of the respondents from the age group of 41-50 years (64 %) had unfavorable level of Health Awareness. Unfavorable level of Health Awareness was observed irrespective of the educational and occupational status of the respondents. Further, majority of the respondents those working as staff nurses had moderate level of nutrition knowledge. 69.6% of the respondents from the age group of 41-50 years had inadequate level of nutritional knowledge. Higher percentage of the male respondents had inadequate (63%) level of nutrition knowledge when compared to their female
counters with a moderate (52%) level. In males age, BMI and W/H ratio and in females BMI and W/H ratio revealed negative significant relationship with nutritional knowledge. Conclusion- With respect to food, knowledge on what should be consumed and the awareness of the importance of healthy food habits are the first steps in altering eating behavior to maintain normal BMI and W/H ratio. Mass media need to be strengthened in improving health awareness and nutritional knowledge among the dyslipidemia patients.

**CMN-O-62**

**BIOELECTRIC IMPEDANCE ANALYSIS (BIA) TEST- AN EASY TECHNIQUE TO ASSESS HUMAN BODY COMPOSITION IN HEALTH AND DISEASE**

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**Background**

Body composition analysis describes accurately about body fat mass, muscle mass, fat percentage and weight more accurately than BMI. Problems such as hypertension, dislipidemias, DM, CVDs like are all related to obesity and body compositional alterations. Materials & Methods- Present study done on participants of a health assessment activity where in 295 adults underwent Bioelectric Impedance Analysis (BIA) test. After controlling age as per sex, data of 240 subjects (110 male and 130 female) aged 30 to 60 was taken. BIA is a method of measuring impedance by applying alternating electrical currents which measures volume of water and fat through measuring of resistance to flow of the current using selected equations. Results- Obtained results showed that with a mean age of 38.86±15.36 yr and 38.79±14.87 yr some important mean body composition parameters of male and female subjects found respectively as BMI 25.72±4.39 and 25.12±5.00, bone.min.2.86±.49 and 2.16±.27 %, required fat control -12.63±9.10 and -12.97±9.55 %, minerals 3.47±5.9 and 2.61±3.3 %, obesity 119.56±20.39 and 118.05±22.87 %, protein 10.03±1.61 and 7.20±.97 %, required wt. control -10.14 ±10.48, -8.98±11.31 kg and total Score 65.98±7.62 and 63.00±7.59. So, with a not significantly different age, BMI and obesity status, the body total proteins, bone mineral density and overall body composition scores were found significantly different in between the sexes, also all health parameters were found lower in female group than their male counterparts. Data has also been analyses in relation to age, occupation and economic status. Conclusion- Thus the study suggests a population shift towards fattiness and obesity as a whole. The study further indicated that female group suffers poorer body composition in totality in comparison to males. It is also clear that BIA technology is very simple, non invasive and convenient tool for the assessment body composition in health, fitness and disease.

**CMN-O-63**

**ROOM FOR HEALTHY AGING IN A HOME -- A QUALITATIVE INVESTIGATION INTO QUALITY OF LIFE, DIET & NUTRITIONAL STATUS; PERCEPTION EFFECTING PRACTICES AMONG GERIATRIC POPULATION OF WEST BENGAL, INDIA.**

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**Background**

Increasing number of ageing (chronological cut off of 60-65 age) population ( 8% of 2015 to a projected growth of 19% in 2050) is an important achievement of public health policies but also raise new window of concern about healthy aging and quality of life among elderly population esp among middle and lower income countries. The study aims to understand different domains of healthy ageing in geriatric population living in household. Material and methods-- The study is qualitative in nature. Household survey consist of in-depth interviews (156 geriatric person , age 60 and above - home dwellers) and focus group studies ( 6 groups- 28 participants ) was conducted using a pre-tested structured questionnaire ( close ended and open ended ) from two district ( one southern and one northern district) of west Bengal. Purposive random sampling and snowball technique was used. Results -- The study has investigated following WHOQOL criteria and the following construct has been identified among ageing population- general health status, quality of life, physical activity level, 24-hour dietary recall, psychological status, nutritional status, perception of health and nutrition, adjustment with changes in food environment, policy changes to suit their need. The calorie consumption and inclusion of food groups (compared with basic five food group by ICMR) were vastly affected with socio-cultural and psychological status. Meals per day and calorie consumption , food diversity was correlated with less of dear one, media influence, desire to live, perception regarding changing food availability over physical inabilities. Conclusion -- The study helps indentifying complex interplay of perception regarding health and nutrition on health and nutritional status and quality of life among this age group. It also points necessity of modifying policy needs to data specific to our population.
INTRODUCTION- stress is a physiological reaction occurring due to imbalance between the level of demand placed upon and the capability to meet those demands. Stress has an immense influence on eating behaviours, eating pattern and food choices which affect both physical and psychological health of the individual. OBJECTIVES- To assess and compare the level of stress and its influence on the dietary habits, nutrient intake and nutritional status among employed and unemployed women. METHODOLOGY- Educated married women, 400 employed (EW) and 272 unemployed women (UEW); aged 25 to 40 years participated. Information regarding their demographic profile, food behaviour was elicited using Self-reporting standardized questionnaires. 24 hr dietary recall method, food frequency questionnaires were used to assess the dietary intakes. Depression, Anxiety, Stress Scale was used to assess the stress levels. Height and weight were measured. RESULTS- Mild to moderate forms of stress was experienced by 63% EW and 67% UEW. Meal routine, Food Behavior and fast food consumption pattern were essentially similar among the women. Skipping meals was significantly higher among EW than their counterparts (P<0.0001). Comparisons on the basis of stress revealed markedly higher percentage of EW and UEW with stress skipped meals at higher frequency as compared to those without stress (P<0.0001). EW with stress consumed higher quantities of energy, protein and fat as compared to those without stress. Conversely, unemployed women with stress consumed lower quantities (P=0.006). A wide coefficient of variation in protein intake was noted between the groups. Body Mass Index did not exhibit major difference among women with and without stress. Mean BMI of all women varied between 23.6&24.9Kg/m2 suggesting them to be overweight. CONCLUSION- Stress markedly influenced food Behaviour and nutrient intakes among women with and without stress in both employed and unemployed group.

SUSTAINABILITY OF COMMUNITY BASED INTERVENTIONS FOR ANEMIA CONTROL AMONG ADOLESCENT GIRLS IN URBAN SLUMS OF PUNE CITY

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Background- Government initiatives to control anaemia through the national anemia prophylaxis programme dates back to 1970 with modest results. Sustainability of short and long term interventions is essential to address this unrelenting issue. However, sustainability of interventions to control Iron deficiency anaemia (IDA intervention) is less explored. Objective- Integrated intervention to control IDA through NGOs was performed during 2014-2016. The present study aims 1) To study the components of interventions for anaemia control that are continued through different organizations 2) To determine the factors associated with sustenance 3) To assess the nutritional status of adolescent girls in different centers at varying levels of sustainability of programs. Methods- i) Study design- Descriptive follow up study ii) Setting- Urban slums of Pune city through NGOs. iii) Sampling- Simple random sampling iv) Sample- 182 adolescent girls from four different organizations. v) Tools and techniques- Two different questionnaires one for the health workers to elicit information about factors that affected the continuation of the program and the other for the adolescent girls to assess knowledge of anaemia, intake of iron supplements and deworming medicines, haemoglobin screening and participation in the mid-day meal program. Nutritional status and anaemia assessed by anthropometry and haemoglobin levels were compared between centres of varying levels of performance. Factors contributing to continuation of activities was studied. Descriptive statistics and Chi 2was used to study associations. Results- Of the five interventions surveyed, nutrition education was the only intervention sustained in all four centres. Screening for haemoglobin levels reflected in only one of the four centres. Availability of resources, such as of manpower, trained, availability of funds and motivation of health workers emerged as major factors contributing to sustainability. Conclusion- Investing in resources is critical in sustainability of public health interventions.
CMN-O-66

CLUSTER OF RISK BEHAVIOURS FOR NON-COMMUNICABLE DISEASES AMONG COLLEGE STUDENTS

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Cluster of risk behaviours for non-communicable diseases among college students Priyanka Pareek1 and Rita Abbi2. 1. Assistant Professor, MGM School of Biomedical Sciences, MGMUH, Navi Mumbai. 2. Professor, Biostatistics MGMUH, Navi Mumbai. Corresponding address- Priyanka Pareek Assistant Professor, MGM School of Biomedical Sciences, MGMUH, Kamothe, Navi Mumbai. E mail- priyankafn1681@yahoo.com

Introduction- India is in the epidemiological health transition state where urbanization led to economic improvement with consequences of increased food consumption, tobacco-use and reduced physical activity. These modifiable behaviours, such as tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol, all increase the risk of non-communicable diseases (NCDs). NCDs are the leading cause of death in India. Mostly NCDs occur during later ages of life, but many of precursors are present during childhood and adolescence. Therefore, more concern should be given to behaviours, acquired during the childhood, and adolescence. Objective- The purpose of this paper is to assess the prevalence of risk behaviours among college students 18-28 years. Methodology- Risk behaviours were measured by clustering smoking, alcohol and physical inactivity. Study participants were interviewed for socio-demographic profile, height, weight, blood pressure, non-communicable diseases namely heart disease and diabetes, with the help of questionnaire. The questionnaire was validated and reliability of data was measured. Using SPSS version 24.0, descriptive analysis was performed. The logistic regression models were constructed to predict risk behaviours, by controlling the socio-demographic variable. Results- In the study 4935 students surveyed consisting of 55% male and 49% female. Overall 22% subjects were overweight followed by 4.7% obese students. The odds ratio revealed that chances of NCD were higher among alcohol, tobacco users, and physically inactive participants. Conclusion- There is strong association between risk behaviour clusters and NCDs. Prevalence of heart disease is many fold higher in the students who consume alcohol followed by physically inactiveness and tobacco consumption respectively. Similar picture is seen in case of diabetes. Keywords- Non communicable diseases, cluster, risk behaviour, blood pressure, physical inactivity

CMN-O-68

NUTRITIONAL KNOWLEDGE ATTITUDE AND PRACTICE AND BODY COMPOSITION- A COMPARATIVE STUDY AMONG THE STUDENTS STUDYING IN NUTRITION AND NON NUTRITION CURRICULUM IN UNIVERSITY OF CALCUTTA

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Introduction - The current study attempt to find out the determinants that predict healthy lifestyle behavior and practices .Objective of the current study is to compare KAP (Knowledge Attitude Practice ) and body composition values between of nutrition and non nutrition departments of University of Calcutta. Method - Two colleges under University of Calcutta having nutrition as a course curriculum was randomly selected. A total 100 female undergraduate students ( aged 18-22 years ), 50 each from nutrition and non nutrition departments were selected as study participants. Data was collected using a standardized KAP questionnaire , body composition was detected using Bio electrical Impedance Analysis method and Food Frequency questionnaire was used to collect diet related data. Independent sample t test, one way ANOVA were used for comparison and chi-square test and Multiple Linear Regression test were used to test the strength of association between different variables in SPSS version 16. Results - Students from nutrition department had higher mean scores for Knowledge Attitude Practice. ANOVA results showed that difference in knowledge score was statistically significant (p<0.00 at 95% confidence level). The prevalence of overweight was 37% and 44% in nutrition and non nutrition department respectively. The data also revealed that BMI and WHR value were significantly associated with junk food consumption. Multiple Linear Regression model revealed that BMI was positively correlated with weekly biriyani consumption. Discussion - The above results revealed that students from nutrition department had higher KAP score and lesser percent body fat value than their counterparts. This result can conclude that knowledge regarding nutrition may predict healthy eating behavior and body composition measurement. So it may be suggested that a better practical oriented nutrition based learning should be emphasized for college students irrespective of their subject discipline.
CMN-O-69

POST-PARTUM HEALTH- A NARRATIVE REVIEW

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Background: Maternal health is the major concern in developing countries, though maternal mortality has declined by around two thirds in Eastern Asia, Northern Africa and Southern Asia, but in developing countries; it is still 14 times higher compared to developed nations. There are various factors associated with poor maternal health which includes, socioeconomic status of women, maternal nutritional intake and dietary parameters, past history of illness and geographical location where she resides. The Objective behind conducting this narrative review is to explore the nutritional programs and policies for post-partum care and attitude of post-partum women towards health care. Methods: Search engines such as PubMed, WHO library, SCOPE and google scholar were used. Total 25 articles were reviewed with diverse methodologies. Qualitative and Quantitative studies both were included. Results: There are many ongoing programs to take care of women in post-partum, one of which is mamta abhiyan; approach to strengthen comprehensive outreach of RCH Services. However, Studies have reported poor utilization of post-partum services with possible reasons such as poor awareness, poor motivation and carelessness of individuals for the poor coverage of women with post-partum health check-up. There are studies which have also reported early discharge of women soon after delivery before 48 hours. Some studies also found the protective effect of nutrients in post-partum stage, such as calcium and iron. However, supplementation of calcium is provided just till 6 months during lactation and not for the period of 12 months, such practices may give rise to the micro nutrient deficiencies among women in future. Conclusion: Many studies have found that Post-partum care is most ignored part of Health and Nutrition. There is need to study the outcomes of the researches and design a better program and policies which focuses Post-partum women separately.

CMN-O-70

DIABETES MANAGEMENT IN ELDERLY RESIDING IN OLD AGE HOMES -IN & AROUND MYSORE CITY.

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Background: Elderly with Diabetes in Old Age Homes (OAH) are at risk of adverse events due to their reduced ability to self-manage their condition, adverse medication effects, the family ability to take responsibility or OAH services sub optimal approaches to diabetes care. Aim: To analyse the FBS, PPBS and BMI of the elderly residing in OAH in and around Mysore City. Materials and Methods: A written consent was taken from each elderly. The FBS and PPBS was analysed in elderly residing in OAH. Also BMI of the elderly was calculated. Results: Among 120 elderly residing in OAH, 92 were found to be diabetic with RBS and for this 92 elderly FBS and PPBS were determined which was >140mg/dl, 46% were male and 54% were female. Mean age was 74Â±8 years. Out of 92 subjects, 13% were having Diabetes Mellitus (DM), 77% had both DM and Hypertension (HTN) and 9.7% had DM, CHD. Among 92 elderly, 72% with Diabetes, HTN and CHD had other health issues such as osteoporosis, arthritis and gastritis. BMI of 27% were fallen under normal, 42.3% were overweight and 25% were obese. Conclusions: In the study it was found that along with diabetes, management of HTN and weight was poor. Lack of Nutrition care and health care by OAH management may be one of the major causative factors for the poor diabetes and other comorbid conditions in the elderly. It was advised to increase the physical activity, regular health check-up and modifications in the menu as per their physiological status for the better and healthy living condition.

CMN-O-71

NUTRITIONAL DEFICIENCY STATUS AMONG SELECTED SCHOOL CHILDREN FROM MYSORE

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Background: Nutritionally insecure children suffer with various kinds of nutritional deprivations which manifest into visible signs and symptoms of deficiencies. They may also suffer with frequent infections on account of compromised immunity status. Methods: The study was planned to target schoolchildren from urban (n=434) and rural (n=416) area of Mysore. All children were physically examined for different nutritional deficiency manifestation and presence of morbidities. Results: The results of the study revealed that 76% of children exhibited one or other form of nutritional deficiencies and around 24% were found normal. Discoloration of hair (40%), vitamin A deficiency (52%), reddening of tongue (39%) and phrynoderma (49%) were observed. The morbidity status of children recorded during the time of study showed prevalence of various kinds of infections in children. The largest occurrence was that of cold with an incidence of 34.2% followed with cough at 26.0%. There were few children with fever. Skin infections were also
very common with 9.6% of children skin problems. Around 52.1% of children did not report any kind of sickness. A small number were also seen with diarrhoea and vomiting. Conclusion- The extent of nutritional deficiencies status was higher than incidence of infections indicating a need to improve the quality dietary intake of children.

CMN-O-72

USE OF FOOD CONTACT PACKAGING MATERIAL- A SITUATIONAL ANALYSIS IN DELHI NCR

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Background- Eating healthy is important but also essential that food be prepared and stored in the right manner; heated, reheated and served in appropriate containers. Malpractices related to these can result in long-term consequences which may currently not seem important. Studies suggest association between exposure to chemicals and development of cancer, respiratory and cardiovascular diseases. With increasing popularity of processed and packaged foods, migration of chemical constituents from packaging material to food has become a reality. Therefore, it is imperative to examine use of different packaging materials, and consumer behaviours relating to their use. Method- Descriptive cross-sectional study to evaluate knowledge, attitude and practices (KAP) regarding usage of food contact material among working adults. The sample comprised 105 adults (21-35 years), working in offices in Delhi NCR. Pretested questionnaire was used to obtain information on socio-demographic profile, health, lifestyle, dietary behaviour, choice of packaging material, frequency of consumption of packaged and processed foods. Subjects' knowledge, attitude and practices were assessed and factors influencing their choices were identified. Gaps in KAP were assessed. Data was analysed using Stata version 12.0. Results- Most subjects (58.1%) checked the symbols on food containers while purchasing; most frequently checked symbol was “microwave safe.” Plastic was preferred material for storing water (61%); >40% subjects reused one-time use bottles. Glass containers/bowls were used in microwave by 45.7%. While ordering from outside, food was received in a plastic container by most (69.5%) and 20% heated it in the container it was received in. Food in the office canteen, etc. was mostly served in disposable plastic (28.9%) and 27.8% reported that it was reheated in the same container. Steel utensils were preferred by 64.4% subjects for serving children in the house due to better safety. Various changes made in the past 5 years by the participants included shift from plastic to glass utensils, reduction in use of disposable plastic and use of heat safe materials. Over 50% subjects had fair knowledge regarding use of food contact materials, 71.4% had a good attitude towards the same and 66.7% were engaged in good/safe practices. Total KAP score indicated that 62% had overall good knowledge, attitude and practices. Strongest positive relationship was found between attitude and practices. Greater proportion of subjects in higher household income groups had good attitude and better practices while those in higher age category had better practices. Conclusion- The current practices among the young adults demonstrate a need for increasing awareness regarding the best practices for use of food contact materials. There is also a need for further research on the food contact materials being used at home, workplace, restaurants and effects of heating and cooking procedures on these.

CMN-O-73

HUMAN SECURITY- FOOD SECURITY IN THE LIGHT OF CLIMATE EMERGENCY

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Climate Emergency (also known as Climate Change) has already begun to show its ugly effects through a number of floods, landslides, record number of heat waves, forest fires, irregular rainfall patterns, storms of increased density and the extinction of a record number of animal and insect species each year. Many of these effects will directly affect agriculture and food production. It will be necessary to improve the efficiency of agriculture to feed an increasing global population of (estimated) 10 billion by 2050. However, with 800 million people starving today, a number that may reach 1 billion if we do not act on Climate Emergency, food security must become the priority. With the ill-effects of the green revolution now coming to light, it is becoming increasingly clear that we need to find alternatives, turn back to our traditional practices, and explore lesser-known options that are sustainable and effective in ensuring that people have the right to food with minimal dependence on derivatives of fossil fuels.
ASSESSMENT OF NUTRITIONAL STATUS AND DIETARY INTAKE OF PULMONARY TUBERCULOSIS PATIENTS OF DHARWAD, NORTH KARNATAKA

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Tuberculosis (TB) is one of the most widely spread infection in the world. India has a major share of the global incidence of TB and TB related mortality. An investigation was carried out with an objective to assess the nutritional status and dietary intake of TB patients of Dharwad. About 105 voluntary patients visiting the DOTS centres were enrolled in the study. The sample comprised of 77.7% males (n=74) and 32.25% females (n=31) including children. Anthropometry (BMI, MUAC and WHR), food frequency and 24 hr dietary recall methods were used to achieve the objective. The results revealed that more than half (63.09%) the patients were undernourished with varying degrees of thinness (WHO classification) and had lower MUAC values. Mean weights (kg) of both men and women (47.41 ±7.91 vs. 44.52±5.89) were less than the ideal weights given by ICMR. According to IAP classification majority of the children belonged to different grades of malnutrition with very few having normal BMI (12.5%). The MUAC values presented that 62.5% of children were moderately malnourished. The per cent adequacies and mean intake of all the nutrients were found to be lower than that given by ICMR among both adults and children and were negatively correlated with BMI. Majority of the subjects had low socioeconomic status (SES) with 72.39% having monthly income less than 10K. Consumption of food was significantly associated with SES. Poor dietary knowledge, vices (smoking, alcoholism) and side effects of medicines were the other factors associated with undernutrition. In general, this study clearly revealed that majority of the patients are in poor nutritional status. Tuberculosis and malnutrition being bidirectional can worsen the pre-existing undernutrition by decreasing appetite and increased catabolism. Hence strategies with nutrition support, proper treatment along with education intervention, mainly targeting the poor is necessary to reduce period of convalescence and break the vicious cycle of TB.

UNDERNUTRITION AMONGST CHILDREN- HOW WELL DO MOTHERS KNOW?

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Abstract title- Under nutrition amongst children- How well do mothers know? Introduction- Increasing awareness amongst mothers regarding undernutrition, its causes and consequences along with teaching them correct practices to be followed can go a long way in reducing and preventing undernutrition amongst children under 5 years of age. Methods- Thus, the present study was planned to assess the knowledge, attitudes and practices (KAP) of mothers of children under 5 yearsâ€™ children regarding breastfeeding, complementary feeding, sanitation and hygiene, immunization, diarrhoea management. The study was conducted in 5 anganwadis under one randomly chosen UHC in the western zone of Vadodara. Anthropometric assessment of children (height, weight and MUAC) was done and data on KAP of mothers was obtained. Results- Mean age of the subjects was 30 months and mean weight and height were 10 kg and 84 cm respectively. Prevalence of underweight, stunting and wasting was found to be 73%, 66% and 57.2% respectively. Majority of the women knew about benefits of early initiation of breast feeding (73.8%), excluding other factors associated with undernutrition. In general, this study clearly revealed that majority of the patients are in poor nutritional status. Tuberculosis and malnutrition being bidirectional can worsen the pre-existing undernutrition by decreasing appetite and increased catabolism. Hence strategies with nutrition support, proper treatment along with education intervention, mainly targeting the poor is necessary to reduce period of convalescence and break the vicious cycle of TB.

CONSUMPTION OF INDIAN SWEETS, OTHER SWEETS, SUGAR SWEETENED BEVERAGES, AND ITS ASSOCIATION WITH ADIPOSY AND BLOOD PRESSURE IN URBAN INDIAN WOMEN BELONGING TO LOW AND LOWER MIDDLE INCOME GROUP

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Background- Sweets are an integral part of Indian diet. Over the years, intake of sweets as well as sugar sweetened beverages has increased in India. Its association with various health conditions has been well documented. Material and methods- Women residing in the city of Mumbai aged 20-45 years belonging to low and lower middle income group (N=1500) were recruited in the present study. Consumption of sweets and sugar sweetened beverages was studied using Food Frequency Questionnaire (FFQ). Sweets were further categorized as traditional Indian sweets and other sweets. Height, weight, Waist circumference (WC), Hip circumference (HC), skinfold, systolic blood pressure (SBP) and diastolic blood pressure (DBP) measurements were taken. Body Mass Index (BMI), Waist to Hip Ratio (WHR) and Body fat percentage (BF%) were calculated. Result- Significant positive association was observed between measures of overall obesity (BMI and BF%) and total servings of sweets, traditional Indian sweets, other sweets and total sugar sweetened beverages. Similar associations were observed for measures of central obesity (WC and HC). Positive association between Blood pressure (SBP and DBP) and servings of sweets, traditional Indian sweets, other sweets and total sugar sweetened beverages was observed but it was not significant. Intake of total sweets and total sugar sweetened beverages was increased with increasing categories of age, BMI and blood pressure. Conclusion- Consumption of sweets and sugar sweetened beverages was associated with central obesity, overall obesity and blood pressure in the present study which increases the risk of chronic degenerative diseases. Limiting consumption of sweets as well as sugar sweetened beverages may help in controlling obesity and risk of chronic degenerative diseases.

CMN-O-78
Assessment of food handling hygiene practices among NGOs of Faridabad- Food Waste Management Study

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Background- Food waste management is a process through which wastage of food items can be prevented. The methods through which waste can be managed include source reduction and reuse, animal feeding, recycling, composting, fermentation etc. Various kinds of initiatives are started by the organizations to reduce the food wastage. Similarly, an initiative named Food Safety and Standards Authority of India (FSSAI) was started by the Food Safety and Standards Authority of India (FSSAI). The initiative aims to bridge the gap between the food companies, surplus food distribution agencies and beneficiaries. To collect the information on distribution of food from different NGOs and to assess the hygienic condition while distribution. Material and Methods- Qualitative questionnaire was developed. The questionnaire was focused on hygiene and sanitation, food portion size, time of distribution, quality of the food, responsibilities of the distributors etc. For this 4 NGOs were approached in Faridabad. The data was analyzed by SPSS21 VERSION. Result- The study revealed that maximum numbers of food handlers from different NGOs were following the guidelines of hygiene and food handling practices while distributing the food. Conclusion- The study concluded that the NGOs were following proper protocols and has become a major solution for food waste management.

CMN-O-79
INCREASING CONSUMPTION PATTERN OF CONVENIENCE FOOD

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Women play a vital role in today’s world. They are the epitome of love, sacrifice and courage. Now a day’s their role have changed significantly. From housewives to the working women, the transition can be seen at a rapid rate. They can manage the house; can take care of their family as well as workplace. They are considered as successful multitaskers. But at the same time, women are exposed to various health related problems whether they are working or non-working like anxiety, fatigue, depression, unhealthy eating patterns and are exposed to many biological and chemical hazards which leads to deterioration of their health. Due to fast life and dual role now-a-days consumption pattern from raw food is drifting towards convenience foods which is also known as tertiary processed food which are commercially prepared and have prolonged shelf life. These food are preferred by both the working and non-working women because it saves cooking time and also have longer shelf life as compared to raw food. Many studies have also shown and has been able to group consumers into segments based on their lifestyles patterns and attitudes towards consumption.
pattern of raw foods and convenience foods. Existing research will focus mainly on convenience foods as a food category and exploring the relationship and factors affecting perceived resources and fresh fruit and vegetables consumption as compared to convenience foods among working and non-working women. KEYWORDS: Working Women, Non-working Women, Convenience Food, Consumption Pattern, Health,

CMN-O-80
SCREENING THE BIOACTIVE POTENTIALS OF ETHANOLIC EXTRACTS OF ROASTED SOY BEAN (GLYCINE MAX. L)

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Identifying the active ingredient through serendipitous discovery from traditional food / food ingredients have long been under immense progress all because of popularity over the use of natural remedies. The process of drug discovery involves with the identification of active compounds, synthesis, characterization, screening, and assays for therapeutic efficacy. The present study aimed to study the radical scavenging activity and anti cancer activity. Antioxidant activity of ethanolic extracts of roasted soybean (Glycine max. L) was determined by DPPH-radical scavenging assay and The results of the antioxidant study revealed that the selected plant has effective 1,1-diphenyl-2-picrylhydrazyl (DPPH), hydroxyl (OH). The study was undertaken to investigate for their potential activity against human bacterial pathogens using agar well diffusion method. The activity of ethanolic extract of roasted soybean was evaluated against four bacterial pathogens including Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa, and E.coli with selected erythromycin antibiotic. According to the obtained results it has been possible to observe antimicrobial properties of the extract related with their composition in phenolic compounds. Ethanolic extract was evaluated for their in vitro anticancer activity. The results obtained indicate that G. max. L has potent cytotoxic activity toward the selected lung cancer cell line using MTT assay. Further studies are needed to explore the novel anticancer bioactive component present in the extract Keywords- Soybean extract, antibacterial activity, anticancer activity

CMN-O-81
PREDICTORS OF NUTRITIONAL STATUS IN INFANTS- BINARY LOGISTIC REGRESSION

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Background- Breastfeeding provides protection against infectious illness and advises protection which is lifesaving amongst the underprivileged population of infants. Due to this reason promotion of breastfeeding is a crucial part in development of infantâ€™s health program all over the world. To gain the optimal understanding of the underlying mechanical relationship between infection and breastfeeding, it is apparent that this relationship is affected by not only if the infant is breastfed but also how the child is fed. The purpose of the paper is two folds, firstly to predict the nutritional status of infants through duration of breastfeeding. Secondly the correlation between the nutritional status of infants having diarrhea or not based on duration of breastfeeding. Material & Methods- Data from National Family and Health Survey (NFHS)-4, which consist of all the states and union territories of India has been used in this paper. Age of infants was bifurcated in 5 groups. Height and weight variables of children were used to find the nutritional status of children, status of diarrhea of infants. Using SPSS version 24 the data was analyzed. Logistic regression was used to predict the nutrition status of infants by duration of breastfeeding. Result- In this paper the sample of 45,658 infants were considered. The duration of breastfeeding practices was divided into two categories namely, immediately breastfed and within 24 hours breastfed. The results revealed that about 52.3% were male and 47.7% were female infants. Prevalence of diarrhea was higher among the infants whose duration of breastfeeding was 24 hours (15%) as compared to immediately breastfed (11%). The significance predictors for nutritional status were duration of breastfeeding and gender. Conclusion- There was highly significant association between duration of breastfeeding and nutritional status of infants.
EXN-O-01

EFFECTS OF TENDER COCONUT WATER ON CARBOHYDRATE METABOLISM IN FRUCTOSE INDUCED EXPERIMENTAL HYPERTENSION

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Background: Glucose intolerance and insulin resistance are reported to play a key role in the pathogenesis of hypertension. Hepatic metabolism of fructose leads to alterations in the activities of key enzymes of glucose metabolism, stress sensitive pathways, insulin signaling and AGEs. The tender coconut water (TCW) presents a series of nutritional and therapeutic properties which contains several biologically active components which can regulate the carbohydrate metabolism positively. Moreover treatment with tender coconut water seems to be more natural, less expensive and without any side effects. In this context the effects of TCW on carbohydrate metabolism in fructose fed hypertensive rats is studied. Material and Methods- Male albino rats (Sprague Dawley strain) weighing 160- 180g, were used for the study. The experimental groups were Group 1 Control rats, Group 2 Control rats + TCW(4 ml/100g body weight),Group 3 High fructose fed (hypertensive) rats, Group 4 High fructose fed (hypertensive) rats + TCW for 5 weeks. Homeostatic Model Assessment Score (HOMA), activities of enzymes of glucose metabolism in liver namely Hexokinase, Phosphoglucomutase, Pyruvate kinase, glycogen phosphorylase, glucose-6-phosphatase and fructose 1, 6 bis phosphatase, glycogen and protein bound sugars namely hexosamine, sialic acid were estimated. Result- Tender coconut water administration significantly increased the enzyme activities of Hexokinase, Phosphoglucomutase, Pyruvate Kinase, glycogen phosphorylase, glucose-6-phosphatase and fructose 1, 6 bis phosphatase (7.89± 0.44, 2.94±0.18, 0.30±0.03, 4.72±0.38, 4.50± 0.50, 6.28±0.48 and 11.54±0.43) compared to fructose fed group. Conclusion- TCW treatment was found to be effective in improving insulin sensitivity and metabolic alterations of carbohydrate associated with consumption of high fructose diet which may be due to increased utilization of glucose in the liver for glycogen synthesis, decreased degradation of glycogen and also due to decreased gluconeogenesis.

EXN-O-02

THE HAPPINESS PROJECT OF FOOD AND ITS MAGIC ON LOVE

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Food is an essential part of human race. Human beings associates food with their emotional well being. Mood and behavioral patterns differ according to the intake of food. Food has a remarkable impact on the well being and mental health. It is often said by age old people that the food cooked by a women often attracts a man, and thus leads a way to his heart. The magic of love is also depended on food items. Often the food ingested by the people in love comprises of ice creams and coffee. They all affect the way the people in love responds. The components of food has a great role in the psychological and hormonal stimulation. A refreshing drink such as lime water indeed refreshes the person. Thus the food and love are inextricably tied. The purpose and objective of the study is to emphasis the inevitable connection between food and the state of mind.

EXN-O-03

IN VITRO PHYTOCHEMICALS SCREENING AND ANTIOXIDANT ACTIVITIES OF PEEL AND PULP EXTRACTS OF DOCYNA INDICA L. (WILD APPLE)

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Background- Docynia indica L. also known as wild apple is a wild edible plant consumed in North-eastern part of India. The pharmacological properties of this fruit are not explored widely therefore the present study was aimed to screen the phytochemicals present and to assess the antioxidant activities of peel and pulp extracts of wild apple. Material & Methods- Preliminary phytochemical screening was carried out in ethanolic peel and pulp extracts of wild apple using standard methods. The antioxidant activities were determined using DPPH (2, 2-diphenyl-1-picrylhydrazyl) assay and Fe3+ reducing assay. Ascorbic acid was used as standard for the antioxidant assays. Differences between concentrations were determined using one-way ANOVA test. Result- Phytochemicals such as alkaloids, phenolic compounds, flavonoids, glycosides, saponins, tannins, quinones were present both in ethanolic peel and pulp extract wild apple whereas terpenoids was present only in pulp extract and cardiac glycosides was present only
in peel extract. The DPPH radical scavenging activity was higher in peel extract than pulp extract of wild apple. The IC50 value of peel extract was found to be lower (23.76±3.38 μg/mL) than pulp extract (162.70±11.22 μg/mL) there by indicating that peel extract exhibited greater radical scavenging activity. The IC50 of standard ascorbic acid was found to be 2.89±0.16 μg/mL. Similarly the result of Fe3+ assay indicated that peel extract of wild apple possessed stronger ferric reducing assay power (0.64±0.02 μg/mL) than pulp extract (0.51±0.00 μg/mL). Conclusion- The results obtained indicated that both peel as well as pulp extracts of wild apple have the potential to be as a source of natural antioxidants. In addition, results of the present study significantly highlight the use of wild apple fruit peels as a pharmaceutical agent.

EXN-O-04

IN VITRO ANTIOXIDANT AND ANTIBACTERIAL POTENTIAL OF BORASSUS FLABELLIFER SEED

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Background- The palmyra seed (Borassus flabellifer), commonly known as nungu in Tamil is a widely consumed summer fruit in Tamil Nadu. The seed coat is peeled off and discarded while the tender seed is consumed. High phenols and flavonoids in the seed coat contribute to the therapeutic properties of the fruit. Hence this study focused on evaluating the in vitro antioxidant and antibacterial activity of both palmyra seed and seed coat extract. Materials and Methods- The in vitro antioxidant activity of ethanolic seed and seed coat extracts were evaluated by DPPH radical scavenging activity and phosphomolybdenum reduction assay. Well diffusion assay method was employed to study the in vitro antibacterial activity against gram positive bacteria such as Bacillus subtilis and Micrococcus luteus and gram-negative bacteria namely Escherichia coli and Proteus vulgaricus by measuring the zone of inhibition. Results- The DPPH assay exhibited IC50 values of 60.88±1.05 % at 60 µg/mL concentration and 77.62 ± 0.93% at 80 µg/mL concentration for seed coat extract and seed extract. Similarly, phosphomolybdenum reduction assay for seed and seed coat extract revealed an IC 50 value of 18.17±0.68 % at 20 µg/mL concentration and 37.75 ± 0.59 % at 20 µg/mL concentration respectively. The antibacterial activity of seed extract showed maximum zone of inhibition of 12 mm at 200 µg/mL for both Bacillus subtilis and Micrococcus luteus. Whereas, the maximum zone of inhibition expressed by the seed coat extract for Bacillus subtilis and Micrococcus luteus was 18 mm at 200 µg/mL. Conclusion- Results revealed significant antioxidant and antibacterial activity in the seed coat in comparison with the seed extract. Thus, it can be concluded that the palmyra seed coat could serve as a natural antioxidant and antibacterial agent.

EXN-O-05

ANTIOXIDANT POTENTIAL OF COMMONLY CONSUMED PLANT FOODS AS AFFECTED BY THERMAL PROCESSING

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Background- Phytochemicals are secondary plant metabolites responsible for color, smell, flavour and wide variety of different molecules such as carotenoids, polyphenols and vitamins. These naturally occurring compounds have attracted great attention from the researchers due to their antioxidant potential and health benefitting mechanisms. The present research was conducted with the objective to assess the effect of thermal treatments i.e. Open pan and Pressure cooking on the phenolic, flavonoid content and antioxidant activity of some commonly consumed foods of North India. Material & Methods- A total of 22 commonly consumed plants foods from cereals and pulses, leafy vegetables, roots and tubers and other vegetables were procured from the local market of Ludhiana, Punjab. All the samples were thoroughly cleaned by removing inedible portions and furthermore, cooked with two common methods i.e. Open pan cooking and pressure cooking. After that, methanolic extraction was done and changes in Total Phenolic Content (TPC), Total Flavonoid Content (TFC), Total Antioxidant Capacity (TAC) by Ferric Reducing Power Assay (FRAP) and DPPH Radical Scavenging Activity were analyzed. Result- The results revealed that the phenolic content in cereals and pulses declined after pressure cooking when compared to open pan cooking, while the flavonoid content increased in pressure cooked pulses. Pressure cooked leafy vegetables showed higher phenols and flavonoids than open cooked ones. Among other vegetables and roots and tubers, pressure cooked bottle gourd, carrot and turnip showed lower values for phenols. All pressure cooked cereals and pulses had lower values of TAC by FRAP, on contrary to higher values by DPPH activity except maize and cowpea. Pressure cooking of colocassia and radish resulted in more retention of TAC as compared to the open-pan cooked ones. Conclusion- The final effect of cooking on various phytochemicals depends on the processing methods, the structure of food matrix, and the chemical nature of the natural compounds present in the foods. It can be concluded that, cooking lead to reduction in the antioxidant potential of most plant foods. However, pressure cooking resulted in more retention of bioactive components and antioxidant activity in case of cereals, pulses and green leafy vegetables when compared to the open pan cooking method.
EXN-O-06

BENEFICIAL EFFECT OF VITAMIN K ON LOWERING HYPERLIPIDEMIA-INDUCED INFLAMMATORY PATHOPHYSIOLOGY VIA DOWN-REGULATING MCP-1/ICAM-1/CCR2/CD11A PATHWAY OF MONOCYTE-HEPATOCYTE ADHESION

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Background- Vitamin K (VK), a well-known antihemorrhagic vitamin is gaining attention due to its role in various hemostasis-unrelated health disorders. This study examines the hypothesis that VK deficiency may be associated with hyperlipidemia induced inflammation and VK supplementation might reduce the hepatic inflammation via activating VK-dependent Gla proteins. Methods- Subjects with hyperlipidemia (n=28) and age-matched healthy controls (n=19) attending clinic at CSIR-NEIST have been included in this study. The plasma levels of triglyceride, total cholesterol, VK1, and ICAM-1 were measured in all subjects. Moreover, by using palmitic acid (PA, 0.75 mM)-treated and GGCX silenced monocytes and hepatocytes, this study examined the effect of VK1 on preventing the PA-induced hepatic injury. Biochemical assays, immunoblotting, ELISA, and fluorescence staining were performed for conducting this study. Data were analyzed statistically by using Sigma Stat statistical software. Results- Circulating VK1 was found to be lower in subjects with hyperlipidemia. Interestingly, VK1 showed a significant negative correlation with plasma lipid levels and ICAM-1 in hyperlipidemic subjects, which suggests that VK1 supplementation might play an important role in management of hyperlipidemia induced inflammation. Further cell culture studies demonstrated that VK1 supplementation (10 nM) reduced the intrahepatic lipid accumulation and expression levels of MCP-1 and ICAM-1 in PA-treated hepatocytes. Moreover, VK1 also reduced the expression of CCR2 and CD11A by monocytes under high PA-exposure resulting in inhibition of monocyte-hepatocyte adhesion and ALT leakage leading to prevention of PA-induced hepatic injury. GGCX silencing demonstrated that the beneficial role of VK1 is mediated via VK dependent Gla proteins. Conclusion- This study for the first time demonstrates the beneficial effect of VK supplementation in preventing hyperlipidemia associated hepatic inflammation. The outcome of the study will be helpful for the development of a novel adjuvant therapy for better management of hyperlipidemia thus improving the lives of the hyperlipidemic patient population.

EXN-O-07

EFFICACY TRIALS OF SORGHUM BASED COMPOSITE FLOUR MIX ON THE BLOOD GLUCOSE LEVELS OF EXPERIMENTAL INDUCED HYPERGLYCEMIC RATS

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Diabetes is a global health disorder affecting millions of people worldwide with the largest number of diabetic adults in India ranging around 61.3 million people. Use of indigenous foods has been advocated to reduce the incidence of chronic, diet related non-communicable diseases such as diabetes, obesity and CVD. In the present study an approach was made to develop and assess the functional efficacy of sorghum based composite flour mix for a period of 15 days on blood glucose level of alloxan induced diabetes rats. The hyperglycaemic effect was assessed after diabetes was induced with single intraperitoneal administration of alloxan monohydrate (160 mg/kg) with 4% saline solution (an average of 0.90 mL per specimen) after an overnight fast and the rats were fed with the composite flour mix. For the present study the experimental rats were divided into seven groups, namely Group A(control), Group B(diabetic control), Group C(diabetic control along with metformin), Group D (80% SBCFM1), Group E(70% SBCFM2), Group F(60% SBCFM3) and Group G(50% SBCFM4). Out of all the seven groups Group A showed no significant improvement in the blood sugar level at the end of the supplementation period. Group B showed significant increase in the blood glucose level while Group C showed significant decrease in the blood glucose level along with Groups D, E, F and G fed with Sorghum based composite flour mix showed significant decrease in the blood sugar level. Thus it can be concluded that the blood glucose lowering effect of sorghum based composite flour may be due to the insitu composition of the composite flour mix which are potential sources of dietary fibres like cellulose, lignin, phytonutrients including tannins, phenolic acids, anthocyanins, phytosterols, polyphenols, and policosanols. The effects of feed 80% SBCFM1 was significantly higher in comparison with the other formulations for lowering the blood glucose level.

EXN-O-08

ANTIOXIDANT AND ANTICARCINOGENIC ACTIVITY OF METHANOLIC EXTRACT OF NIGELLA SATIVA SEEDS AGAINST A549 HUMAN LUNG CANCER CELL LINES

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Spices in India have been used traditionally not only as flavour enhancers in food but are also considered as natural therapeutic agents in the prevention and treatment of a wide variety of ailments owing to the presence of an array of bioactive principles. One such spice is Nigella sativa seeds. The present study was undertaken to assess the antioxidant and anticancer activity of Nigella sativa seeds on A549 human lung cancer cell line by the phosphomolybdenum assay and MTT (3-(4, 5-dimethylthiazol-2-yl)-2, 5-biphenyl tetrazolium bromide) assay. 1mg/ml of methanolic extract of Nigella sativa seeds was evaluated for its Total Antioxidant Activity with quercetin as reference standard. A maximum antioxidant capacity of 94.43±0.29% was observed at 120 Âµg/mL. The concentration required to scavenge or inhibit 50 per cent of the radicals (IC50) was found to be 33.92Âµg/mL. When A549 human lung cancer cell lines were exposed to different concentrations (5, 10, 20, 40, 80, 160 Âµg/mL) of methanolic extract of Nigella sativa seeds, gradual increase in cytotoxicity was observed. Maximum cytotoxicity of 72.22Â±0.809% was observed at 160 Âµg/mL and IC50 was calculated to be 12.6 Âµg/mL. Significant cytotoxicity observed in A549 lung cancer cell lines can be attributed to its dose dependent antioxidant response. Thus, this study shows that Nigella sativa seeds exhibit strong antioxidant and anticancer properties which makes it suitable as a natural remedy for the prevention and treatment of cancers worldwide.

EXN-O-09

POTENTIAL HEALTH BENEFITS OF PROCESSED MORINGA OLEIFERA (PKM1) SEEDS

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ABSTRACT Background Moringa oleifera (Moringaceae) is commonly known as the drumstick tree which has excellent therapeutic properties. Various researches have concluded that moringa seeds should be used as a functional ingredient in food products. In this study moringa seeds are processed to evaluate the antimicrobial, antioxidant and shelflife of the seeds. Methodology Ethanol extract of raw (RMO), germinated (GMO) and fermented (FMO) Moringa oleifera (PKM1) seeds were prepared in concentration of 1ml/mg. The antioxidant assays DPPH radical scavenging assay and Ferric reducing assay was performed to identify the antioxidant potential. The resultant was compared with reference standard ascorbic acid. The antibacterial activity was carried out in Nutrient Agar Diffusion method and was assessed against food borne pathogen (Salmonella typhi). The shelf life of the seed samples was analyzed using microbial technique. Results The DPPH assay showed an IC50 value of RMO, GMO and FMO to be 55.30, 40.65 and 121.89 Âµg/mL respectively and in the FRAP assay, GMO (90.42 Â± 0.95) showed a higher reducing activity than that of FMO (85.72 Â± 0.69) and that of RMO (75.60 Â± 1.02). The antibacterial assessment showed an increased linearly with increased concentration of the extract. The RMO, GMO and FMO against Salmonella typhi exhibited inhibition zone of 16mm, 20mm and 18mm at 20Âµl concentration respectively. Finally, the shelf life of RMO and GMO was found to be higher than FMO. Conclusion The present study concluded that the processed moringa seeds have a high antioxidant capacity, which reduce the risk of cancer and the antibacterial activity is helpful in curing infections and destroys harmful bacteria. Therefore the use of processed moringa seeds should be promoted in the diet because it is natural and easily available. It is a neutriceutical for various disease conditions thus called the miracle tree.

EXN-O-10

IN VITRO ANTIOXIDANT, ANTI-INFLAMMATORY AND CYTOTOXIC ACTIVITIES OF METHANOLIC EXTRACT OF DELONIX REGIA (GUL MOHAR) FLOWER ON MCF-7 AND A549 CELLS LINES

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Background- Lung and breast cancers are the two major causes of death worldwide, especially among women. Drugs used for the treatment of cancer are also cytotoxic to normal cells and the cancerous cells become resistant after prolonged use. Natural plant-based products can be used as a safe alternative source for the treatment of cancers, owing to the presence of bioactive compounds in them. The multiple therapeutic uses of D. regia flower in traditional medicine motivated us to evaluate the antioxidant, anti-inflammatory and cytotoxic activities of its methanolic extract on MCF-7 (breast) and A549 (lung) cancer cell lines to assess its potential in the treatment of lung and breast cancers. Material & Methods- DPPH, Hydroxyl Radical Scavenging (OH•—) and FRAP assays were used as antioxidant indices. In vitro anti-inflammatory potential was evaluated by membrane stabilization assay. MCF-7 and A549 cells were exposed to various concentrations (5-160 Âµg/mL) of methanolic extract of D. regia flower for 48 hours, and the loss in
percent cell viability was evaluated by the MTT assay. Results- The maximum DPPH and OH− scavenging activity was 60.93±0.59% and 62.50±0.34% at 120 µg/mL with IC50 of 98.47 µg/mL and 82.06 µg/mL respectively. The maximum Fe3+reduction was 71.44±0.09 and RCF50 was 59.65 µg/mL. The highest percentage of heat-induced haemolysis was observed at 120 µg/mL (78.95±0.12%) with IC50 of 88.57 µg/mL. The maximum percentages of cytotoxicity recorded were 51.5±0.16% and 60.05±0.77% at 160 µg/mL and the IC50 values obtained were 155.33 µg/mL and 76.21 µg/mL for MCF-7 and A549 cells, respectively. Conclusion- The findings show that D. regia flower possesses significant antioxidant, anti-inflammatory, and cytotoxic potential that may be attributed to the synergistic effect of phytochemicals present in them. This natural source may, therefore, be tapped in the prevention and treatment of various cancers.

EXN-O-11

ENZYMATIC HYDROLYSIS FOR LIPID-FREE FISH PROTEIN HYDROLYSATES AND ITS BIOACTIVITY PROPERTIES FROM RIBBON FISH

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Background- The new era of fish protein utilisation focuses on the production of fish protein hydrolysates for various food applications. Protein hydrolysates contain peptides of high bioactive properties like anti-oxidative, anti-bacterial and ACE-I inhibitory activity. Use of proteolytic enzymes like papain seems convenient to produce protein hydrolysates due to its ease of usage. The protein hydrolysate obtained after protein hydrolysis yields an 85-90% as per the traditional methods. Thus, this study aims to use a supplementary enzyme, lipase to produce lipid-free proteins hydrolysate (TFPH). Methodology- Protein hydrolysate is extracted in two stages. 1. Protein hydrolysate preparation by papain (1.5% enzyme concentration for 4h) 2. Protein hydrolysate obtained by papain treatment was further treated with lipase (0.5-2%) for 1-4h. Results- The protein hydrolysate obtained after protein hydrolysis yielded 70.81% protein and 24% of lipid. The results reveal that there was no significant change of protein content (≈94%) of the hydrolysate after the lipase concentration and duration of reaction increased. The lipase free protein hydrolysate was obtained at 1h of lipase treatment. Lipase treatment did not change the DH, but it markedly increased the ACE-I inhibitory activity. CFPH showed IC50 value at 40mg/ml concentration. Whereas, in the case of TFPH it was 8mg/ml. Electrophoresis data revealed that the molecular weight of peptides in both CFPH and TFPH samples were of the same size ranging from 12 - 85 KDa. Results of the study indicate that lipase treatment increases the ACE-I inhibitory activity of the protein hydrolysate. Production of an improved lipid-free bioactive protein hydrolysate will be obtained by modifying the method with lipase treatment.

EXN-O-12

SUB-ACUTE TOXICITY STUDIES OF KETOCgenic DIET IN FEMALE WISTAR RATS

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The ketogenic diet is high-fat, adequate protein, low-carbohydrate diet that in medicine is used primarily to treat difficult-to-control (refractory) epilepsy in children. There is little carbohydrate in the diet, the liver converts fat into fatty acids and ketone bodies. The ketone bodies pass into the brain and replace glucose as an energy source. An elevated level of ketone bodies in the blood, a state known as ketosis. Recently majority of the people are consuming this diet, because positive effects on decreasing glucose levels, weight reduction, BP control etc. Some negative effects of ketodiet was kidneystones formation, keto flue etc. None of the studies are focused on the sub-acute toxicity studies of ketogenic diet, present study was doing to study the sub-acute toxicity effect in the wister rats. The study consists four experimental groups i.e. Normal diet group, Ketogenic diet group, Modified diet group and one day normal+one day kete diet group. Adult female wister rats weight between 141-150g were taken for the study. In the experimentation period the weights of the animals were taken. Other parameters like organ weights, urine analysis, Hematology, serum biochemistry and selected organal histopathological examinations were done. There was significant variations between the experimental groups were observed.

EXN-O-13

CO-ADMINISTRATION OF DIHYDROCAPSIATE PREVENT HIGH-FAT DIET-INDUCED ADIPOSITY, HEPATIC STEATOSIS, GLUCOSE INTOLERANCE, AND GUT MORPHOLOGICAL ALTERATIONS IN MICE

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Despite the potential preventive and therapeutic anti-obesity effects of capsaicin, its putative use as a weight-lowering dietary supplement has been limited because of its pungency. A potential alternative to capsaicin are the capsinoids, nonpungent capsaicin analogs that exhibit effects similar to capsaicin. There is literature available for the antiobesity properties of capsinoids, the effectiveness of FDA-approved synthetic dihydrocapsiate has not yet been investigated. In the present study, we hypothesized that dihydrocapsiate might ameliorate high-fat diet (HFD)-induced metabolic disorders in a manner similar to capsaicin and therefore can be its nonpungent alternative. To test this hypothesis, HFD-fed mice were orally administered dihydrocapsiate (2 and 10mg/kg body weight) for 12 weeks. Dihydrocapsiate modestly reduced the HFD-induced weight gain and significantly prevented the associated hyperglycemia and hyperinsulinemia while improving glucose tolerance. Histological and gene expression analysis showed that dihydrocapsiate significantly prevented the lipid accumulation in white adipose tissue and brown adipose tissue via targeting genes involved in energy expenditure and mitochondrial biogenesis, respectively. Dihydrocapsiate corrected hepatic triglyceride concentrations and normalized expression of genes regulating hepatic lipid and glucose metabolism. Moreover, dihydrocapsiate administration significantly improved gut morphology and altered gut microbial composition, resulting in reduced host energy availability. Collectively, these results indicate that dihydrocapsiate administration improved glucose tolerance, prevented adiposity and hepatic steatosis, as well as improved HFD-induced gut alterations, positing dihydrocapsiate as a potential food ingredient for the dietary management of HFD-induced metabolic alterations. Reference- Baboota et al., Dihydrocapsiate supplementation prevented high-fat diet-induced adiposity, hepatic steatosis, glucose intolerance, and gut morphological alterations in mice. Nutr Res. 2018;51-40-56.

EXN-O-14
A CASE STUDY ON CLINICAL EFFICACY OF THE FUNCTIONAL FOOD SUPPLEMENT (FFS) IN MANAGEMENT OF HYPERGLYCEMIA

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The advent of the industrial age, have dramatically changed the lifestyles of human beings which has manifested into an increased incidence of diabetes, cardio vascular diseases, obesity, cancers and other degenerative diseases. With a global increase in the prevalence of lifestyle diseases, the picture of Kerala is not much different from that of the developed Western countries as it is vigorously competing to keep up its top position as the diabetes capital of the country. With recent advanced researches in medical and nutrition sciences, natural products and health-promoting ingredients has flourished the functional food and nutraceutical industries. There is a wide range of food stuffs that exerts promotive action for countering the adverse effects but at present is not used in our daily diet due to ignorance or oversight. Locally available food substances are found to be healthy alternatives to medicines as they are rich in antioxidants and other inhibitory properties. Every country has its own rich traditional knowledge on their natural local resources which have been proven to improve health or reduce certain diseases. An in-depth study was conducted to develop one such functional food supplement from local food substances like Barley, Ragi, Banana, Soy, Drumstick leaves and Mushroom, rich in bioactive compounds and to assess its clinical efficacy in the management of Hyperglycemia. A combination of processing techniques like fermentation and drying was applied for the development of the supplement. The ingredients were tried in various ratios and the best was selected based on their nutritional and functional properties. A supplementation study was carried out for a period of 90 days. Fasting and post prandial blood sugar levels were analyzed initially, intermittently (45th day) and after 90 days. The glycemic index and load of the FFS was The study proved that the developed FFS is very effective in bringing about considerable changes in the blood parameters of subjects with hyperglycemia.

EXN-O-15
QUALITY EVALUATION OF LYSINE ENRICHED WHEAT BASED VERMICELLI

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Background- Vermicelli is a traditional instant food product prepared by extrusion of wheat or rice flour. Since, Indian vermicelli are prepared using wheat flour, which is having lower protein quality due to deficiency of essential amino acid such as lysine. Hence, value addition of wheat-based vermicelli is important. The aim of this paper was to prepare vermicelli with increased lysine content and protein quality using composite flours. Materials and Methods- Fermented sorghum flour and oyster mushroom powder was used for value addition. Box-Behnken Design (BBD) in Response Surface Methodology (RSM) was used to optimize the product. Optimized and Control vermicelli were compared for its nutritional composition and sensory parameters. Proximate composition was estimated using AOAC, 1995. Estimation of Total and Available carbohydrate by difference method given by Pearson (1976)
Physiological energy is given by Mudambi et al. (1989). Tannin content estimated using Folin-Denis spectrophotometric method given by Schandrel (1970). In vitro protein digestibility determined using the procedure given by Akeson and Stahman (1964). Lysine content estimated using the procedure given by Balasubramanian et al. (1987). Result- The results showed that crude protein content increased from 10.9% to 12.3% and crude fibre content increased from 2.4% to 2.83%. Crude fat content reduced to 2.1% from 2.33%. Lysine content of optimized vermicelli increased to 3.53 g/16 g of N compared to control 1.9 g/16 g of N. Control and optimized vermicelli showed a non-significant difference in IVPD (69.4% and 65.5%) and tannin content (0.895 and 0.993 mg TAE/100g). Overall sensory acceptability score was non-significant between control (7.8) and optimized vermicelli (7.4). Conclusion- Thus, fermented sorghum flour and oyster mushroom blended wheat-based vermicelli can be used as a healthy snack food for combating protein malnutrition and lysine deficiency.

EXN-O-16

METABOLIC AVAILABILITY OF LYSINE IN MILK AND A VEGETARIAN MEAL DETERMINED BY INDICATOR AMINO ACID OXIDATION TECHNIQUE (IAAO) IN INDIAN ADULTS

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Background: Cereal based Indian diets are limited in lysine and complementing with foods rich in lysine, such as legumes, may overcome this limitation; however it remains to be empirically investigated. Milk is a high-quality vegetarian protein source, but has never been evaluated for its bioavailability or metabolic availability (MA) in Indians. The primary aim of the study was to determine MA of lysine in milk and a habitually consumed vegetarian meal with a combination of cereal-legume (test proteins) using a non-invasive IAAO technique. Second, to calculate the protein quality metric- Digestible Indispensable Amino Acid Score (DIAAS) of the test proteins. Methods- Three levels of lysine intakes: 6, 10.5 and 15 mg-1kg-1d-1 (20, 35 and 50% of the lysine requirement (30 mg-1kg-1d-1) were studied in healthy young men in a repeated measures design. A total of 49 experiments were conducted. L-[1-13C] phenylalanine was used as an indicator amino acid (AA). The MA of lysine was estimated by comparing the IAAO response to varying intakes of lysine in test proteins with the IAAO response to lysine intakes in a crystalline AA mixture (modeled on egg protein AA composition) using the slope ratio method. The MA estimates were used to calculate DIAAS of the test proteins. Results: The participants were 21.2±2.4 y with a body mass index of 20.3±0.5 kg.m⁻². The MA of lysine in milk and cereal-legume based vegetarian meal were 92.5% and 87.7% respectively. The DIAAS were estimated to be >100% and 91% respectively for milk and vegetarian meal. Conclusion: Since lysine is the limiting AA in cereal-based diets, the lysine DIAAS can inform the protein quality of these diets. The estimates of lysine MA from the study could be used to evaluate the protein quality of dietary interventions which could quantitatively inform policies for supplementary nutrition programs in India.

Food Science Nutrition

FSN-O-01

PRODUCTION AND RESPONSE SURFACE OPTIMIZATION OF PURIFIED FISH PROTEIN HYDROLYSATE IN THE FORMULATION OF FUNCTIONAL CURD

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Background: Fish protein hydrolysate (FPH) enables to be used as functional ingredients and nutritional supplement. FPH comprises high essential amino acids and potent antioxidants. Fermented dairy products are termed as functional foods. The purpose of the present study was to optimize the formulation of FPH incorporated in set-curd to act as an enhanced functional and antioxidant-rich food. Materials & Methods The FPH purification was prepared by Size-exclusion based gel filtration chromatography technique. The influence of FPH concentration (0.5 â€“ 1.5 %) and incubation time (5 - 8 h ) was investigated on water holding capacity (WHC), reducing power and Overall acceptability of the prepared curd using Response Surface Methodology (RSM). Results The models were found to be highly significant (p < 0.05). The high value of R² for WHC (0.76), reducing power (0.90) and overall acceptability (0.96), indicated that response surface second-order quadratic models were adequate and applicable. The optimum levels of FPH concentration and incubation time were respectively predicted to be 1.45 (mg/g) and 6.7 for the maximum WHC of 15.4, reducing the power of 0.80 and overall acceptability score of 5.9 with the desirability of 0.852 in curd with the incorporation of FPHF. Conclusion The CCRD design was used to investigate the influence of two independent factors on the quality characteristics of the prepared functional curd. It was beneficial in optimizing the factors for formulating of FPHF incorporated curd based on the desired goals of the maximum antioxidant activity, water holding capacity and overall acceptability. Hence the incorporation of FPHF could be the nutritional and functional approach to enrich the protein content and antioxidant potential of curd.
Papaya is a climacteric fruit characterized and increase in respiratory rate and autocatalytic production of ethylene. Papaya is highly perishable commodities that required to be handled with much care, the fresh fruit is loaded with nutrients. Fresh cut produce is defined as #eany fruit or vegetable or combination thereof that has been physically altered from its original form, but remains in fresh stateº (Garratte, 1997; king and bolin, 1989). Edible coatings are thin layer of edible component applied to the fruits surface in addition to or as a replacement for nature protective waxy coating. Zein is the water insoluble prolamine of corn gluten, totally natural, not an additive; it can be combined with many different ingredients or alone can create a wide range of coating properties. Fresh ripe papaya purchased from the local market, washed dried and cut into 10mm thickness. The cut samples were coated with 5% (sample A) and 10% (sample B) Zein solution. The weight loss ,moisture, Vitamin C content and microbial analysis was performed at an interval of 3 days for a period of 15 days. A control sample (C) of papaya was kept without any coating for comparision. The weight loss and moisture loss was maximum in control compared with coated sample A and B. The initial mean vitamin C content of sample A, B, and control was 50.34±0.65mg, 52.54±1.20mg, 50.25±0.50mg/100 g respectively. The vitamin C content after 15 days of sample A and B was 46.28±0.75 and 49.61±0.55 mg/100 g. The control sample spoiled at end of seven days. These was no significance difference in sensory attributes between A B and C up to 4 days, after 4th day the control scored less compared to A and B. The sample B Scored highest in sensory parameters than A at the end of 15th day.

Optimisation of enzymatic liquefaction of papaya waste by response surface methodology

Optimisation of enzymatic liquefaction of papaya waste by response surface methodology Ashwini N. Bellary and Neena Joshi Department of Food Science and Nutrition GKVK, University of Agricultural Sciences, Bangalore Papaya (Carica papay) is known for its nutrition, phytochemical properties. It is used in traditional medicine around the globe. Papaya is a commonly consumed and easily available fruit. Papaya is widely used in cosmetics and food processing. It is estimated that, the total loss of papaya during processing accounts for 1 to 20% which mainly includes the out graded/over riped papaya, its skin, seeds and dices. As per the literature review this waste was mainly used for production of flavour, enzymes and organic acids. In the present work an attempt is made to liquefy the papaya pulp (waste) using enzyme. To optimise the liquefaction conditions response surface methodology was employed. Pectinase enzyme concentration of 0-2%; reaction time of 0-120min and temperature 25-100°––C was selected as independent variables. Whereas, the per cent juice yield, total soluble solids and clarity of the juice were the dependent variables studied. Central composite rotatable design of experiments with three variables was used to study the response pattern and determine the optimum conditions of the variables. The fitted polynomial equation was expressed as surface and contour plots using the graphical technique through Design Expert® Software trial version 10. The results of experiments showed that, pectinase concentration of 1.50%, reaction time 79.33min and a temperature of 47.22°––C the per cent yield of juice was 80.56%, clarity 38.69% Transmittance and TSS was 14.46—JBrix. The experimental results were on par with predicted values obtained through the software. Enzymatic liquefaction was found to be significantly influenced by pectinase concentration, time of reaction and temperature. By using response surface methodology as a statistical tool the interactions and the optimum conditions of the variables could be identified within a specified range with smaller number of experiments, by reducing the time and cost of the study.
PROPERTIES OF SYNBIOTIC YOGHURT WITH IMPROVED TEXTURAL, MICROSTRUCTURAL AND FUNCTIONAL PROPERTIES

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Background- Yoghurt is one of the widely consumed fermented dairy-based product but to provide a good body and texture synthetic hydrocolloids are being used which possess various health implications. On the other hand, bacterial exopolysaccharides (EPS) can be used successfully to serve this purpose along with additional health beneficial properties. So, an attempt was made to develop synbiotic yoghurt with improved functional attributes using natural hydrocolloid. Material & Methods- Milk was procured from ponlait dairy. Yoghurt cultures were procured from NDRI, Karnal (NCDC). EPS production was carried out using probiotic strain Weissella confusa KR780676. Standard protocols were used for the production of both yoghurt and EPS. The prepared yoghurt incorporated with EPS was analysed for various physicochemical, rheological, textual, microstructural, sensorial and functional attributes. Treated (EPS incorporated yoghurt) and Control (without EPS) Result- Yogurt incorporated with EPS has good water holding capacity which was increased from 45% for control to approx. 65% for treated sample with less syneresis and wheying off which are prime properties of yoghurt. This difference was seen in viscosity values also which was 461 m.Pa.s for control while for treated sample it was 1090 m.Pa.s. Textural attributes including firmness, work of adhesion, work of shear and stickiness were also significantly high for treated samples. In terms of functional attributes, antioxidant activity for treated yoghurt as ABTS was 279.44 μg Trolox/ml while as reducing power assay it was 0.25 mg vitamin C /100g, significantly higher than corresponding control. Higher colony-forming unit (CFU) for the treated sample revealed good prebiotic attribute of EPS and opens its doors to be used as synbiotic yoghurt. Also, Confocal Laser Microscopy and Scanning Electron Microscopy revealed more structured and compact texture for treated (EPS incorporated yoghurt) and Control (without EPS) yoghurt. Also, Confocal Laser Microscopy and Scanning Electron Microscopy revealed more structured and compact texture for treated sample. This yoghurt can be used as functional food due to its antioxidant and prebiotic property. The texture and mouthfeel most important parameters for yoghurt were superior.
FSN-O-07

DEVELOPMENT AND QUALITY EVALUATION OF CEREAL BASED NUTRIBARS

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Development and Quality Evaluation of Cereal Based Nutribars SHAHLA K.1 AND SUMAN K.T.2 Research scholar1 and Assistant professor2 1. Department of Home science, College of Horticulture, KAU, Vellanikkara 2. Krishi Vigyan Kendra, KAU, Thrissur e-mail- shahlahz.k@gmail.com Abstract Background Nutribars are one of the convenient snack bars with good nutritional value. For this study, 24 varieties of nutribars were prepared with various types of cereal flakes, dehydrated fruits, nuts, jaggery honey mix, glucose syrup and other functional ingredients. From this six nutribars were selected, prepared, packed in polyethylene and laminated aluminium pouches under vacuum and stored for a period of six months under ambient conditions. Methods The nutribars were evaluated organoleptically for different quality attributes like appearance, colour, flavour, texture, taste and overall acceptability using score cards at 9 point hedonic scale with a panel of 10 judges for a period of 6 months. Results Based on statistical analysis, the mean score for different organoleptic qualities of nutribars in both packages decreased gradually during six months of storage. Comparing both packages, better mean score for different quality attributes was noticed in nutribars packed in laminated aluminium pouches under vacuum and retained its original qualities up to fourth month of storage than polyethylene packed samples. Conclusion The nutribars had mean score above 7.0 in laminated aluminium pouches and in polyethylene pouches at the end of storage. The nutribars prepared with corn flakes in jaggery honey mix followed by wheat flakes in glucose syrup were the most acceptable nutribars in both the packages during storage.

FSN-O-08

DEVELOPMENT AND EVALUATION OF FOXTAIL MILLET (Setaria italica) LADDU

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BACKGROUND- The traditional food of India has been widely appreciated for its fabulous use of locally grown crops and are assorted like sweet, savoury and spicy traditional foods. The significance of traditional foods is more appreciable when their nutritive value is known. Millets are a group of small seeded species of cereal crops, widely grown around the world. Millet, when compared to cereals have several desirable nutritional qualities and are termed as nutri-cereals. Foxtail millet (Setaria italica) is one of the most important food crops of semi-arid tropics. It is the second most widely planted species of millet. Laddu are ball-shaped sweets popular in the Indian Subcontinent. They are often served at festive or religious occasions. Hence, an attempt was made to develop foxtail millet based laddu. MATERIAL & METHODS- Foxtail millet (Setaria italica) Laddus were standardised using foxtail millet flour, bengalgram dhal flour, ghee and sugar powder. Developed Laddu was analysed for proximate composition by AOAC (2005). Sensory evaluation was carried out using 9 point hedonic scale. RESULTS - Standardized trials indicated that acceptable foxtail millet laddu could be developed by incorporating 50 % foxtail millet flour, 50 % bengalgram dhal flour, 45 % ghee, 75 % sugar powder and 40 minutes roasting time in the standard laddu recipe. The developed laddu had good binding property and was highly acceptable by sensory evaluation. Nutritional analysis of foxtail millet laddu revealed that protein, fat, crude fibre, ash and carbohydrate of 11.61, 17.52, 2.64, 1.11 and 66.85 % /100g respectively. CONCLUSION- Reintroduction of foxtail millet in the regular diet and traditional dishes as ready to eat can be encouraged which will enhance the economic value. Thus, the study presented an upshot of potential as income generating activity among the women entrepreneurs which is profitable and cost effective as a nutritional product.

FSN-O-09

INFLUENCE OF HYDROTHERMAL TREATMENT ON FUNCTIONAL AND STRUCTURAL BEHAVIORS OF RED AND BLACK RICE STARCHES

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Background- The influence of repeated heat-moisture treatment (RHMT) on the functional and structural behaviors of red and black rice starches were investigated. Materials & methods- Red and black rice starches were subjected to RHMT and the cycling times of RHMT ranging from 1 to 4 were designated as RHMT-1, RHMT-2, RHMT-3 and RHMT-4, respectively. The RHMT starches were further analyzed for functional and structural characteristics using X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM)
and Fourier Transform Infrared Spectroscopy (FTIR). Results- Scanning electron microscopy revealed that the morphology of starch granules were affected by RHMT. RHMT created more cavities, fissures and holes on the surface of starch granules for both red and black rice starches. Functional properties like solubility and water absorption capacity increased significantly (p<0.05) as the cycling times of RHMT increased. The clarity of the starch pastes increased significantly during 96 hrs of cooling storage period and swelling power was significantly lower in RHMT starches than the native red and black rice starches. Lightness index decreased significantly while, redness and yellowness values were higher in RHMT starches than native starches due to caramelization reaction. XRD displayed A-type crystalline pattern and did not show any significant changes after RHMT. Conclusion- RHMT significantly affected the functional and physicochemical properties of red and black rice starches. Hydrothermal treatment is one of the most promising physical modification techniques for promoting food additives or ingredients that require specific properties. The decrease in swelling power that resulted from RHMT red and black rice starches makes it desirable for manufacturing of food products like noodles and other extruded foods.

FSN-O-10

INFLUENCE OF ANNEALING AND HEAT MOISTURE TREATMENT ON MORPHOLOGICAL, FUNCTIONAL AND IN VITRO DIGESTIBILITY OF AMORPHOPHALLUS PEAONIFOLIUS FLOUR

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Background The objective of the study was the influence of hydrothermal treatment (annealing and heat moisture treatment) on the various physicochemical, functional and in vitro digestibility of flour from elephant foot yam. Materials and methods Yam slices were dried using convection oven drying (50Â°C, 24 h). Further, hot air oven blanched (HAOB) flour was treated into annealing (ANN) and heat moisture treatment (HMT) with different moisture level (20, 25, 30, 35 %) process and their morphological, pasting, textural, and functional properties were assessed. Results Scanning electron microscopy showed that the native flour granules were round to spherical and polygonal in shapes, but the modified flour granules exhibited higher granular size, irregular in shapes and also complete breakdown of the granules. The pasting parameters were found to decrease after hydrothermal treatments except pasting temperature which was found to be higher. Hardness of flour samples were decreased in ANN treatment but in HMT flour samples, it was increased. Syneresis values for ANN and HMT was significantly lower than the native and HMT counterparts. Swelling power and solubility of flour samples were found to decrease after HMT and ANN. Amylose content increased after hydrothermal treatments. In-vitro digestibility showed that RDS content decreased while SDS and RS content increased post hydrothermal treatments. Conclusion Hydrothermal treatments resulted better pasting stability, low retrogradation tendency, and decreased staling rate in flour. These properties also signify that the elephant foot yam flour can be an excellent source for bakery and confectionary products and also for extruded products.

FSN-O-11

DEVELOPMENT OF VALUE ADDED PRODUCTS OF DRY KOKUM FRUIT

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Kokum fruit is a traditional tree spice available in the Konkan belts of Karnataka. Kokum fruit is a rich source of Anthocyanins, Hydroxy Citric Acid and Garcinol which have various health benefits like anti obesity, anti ulcerative properties etc. Development of dry Kokum fruit products started with the market survey of available Kokum products, like Kokum juice, kokum Butter etc. In the present study, an attempt has been made to develop value added products using Dry Kokum fruit, which are in easy to serve form, inspired by the traditional recipes. The developed products were Kokum jam, Kokum rasam cubes, Kokum squash and Kokum spicy candy. The methods of preparation of all these products was standardized. These developed products were subjected to sensory evaluation using Ranking test done by 30 semi trained panelists. The results of the sensory evaluation revealed that the mean standard scores of Kokum jam was the highest (3.75) followed by Kokum rasam cubes (2.92), Kokum squash (1.75) and Kokum spicy candy (1.58). The best accepted product, Kokum jam was subjected to shelf life analysis for 20 days, kept at room temperature, for its sensory qualities. The product showed no change in organoleptic properties even after 20 days. From the study, it can be concluded that the Dry kokum fruit based products are innovative and have great demand due to their various health benefits. These value added products developed are also suitable for vegans, lactose intolerant and children of all age groups. KEYWORDS- KOKUM, JAM, SENSORY EVALUATION
FSN-O-12
CASEIN COATINGS Â“TO DELAY THE RIPENING OF GUAVAS

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Edible coatings and films are defined as a thin application of materials that forms a protective barrier around an edible commodity and can be consumed along with the coated product (Guilbert,1986). Fresh mature, raw, moderately ripened and good sized guavas were purchased from local fruit market of Tirupathi. The guavas purchased were at ready-to-eat stage, so that the application of coatings on ripeness can be studied. The procured guavas were washed using 1% chlorine solution and air dried. Casein solution of 5% and 10% were prepared by using 5g and 10g of dry casein powder dissolved in 10g citric acid, 5ml glycerol and 100ml distilled water respectively. The cleaned guavas were coated with casein 5 and 10 % solutions and a control sample without coating. The samples were made to dry, wrapped and packed in filter paper tightly. All the samples were stored at 26Â±10C for a period of 15 days. There was significant difference in moisture loss between sample- A (5%) and B (5%) with the control. 10% casein treatment had a better appearance than 5% at 8 days, there was not much variation seen between the two samples when stored for 14 days. There was much less pitting and blemishes and fungal spoilage was minimum in the treated guava. The acidity and pH constantly declined from day one to 16th day in coated samples than the control sample. In all the samples there was an increase in TSS because of the degradation of polysaccharides. But the low TSS in coated sample represents in the delaying of ripening. The sensory and vitamin C content good in all samples till 8th day after that control sample was spoiled whereas sample A and B was good to consumption till 12th day.

FSN-O-13
NUTRITIONAL AND SENSORY EVALUATION OF TEMPEH FROM DOLICHOS LABLAB

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Back ground- A variety of indigenous fermented foods exist today, however tempeh has been one of the most widely accepted fermented products. Tempeh is usually produced by fermenting soybeans inoculated with Rhizopus oligosporus / Rhizopus oryzae. Recently the consumption of Tempeh has been increasing rapidly, as tempeh a supplement for meat. Tempeh could be prepared with pulses other than soybean thereby increasing the acceptability and digestibility of the common pulses. Materials and Methods- Dolichos lablab is an herbaceous plant Despite the nutritional benefits of this legume, Dolichos lablab is still underutilized because of inadequate processing and antinutritional content. Reduction to a safe level or total elimination of these antinutrients will improve the nutritional quality of the food and also confer effective utilization potential on such foods for human consumption. The study thus evaluated the nutrients and antinutrients content and sensory characteristics of Dolichos lablab tempeh. The purpose of this study was to standardize tempeh using fresh D. lablab and evaluate the physico-chemical, nutritional, bioactive components and organoleptic quality of tempeh and also prepare value added products using tempeh mimicking non-vegetarian preparations. Result- The quality analysis of D.lablab tempeh revealed 50.03% of moisture, 20.50g of carbohydrate, 18.38g of protein, 0.81g of fat, 3.11g of crude fiber. When compared with raw pulse Dolichos lablab, fresh tempeh has protein increase of 14.87 % and 54.00 % in dried tempeh and there was 100 per cent removal of anti nutritional factors tannin and phytic acid because of various processing in tempeh (soaking, cooking, fermentation , curing, frying). The value added product was developed using D. lablab tempeh and the overall acceptability of tempeh fry was observed as highly acceptable with score point of 8.0 ± 0.5 /9.0 in tempeh fry. Conclusion- Dolichos lablab, tempeh best mimics the taste of for nonvegetarian chicken 65 and this value addition technique can be promoted to the food processing industry in view of better nutrition and health advantage.

FSN-O-14
DEVELOPMENT OF LOW CALORIE, HIGH PROTEIN GLUTEN-FREE COOKIES

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BACKGROUND- Availability of excess food calories in the form of unhealthy snacks and processed foods has contributed to the obesogenic environment. This has led to a rise in non-communicable diseases, inflammatory bowel syndrome, celiac diseases, Fibromyalgia, Schizophrenia, endometriosis and various neuropsychies. Therefore, alternate solutions to healthy eating needs to be
provided, which can either prevent or postpone the onset various disorders/diseases. AIM- The focus of the study was to formulate a high fiber, high protein gluten-free cookie, estimate the nutrient content, and analyze the quality of the developed product with respect to sensory, microbially and shelf life. MATERIALS &METHODS- Choco-chip cookies were baked using assorted millets, red rice, watermelon seeds, flax seeds, dark cocoa powder, isolated soy protein, coconut oil, dark chocolate chips and brown sugar. All the ingredients gave an excellent texture and contributed to a gluten-free product. No preservatives were added to the baked cookies. This was packaged in a hygienic setting and was subjected to organoleptic, physical and nutritional analysis. Each cookie weighed about 20 grams. RESULTS- The overall acceptability of the developed product was very high, with a shelf life of 3 months. No microbiological spoilage was observed. HACCP principles were followed for standards relating to food safety and quality. On estimation of the nutrient content, 20 grams of the cookie provided 75 Kcals of Energy, 3 g of protein, 8.8 g of carbohydrate, of which sugar was 3 g, 2.8 g of fat, 1.8 g of fiber and 10.77 mg of calcium. CONCLUSION- The formulated cookie will serve as a healthy alternative to calorie-dense snacks and refined cookies available in the market. Keywords- Gluten-free cookie, HACCP, high fiber, prebiotic.

FSN-O-15
MEASURING THE QUALITY PROFILE OF PALM SUGAR AT DIFFERENT STORAGE CONDITIONS

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Palm sugar concentrates is a natural and traditional product of palm sap, without separation of molasses and crystals. The quality of the palm sugar at different storage conditions were measured in this experiment. Palm sugar procured from the manufacturing unit was analyzed to measure the initial parameter. After measurement of the initial parameters, palm sugar was divided into three equal parts and was stored in three different containers such as plastic, steel and glass. After storing the palm sugar for three months, it was further analyzed for any change in the quality and the results were compared. Number of colonies were present in palm sugar stored in plastic and very less number of colonies were present in the glass. Colony morphology of various colonies was observed to identify the bacteria. Isolated colonies with unique characteristics (such as colonies that had antibacterial effects and those which were chromogenic) were stained to find out the nature of their cell wall using Gram’s staining. These colonies were pure cultured and used for further experiments (like DNA isolation, DNA sequencing, etc). From this experiment it can be concluded that glass is safer to store palm sugar compared to plastic and steel. Moreover, food storage containers made of glass don’t leach unwanted poisonous chemicals when in contact with food. Glass is inert and a non-porous natural material. Glass containers are free from any leakage and safe for using over and over again.

FSN-O-16
TABLE TOP MILLET DEHULLER- PERFORMANCE EVALUATION OF A PROTOTYPED TABLE TOP SMALL MILLET SEED DEHULLING MACHINE AND NUTRITIONAL QUALITY OF PRODUCT

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Background- Millets are small seeds are gluten free grains grown and consumed extensively in local tribal and hilly areas. They have been characterised as climate smart, nutrient rich and agriculturally important raw material for use in gluten free food processing sector. The drudgery involved in dehulling of these seeds has been prime concern of local population and food processor hindering the extensive utilisation of these grains. This article describes features and performance of new table top impact dehuller prototype model developed by Development of Humane Action (DHAN) Foundation, Tamil Nadu for removal of husk from small millet grains. Material and Methods- Millet seeds were obtained from DHAN foundation, Tamil Nadu for dehulling in this study. The procedure involves dehulling of millet seeds based on impact-centrifugal force principal (SMF V3, Table Top Impact Dehuller Model), Masses were fractionated manually to calculate performance indicators and nutritional quality of rice was determined. Result- The study indicated that higher recovery of dehulled and unpolished grain is possible in less time using this prototype. The dehulling is easier in terms of operation scale which varies from 30-80kg/hr. The operation needs to be optimised for different small millet seeds of different size, shape and hardness. The drive unit needs improvement so as to separate fine stones and dirt balls similar to milled rice and grits. Conclusion- The improved prototyped impact-centrifugal dehuller had improved efficiency with low breakage and reduce the associated drudgery. Rice is nutritious as bran and endosperm fractions were retained. It is a suitable option for local villagers, small scale micro enterprise and may improve situation of food security and livelihoods.

FSN-O-17 With draw
FSN-O-18
DEVELOPMENT OF MUSHROOM FORTIFIED VERMICELLI

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BACKGROUND- Today in-spite India being a fast-developing nation in the world, Indian children are facing major health problems related to malnutrition. This is becoming a common scenario in urban slums and rural areas. Around 40 per-cent of the children under 5 years in India are Severe Acute Malnourished. The survival chances, learning ability and resistance to the diseases are considerably decreased in the malnourished children. To overcome this, Vermicelli an Indian traditional food was fortified using dry mushroom powder that acts as a protein source. MATERIALS AND METHODS- Dry mushroom powder was prepared using vacuum dehydration process. Mushrooms (Agaricus ostreatus) were cut into small pieces and dried at 45 ºC and 10 KPa for 4 hours. Then it was grounded to powder. Fine semolina (150 g), dry mushroom powder (1.5% w/w) and water (90 ml) were added and conditioned for 5 minutes. The conditioned mixture was later fed into an extruder and the vermicelli was cut based on size required. The dried vermicelli was then estimated for its nutrients using AOAC methods. Sensory analysis was carried out by 16 semi-trained panelists in UAS, Dharwad using 9 Point hedonic scale. RESULTS- Sensory analysis conducted for the parameters like appearance, color, flavor, taste, texture and overall acceptability showed it was liked very much with a scale of 8.4. The nutrient estimation revealed that for every 100 g product has fat 1.03 g, protein 20.34 g, crude fiber 3.90 g, carbohydrate 73.55 g and 385 Kcal energy. CONCLUSION- It is concluded that the product can be used in wide range of dishes either sweet (payasam, appam, etc.,) and spicy (upama, etc.,) that are liked by the children. Hence this product will play its role in reducing the chances of malnutrition in children.

FSN-O-19
QUALITY ANALYSIS OF THE FORMULATED COMPOSITE MILLET FLOUR INCORPORATED RUSK

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Background- An improvement in millet processing technology to provide millet based convenience food would help in increasing millet cultivation area, scope for millet utilization on industrial scale, maintain ecological balance, prevent malnutrition and ensure food security. Considering this, the study was designed to formulate Ready-to-Eat rusk using composite millet flour and assess its sensory acceptability and quality characteristics. Material and methods- Composite Millet Flour (CMF) prepared using equal quantities of sorghum (Sorghum bicolour L. Moench), pearl millet (Pennisetum typhoides) and foxtail millet (Setaria italica) was
substituted in refined flour at 25 (Variation I), 50 (variation II), 75 (Variation III) and 100 per cent (variation IV) to develop rusk. The formulated rusk was assessed for its physico-chemical properties, nutrient content and storage stability. Results- The flour recovery was found to be in the range of 79 ± 90 percentage. Of the different formulations, variation I with 25 per cent composite millet flour substitution recorded the highest mean sensory scores with 8.75 ± 0.46. The moisture, ash and acid insoluble ash content of the rusk (CMF â€“ 25 %) were found to be 4.92, 1.22 and 0.05 % respectively. 100g of the CMF substituted rusk (25%) provided appreciable quantities of carbohydrates, protein, vitamin B1, B9, calcium and 354 kcal of energy. On storage (90 days), the moisture content (5.78 %) and the total plate count (<100 cfu/g) were within the FSSAI limits and organoleptically well acceptable. Conclusion- Utilization of composite millet flour for the development of Ready-to-Eat products like rusk would enhance the marketability of millets and improve the therapeutic value of formulated food products.

**FSN-O-20**

**PRODUCTION OF GALACTAN EXOPOLYSACCHARIDE BY WEISSIELLA CONFUSA- AN APPROACH OF BY-PRODUCTS UTILIZATION**

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**Background & objectives**- Demand of natural polymers for their novelty, health benefits and industrial applications has led to an interest in exopolysaccharide (EPS) production. Their biocompatible and biodegradable nature has led to immense food and pharmaceuticals use. Therefore, it is imperative to produce economically from unutilized inexpensive sources to minimize production cost. This study evaluates to produce galactan EPS by lactic acid bacterium Weissella confusa KR780676 from bio waste. Materials & methods- An exopolysaccharide producing strain was isolated from Idli batter. Different carbon sources were assessed for production of EPS (g/L). Certain fermentation parameters, such as concentrations of carbon sources, time, temperature and inoculum volume (Cfu/mL) were analyzed. EPS was extracted by heating the cell suspension and subsequently centrifuged to remove biomass. EPS was precipitated with chilled ethanol. Precipitate was collected and quantified by phenol sulphuric acid method. Result- EPS yield in all carbon sources increases with increasing concentrations and time from 2 to 20 % and 12 to 72 hours respectively. EPS yield contributed by different sources varies follows the order ranging from maximum to minimum (g/L), Sucrose > mixture of coconut water and sucrose > molasses > coconut water. The highest yield 36.56 g/L was obtained from sucrose as carbon source at 5 % inoculum at 25 Â°C, as compared to 10 % and 15 % inoculum contributes 16.66 and 27.25 g/L at 25Â°C and 30 Â°C respectively. Mixture of coconut water and sucrose affords maximum 19.31 g/L at 30 Â°C and 10 % inoculum for 72 hours. Molasses contributes 2.84 g/L at 2 % in comparison to 20 % obtained 9.30 g/L for 72 hours. Coconut water affords least 3.61 g/L at 10 % inoculum at 30 Â°C for the period of 72 hours. Conclusion- The study suggests there could be significant reduction in food waste by efficient utilization for EPS production. Novel food products can be added to sizeable amount for food industry. Besides that effective use of bio waste can reduce detrimental environmental pollution. Key words- Galactan EPS, extraction, by-products, fermentation parameters

**FSN-O-21**

**SENSORY AND NUTRITIONAL ATTRIBUTES OF MUFFINS DEVELOPED BY THE UTILISATION OF GHEE RESIDUE**

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Abstract-- Ghee residue is the by- product of dairy industry it is charred light to dark brown and moist Residue which is obtained during manufacture of ghee from cream and butter. It is good source of good quality of protein, fat, minerals and vitamins which signifies its competence to be an excellent food item for human nutrition. The present study was carried out with the objectives to evaluate the Organoleptic quality, nutritive value and the cost of the prepared food products utilize the Ghee residue for the preparation of muffins by utilization of Ghee residue incorporated in different proportions and served as treatments T1, T2, T3 and T4 respectively. T0, without incorporation of utilization of Ghee residue served as control. Chemical analysis of carbohydrate, protein, energy, calcium was done by AOAC (2005) methods. Sensory evaluation was carried out using the nine point Hedonic scale. The nutritive value of the prepared products was determined using food composition tables (Gopalan et al., 2011) and the values obtained from analysis of prepared products. Data obtained were statistically analyzed by using analysis of variance (ANOVA), (t) test and critical difference (CD) techniques. On the basic of findings, it was observed that in muffins 60 percent refined flour and 40 percent ghee residue incorporation level scored the best with regard to colour, body and texture, taste and flavour and overall acceptability.. Four replications of control and treatments for muffins was carried out and mean values were obtained. Utilization of Ghee residue for
preparation of bakery products like muffins was well acceptable, based on sensory evaluation. In Muffins T4(wheat flour refined + Ghee residue in the ratio, 60-40) was the best. In Muffins, Calcium (131.35mg/100g), Protein(56.48g/100g) and Fat(90.72g/100g) were increased as compared to control. Cost of the products on the basis of raw ingredients per 100g ranged between Rs 31.00 for muffins. It is concluded that Ghee residue can be incorporated in the preparation of muffins in addition to improving the nutrient content. KEYWORDS- Ghee Residue, Organoleptic Evaluation, Utilization, Muffins

FSN-O-22
DEVELOPMENT OF BUCKWHEAT VERMICELLI
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INTRODUCTION- Buckwheat (Fagopyrumesculentum) an annual crop, is a pseudo cereal and member of Polygonaceae family. Compared to other grains, the major benefit of buckwheat is, it is gluten-free and has a unique amino acid composition which gives special biological activities including cholesterol-lowering, anti-hypertensive and improving digestion by relieving constipation. MATERIAL AND METHOD- Two buckwheat varieties PRB-1, Nelagiri along with one bread wheat variety as control were procured from the wheat scheme, MARS, Agricultural University, Dhawad during Kharif - 2018. The buckwheat varieties were studied for milling quality. Milling yield was analyzed with different soaking time- 12hr & 18 hr and shade drying for 24 and 36 hr. The utility of highly acceptable buckwheat variety i.e., Nelagiri was studied in terms of vermicelli upma. Vermicelli from refined wheat flour was used as control. Vermicelli was prepared with mixed flour having buckwheat flour and refined wheat flour in 25-75 50-50 75-25 and 100-00 proportion. Nutritive value of buckwheat vermicelli upma was calculated by using the food composition table. RESULTS- Soaking Nelagiri and PRB-1 for 12 hr followed by shade drying for 24 hr yielded 32 and 30 per cent recovery of de-husked whole grain. Utilization of buckwheat @ 25 per cent in vermicelli upma had better sensory scores for appearance (8.20), color (8.10), flavor (7.90), taste (8.10), texture (7.80) and overall acceptability (7.90) with acceptability index of 88.88. The vermicelli upma with 25 per cent buckwheat had good protein -17.07 g, fat-29.00 g and crude fiber -2.39 g per 100 g. The upma had calcium, sodium, potassium, iron, zinc, manganese copper contents of 83.93 mg, 20.37 mg, 348 mg, 2.39 mg, 2.00 mg, 0.74 mg per 100 g respectively. The upma was rich in B complex vitamins including thiamine (1.36), riboflavin (0.54), niacin (6.17), pyridoxine (2.24) and pantothenic acid (3.47) mg/ 100 g. CONCLUSION- Thus, the utilization of nutritionally rich buckwheat can be promoted as vermicelli in the daily diet for the general population.

FSN-O-23
EFFECT OF COOKING METHODS ON PRODUCTS PREPARED FROM BROWN RICE VARIETIES
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Brown rice is a whole grain cereal produced by removing only the hull or husk using mortar-and pestle or rubber roller (dehuller) milling machine. It is known as pinawa in Pilipino but labeled either as brown, unmilled, or unpolished rice. The bran layer that is not removed gives the grain its brown color and retains its high levels of soluble fiber, antioxidants, and other vitamins and minerals. When the bran is removed, it becomes well-milled or white rice. The experiment was conducted in the Research laboratory of Foods Nutrition and Public Health, Ethelind School of Home Science, Sam Higginbottom University of Agricultural, Technology and Sciences. Products Idli and tikki were prepared from different varieties of brown rice, T1 (Basmati brown) and T2 (Jasmine brown) by using two cooking methods (baking and steaming). Organoleptic quality and nutritive value of the prepared products were evaluated. Sensory evaluation of prepared product was done by using nine point hedonic scale based score card. The Proximate analysis of the prepared products was done by using standardized methods AOAC (2005).The experiment was replicated five times and the data obtained during investigation were statistically analyzed using analysis of variance (ANOVA) and critical difference (CD) techniques. From the results, it is concluded that brown rice can be used in place of white rice in Idli in order to enhance the nutritive value. The product was acceptable on the basis of sensory evaluation. In Tikki treatment T2 (jasmine brown) was highly acceptable in terms of flavor, taste, color and overall acceptability, where as in idli the treatment T1 (basmati brown) was more acceptable than the treatment T2 in terms of flavor, taste, colour and over all acceptability. The treatment T1 of idli was prepared by steaming method and the maximum content of energy (368 Kcal/100g), protein (12.15 g/100g) and iron (5.64mg/100g) were found in treatment T1 of the idli and the treatment T2 of tikki was prepared by baking method and the highest content of fiber (1.92g/100g), carbohydrates (57.26 g/100g),
protein (8g/100g) and fat (7.56g/100g) was found in T2 of tikki. Key Words- Pestle, Proximate analysis, hedonic scale and antioxidants.

**FSN-O-24**

**DEVELOPMENT AND QUALITY EVALUATION OF PERI-PERI MILLET NACHOS**

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**ABSTRACT** - Introduction- Millets have a unique nutrient value which is good for physical and mental health. They have high fiber content, low sugar, vitamins and if consumed regularly they promote movement of the bowels, help detoxify the system, renders less blood sugar and cholesterol than eating fine flour or rice. Hence, the present study has been undertaken to modify traditional nacho into an innovative and healthy product. The traditional Nachos recipe has been modified by the addition of millets. Methodology- The product developed was a completely millet-based product made using Jowar, Bajra, and Kodo millet in the ratio 3:1:1. The product was baked which makes it a healthier alternative to the traditional fried nachos. Three variations of the product were made by using different levels of the spice mix. Sensory evaluation was done to find the acceptability of per-peri millet nachos using 9 point hedonic scales by a panel of 30 semi-trained panelists. Various characteristics like appearance, color, texture, taste, odor, and overall acceptability were scored. Nutritional composition of the standardized per-peri millet nacho was determined by conducting proximate analysis at IADFAC (Institute for Analysis of Dairy, Food, and Cultures) Laboratory using standard procedures. Results- The results of the sensory evaluation showed that variation-II that was composed of 80% Millets (Jowar-60%, bajra-20%, Kodo millet-20%), 10% ghee, 10% peri-peri masala (spice mix) was the most accepted variant. The result of the proximate analysis revealed that 100g of Nachos contributed 434 kcal of energy, 11g of protein, 10g of fat and 271mg of calcium on a dry weight basis. Conclusion- The developed product attempts to create awareness on millets and also provide a healthy snack option. Keywords- millets, nachos, proximate composition, sensory qualities.

**FSN-O-25**

**DEVELOPMENT AND QUALITY EVALUATION OF GUAVA DESSERT**

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**ABSTRACT** - The research on the development and quality evaluation of a dessert using guava puree in semolina had been undertaken with an objective as to develop and standardize value-added product using a different variation of guava, semolina, and khova. The reason for incorporating guava puree in the semolina dessert is to utilize the guava fruit which is found to be highly nutritious and to make a new experimental dessert, and also creating awareness about the remarkable benefits of the guava on human health. Methodology- The development of fruit-based - guava dessert using guava, semolina, milk, sugar, ghee, and khova, with the presentation of the dessert in a glass jar with layers of khova cream. Three variations of the product were made by using a different percentage of ingredients. Sensory evaluation was done to find the acceptability of guava dessert using 9 point hedonic scales. Nutritional composition of the standardized guava dessert was determined by conducting proximate analysis standard procedures. Result- The sensory evaluation showed that variation - I that was composed of 40% guava puree, Semolina 20%, sugar 10%, khova 20%, milk 9%, and ghee 1% was the most accepted variant. The result of the proximate analysis revealed that 100g of guava dessert contributed 206 kcal of energy, 4g of protein, 8.4g of fat and 122mg of calcium and 67mg of vitamin C. Conclusion- The innovative guava dessert khova was meant for its health benefits and emerging needs for people who want to make the normal semolina halwa into a much nutritious and healthier one without the addition of any colors and additives to it. Keywords- semolina, proximate analysis, dessert.

**FSN-O-26**

**DEVELOPMENT OF BREAD INCORPORATED WITH DEHYDRATED SPINACH POWDER**

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**ABSTRACT** - Leafy vegetables represent inexpensive but high-quality nutritional sources of micronutrient such as vitamin A, Iron, ß-carotene, etc. and utilizing them is one way of ensuring the micronutrient intake. Dehydration is one of the traditional methods of preservation, which converts the food into a lightweight, easily transportable and storage product. Objective- - The present study has been undertaken to develop bread enriched with dehydrated spinach powder. Methodology- - The method of bread preparation was standardized, and dehydrated Spinach Leaves Powder was incorporated into bread at 5, 10, 15% levels. The
results were evaluated for sensory quality using a 9-point hedonic scale in comparison to control by 30 semi-trained panelists. Results - Results of sensory evaluation revealed that product incorporated with 5% dehydrated greens were similar to control in all sensory aspects. Proximate analysis revealed Energy as 287 kcal, Protein 8.25g, Fat 3g, Carbohydrate 56.4g, Iron 2mg, moisture 31.28g, ash 0.99g. However, acceptability scores reduced with increasing concentration of greens. Conclusion - From this study, it can be concluded that the addition of dehydrated spinach greens at 5% level improved its nutritional quality without affecting its sensory quality. It is suitable for the consumption of all the age groups. Keywords - Spinach powder, 9-point hedonic scale, sensory evaluation.

FSN-O-27
DEVELOPMENT OF KATLI USING DEHYDRATED BETEL LEAVES

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Abstract Introduction - The deep green heart-shaped betel leaves popularly called as paan in India, belongs to Piperaceae family and known for its nutritional and medicinal value. The leaves are nutritive and contain anti-carcinogens showing promise for manufacturing of a blood cancer drug. Objective - The present study was undertaken to develop value-added katli/barfi from the same in an order to increase the consumption of betel leaves to exploit their nutritional benefits. Methodology - The present review aims to compile medicinal values of Piper betel generated through the research activity using modern scientific approaches and innovative scientific tools. Incorporation of betel leaf powder to coconut & milk katli was to develop a healthy snack/dessert for all age groups In the present study, a systematic approach was followed to develop and standardize the process for the preparation of betel leaf katli. Shade drying method was used to prepare betel leaf powder. It was evaluated organoleptically in comparison to a control sample using a 9-point hedonic scale. Results - Nutritive value (per 100 gm) of katli incorporated with betel leaf powder was found to be energy 367.3 kcal, protein 7.2 gm, fat 4.3 gm, calcium 583.6 mg. Conclusion - From the study, it can be concluded, that katli was found to be acceptable at 2 percent level of incorporation improved its nutritional quality without affecting its sensory qualities. Gul pan katli is a tasty healthy dessert for pregnant & lactating women. The innovative standardized katli may play a role in preventing protein-energy malnutrition and help in bone calcification in pregnant & lactating women. Keywords - betel leaves, katli, dessert, sensory evaluation.

FSN-O-28
DEVELOPMENT AND QUALITY EVALUATION OF KHAKHRA INCORPORATED WITH DEHYDRATED AMARANTH POWDER

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ABSTRACT Introduction - Green leafy vegetables (GLVs) are known to be inexpensive rich sources of micronutrients such as Vitamin A, Iron, β-carotene, etc. and utilizing them is one way of ensuring the micronutrient intake. Dehydration is one of the traditional methods of preservation, which converts the food into light weight, easily transportable and storable product. Objectives - A study has been undertaken to develop khakhra by incorporating dehydrated Amaranth Leaves Powder (ALP) at different levels. Methodology - The method of khakhra preparation was standardized and developed at 3 variation adding 5%, 8%, 10% of ALP. The developed products were subjected to sensory evaluation by 30 semi trained panelist using a 9 point hedonic scale. Results - Results of sensory analysis revealed that products incorporated with 5% dehydrated greens were similar to control in texture, taste and overall quality. However, acceptability scores reduced with increasing concentration of greens. Conclusion - Amaranth leaves powder incorporated products developed in this study were acceptable by people and can be a daily use snacks which will help community to maintain a healthy life. Better taste and superior nutritive value of khakhra added with ALP justifies as high consumer acceptability. Keywords - Dehydration, Amaranth leaves powder, khakhra, Variations, Sensory, Incorporated, Developed.

FSN-O-29
DEVELOPMENT AND QUALITY EVALUATION OF LADDU USING PLANTAIN FLOUR

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**Introduction**- Value addition of foods is of current interest because of increasing nutritional awareness among consumers. Today’s consumers diet lack in fiber intake therefore value addition using plantain flour is one of the best way to meet fiber and potassium needs particularly in plantain-based diets. An investigation was undertaken to develop fiber rich plantain laddu.

**Methodology**- Three variations were made by taking a reference of basic recipe. Variation-1 was prepared by incorporating 90% of plantain flour and 10% ragi flour, for variation-2 (80% RF and 205 PF) and variation-3 was done with 50% of RF and 50% PF. The products were subjected to sensory evaluation by 30 semi trained panel members using 9-point hedonic scale. Results & Discussion- Among all the three variations appearance was most accepted in variation 1 and rest of the attributes like color, texture, taste and odor was well accepted in variation 3, so by considering all aspects variation 3 (50% of RF and 50% PF) was accepted as a standardized product by the panel members. The standardized plantain laddu contained 203 k cal of energy, 3.14 gm of protein, 7.51 gm of fat, 116.84 mg of calcium, 2.12 mg of iron, 7.9 mg of vitamin c and 4.8 gm of total dietary fiber on dry weight. Proximate analysis was showed Carbohydrate 72.16 gm, Fat 21 gm and Protein 4 gm. Conclusion- In school going children’s this fiber rich plantain laddu product would replace the junk food, intern helps to reduce childhood obesity. Key words- PF (plantain flour), RF (ragi flour), fiber rich, sensory evaluation.

**FNS-O-30**

**Title**: DEVELOPMENT OF VALUE ADDED PRODUCTS FROM UNDERUTILIZED FRUIT- WOOD APPLE

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**BACKGROUND**- Wood apple (Aegle Marmelos) is an underutilized, former and indigenous fruit plant. It is a common fruit which can be consumed by all age group. Wood apple has got high medicinal value. Fruit pulp has anti-inflammatory, antipyretic and analgesic activity. The main objective was to study about the underutilized wood apple in the preparation of different products. METHODOLOGY- Four products were prepared by using wood apple pulp. An experimental method was followed. The sensory evaluation of the products was done by a panel of 30 semi-trained judges from nutrition background in the laboratory at Smt.VHD central institute of Home science and Research centre. The tool selected for the study was a ranking score. RESULTS AND DISCUSSION- The results of sensory evaluation revealed that among wood apple chutney, squash, jam and squash, the most acceptable product was wood apple spread. The proximate analysis showed about 245.21 Kcal of energy, 1.76 gm of protein, 1.17 gm of fat, carbohydrates ≤0.1 gm of crude fibre and 113.6 mg of calcium. CONCLUSION- The finding of the study was to study about the utilization of wood apple fruit in preparation of different products Wood apple have nutritional capacity to prevent and cure various diseases like kwashiorkor, marasmus, night blindness, cancer, diabetes, hypertension, PEM and hidden hunger. KEYWORDS- Wood apple, sensory evaluation, anti-inflammatory, medicinal value

**FNS-O-31**

**Title**: DEVELOPMENT AND QUALITY EVALUATION OF WHEAT LADDOO INCORPORATION OF GERMINATED HORSE GRAM

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Horse gram is one of the lesser know beans. Horse gram is an important crop of south India. Its grain is used for human consumption as ‘Dal. Pulses are good sources of cheap and widely available proteins for human consumption. Horse gram economically low compared to other pulses. It is prescribed for persons suffering from jaundice or water retention and as part of a weight loss diet. In the present study an attempt was made to develop nutritious laddoo using pulses. The main aim of this study was to incorporate pulses in people regular diet as sanck laddoo due to their health benefits and nutritive value. Laddoos were prepared using Horse gram, wheat flour, and ground nut, making several trails with different variation till the proper texture and consistency was obtained. Three variations along with basic form laddoo were subjected for sensory evaluation using 9 point hedonic scale and using 30 semi trained panellist. The results of sensory evaluation showed that the variation 1, Developed using 40 g wheat flour, 10 g horse gram, 15 g ground nut, and 35 g organic jaggery was best accepted. The results of chemical analysis showed that 78.53 percent of carbohydrate, 8.14 percent of protein, 1.80 percent of fat, <0.1 percent crude fiber, 62.7 percent of calcium and 1.49 percent of ash content was found to be present in 100g of the product. Thus the laddoo with cereal pulse combination increased protein quality, due to germination of horse gram it reduces the antinutrition factors, minerals, amino acids, protein and phytochemicals. Key words- Horse gram, wheat flour, protein, laddoos, amino acids, organic jaggery.
Germination improves the nutritive value of cereals and legumes and has been found to maximize the levels of utilizable and enhances of nutritional quality and an increase in the bioavailability of minerals and B-vitamins has been observed due to germination green gram and jowar. Moong beans contain balanced nutrients, including protein and dietary fiber, and significant amounts of bioactive phytochemicals. Jowar is a cereal grain. It is a good substitute for people with celiac disease or wheat allergies. Jowar has high-protein, is cholesterol-free source of a variety of essential nutrients, including dietary fiber, iron, phosphorus and thiamine. In the present study an attempt was made to develop nutritious laddoo using cereals and pulses combination in regular diet as snack laddoo, due to their health benefits and nutritive value and bioactive compounds are highlighted. Laddoos were prepared using sprouted green gram flour, sprouted jowar flour, the proper texture and consistency was obtained. Three variations along with basic form laddoo were subjected for sensory evaluation using 9 point hedonic scale and using semi trained panellist. The results of the sensory evaluation revealed that variation-3, developed using green gram(25g) and jowar(25g), peanut(10g), organic jaggery(30g), and sesamseed(5g) was best accepted. The results of chemical analysis showed that 62.14 percent of carbohydrate, 16.9 percent of protein, 1.4 percent of fat, <0.3 percent crude fiber, 217 percent of calcium and 1.49 percent of ash content was found to be present in 100g of the developed product. The innovative developed laddoo may play a role in preventing protein-energy malnutrition, calcium deficiency.Key words-Green gram, Jowar, Germinated, Laddoo, Protein, Cereals, Pulses.

Development and Quality Evaluation of Cupcakes Incorporating Green Leafy Vegetables. Shaziya Iram, Dr. Usha Devi C, Dr. Vijetha B V, Dr. Neeta Pattan. Smt.VHD Central Institute of Home Science, Bangalore-560054, Karnataka. Background- Green leafy vegetables are an inexpensive and rich source of vitamins, minerals, crude fiber and bulk. Although their nutritional value is well known, they are hardly consumed. They are essential in our diet and even more so for children, adolescents, pregnant and nursing women and the elderly who have a higher requirements for vitamins and minerals. Spinach and amaranth are high in nutrients and low in calories; rich in proteins, iron, vitamins, and minerals. Adding them to cupcakes provides their nutrients to a large bread loving population, especially children. Methodology- In this research, cupcakes were made using different types and proportions of green leafy vegetable puree. Three such variations were designed. Variation-01 had 10% spinach, variation-02 had 5% spinach plus 5% amaranth and variation-03 had 10% amaranth puree with a common banana cupcake base. Sensory evaluation was done to check their acceptability using 9-point hedonic scale by 30 panel members. Various characteristics like appearance, color, texture, taste, odor, and overall acceptability were scored on a rating of 9 to 1. Results- Variation-01 was the most acceptable product followed by variation-02 and then variation-03. Hence, variation-01, named â€œGreen Silk Cupcakeâ€​ was selected as the final product for budgeting and sales. Nutritional composition of the standardized cupcake was determined by conducting proximate analysis at IADFAC (Institute for Analysis of Dairy, Food and Cultures) Laboratory using standard procedures. The green silk cupcakes per 100g provide 312.72 kcal of energy and contain 1.53mg of iron, 7.44mg protein, 9.4g fat and 49.59g carbohydrates. Conclusion- Cupcakes can be eaten as a dessert or snack at any time of the day. Green leafy vegetable puree incorporated into a cupcake, increases its nutritive value and makes it more nutritious than the ordinary cupcakes. This product can be consumed by various age groups as it is rich in energy, protein and antioxidants.

Development and Quality Evaluation of Waffles Incorporated with Buckwheat Flour. Nabeela Jameel, Dr. Neeta Pattan and Dr. Usha Devi C. The consumer demand is increasing for composite flour based bakery products like cookies, waffles, biscuits, cakes. The incorporation of buckwheat flour into the all purpose flour can prove to be essential in only all purpose flour based waffles.
Buckwheat flour has nutraceutical properties and it is gluten free. These properties will make buckwheat waffles a suitable snack for health conscious people and those suffering from celiac disease. OBJECTIVE - The current study has been attempted to develop waffles incorporated with buckwheat. METHODLOGY- The procedure and formation of waffles was standardized and different alterations of waffles were developed by incorporating 10%, 15%, and 20% of buckwheat with all purpose flour. The developed products were imposed to sensory evaluation by semi-trained panelists using 9 point hedonic scale. The best approved variation was further used for proximate analysis. MATERIAL AND METHODS- Fresh and Best quality ingredients were used for the development of the product. 9 point-hedonic scale was used for sensory evaluation RESULTS- The waffles with addition of 15% of buckwheat flour got highest overall acceptability score in comparison with the other formulated waffles. Nutritional composition of best accepted waffles revealed 355kcal of energy, 10.2gm of protein, 11.42gm of fat, 52.89gm of carbohydrates and 171mg of calcium for 100gm of the product. CONCLUSION- The results poses that a replacement diet with buckwheat products exerts a protective effect on celiac disease patients, the youth and the senior citizens since the buckwheat flour is cholesterol free, gluten free, good source of protein and fibre. KEYWORDS- Waffles, Buckwheat, Gluten-free, Sensory Evaluation, Proximate comparison

FSN-O-35

DEVELOPMENT OF MAKHANA BASED LADOO

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The preparation of moong dal ladoo fortified with makhana was done with a aim of developing nutri rich product among the common population. the formulated ladoo was prepared with varying concentrations of makhana and moong dal. the developed product was subjected to sensory evaluation by a group of 30 semi trained panel members using a 9 point hedonic scale. The samples which gave the highest sensory score in terms of taste, flavor, and texture were selected for further analysis, it was observed that the test ladoos were rich in calcium [88.2mg/10g], energy [304 mg/100g] and carbohydrates [62.32mg/100g] when compared to the other variation ladoos [moong dal-makhana variations]. among the four variations, variation 3 was selected and it was better in taste, texture and appearance than the other variations, nutritional analysis of formulated ladoos showed that it was rich in energy, carbohydrates and calcium which can be a nutri dense snack for all the age groups

FSN-O-36

STORAGE STABILITY AND ACCEPTANCE OF SPIRULINA BISCUITS FOR DIABETIC SUBJECTS

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Background- The importance of antioxidants is found to be significantly high in diabetic diet therapy. The acceptability of the Standardised antioxidant rich Spirulina Biscuits were assessed. Storage stability of a product depends on its ability to remain edible during the storage period without bacterial/fungal invasion and change in Organoleptic Qualities. Aims/Objectives- 1. To evaluate the Organoleptic parameters of Standardised Spirulina Biscuits 2. To assess the storage stability of Spirulina Biscuits Methods- For Standardisation of the Spirulina biscuits recipe three variations were made by varying the spirulina content. Organoleptic parameters were evaluated in the laboratory with the selected panel of twenty judges. Ranking test and Numerical scoring tests were used to rank the spirulina biscuits. The consumer preferences of biscuits were measured using Nine Point Hedonic Rating Test by 25 diabetic and 25 non-diabetic subjects who were selected at random from Thiruvananthapuram. To test the shelf life period/microbial activity, the spirulina biscuit were packed in polypropylene covers and was stored in an air tight container at room temperature for a period of six months. After the storage period the total microbial counts i.e. bacterial and fungal colonies were determined by Serial Dilution Technique (AOAC, 1990). From the scores the best variation or combinations were identified and was selected. Results- Flour was sieved thrice with spirulina, salt, baking powder and made into medium stiff dough with powdered garam masala, green chilies and equal proportion of water and oil (1-1); and baked for 30 minutes at 1400 Celsius. The variations V1, V2 and V3 were made containing spirulina in the ratio 2.3-4. Organoleptic parameters were statistically assessed and on comparing the total scores and mean obtained between groups it was found that variation one (V1) containing 2.65g of spirulina per biscuit scored the maximum and costs Rs 18/100g including 20% tax. After an incubation period the Bacterial Colonies (Nutrient Agar Medium) and Fungal Colonies (Sabouraud Dextrose Agar medium) were found well within the specified limits. Conclusions and Recommendations- The Spirulina Biscuit was found to have good storage stability and acceptability and can be used to evaluate effectiveness of the food product among diabetic subjects.

FSN-O-37

FORMULATION AND ACCEPTABILITY OF FOXTAIL MILLET FLOUR BURFI
FORMULATION AND ACCEPTABILITY OF FOXTAIL MILLET FLOUR BURFI Bhagyajyothi Kotibagar1*and Pushpa Bharti1*

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INTRODUCTION- Foxtail millet is one of the oldest millet, widely cultivated in India, grown in adverse agro climatic conditions. Burfi is one of the Indian traditional sweet produced from roasted bengal gram flour with combination of ghee, sugar and cardamom. The present study was undertaken with the objective to study the effect of incorporation of foxtail millet flour in burfi. MATERIALS AND METHOD- The foxtail millet burfi was prepared with 50, 75 and 100 per cent incorporation of foxtail millet flour into roasted bengal gram flour. The nutritive value was computed using the nutritive value of Indian foods by NIN. The foxtail millet burfi was evaluated for appearance, colour, flavour, taste, texture and overall acceptability by using nine point hedonic scale by semi-trained panels. RESULTS- The results revealed that the sensory quality of foxtail millet burfi decreased with increase incorporation of foxtail millet flour. The overall acceptability score of control was 8.6 and the scores for 50, 75 and 100 per cent incorporation was 8.1, 7.1 and 7.0 respectively. Burfi incorporated with 50% foxtail millet flour had higher protein (21.1gm), fat (6gm), carbohydrate (65.5gm), calorie (1085Kcal) fibre (8.35gm), calcium (37.5mg), iron (3.86mg) per 100gm compared to other incorporations. CONCLUSION- The foxtail millet burfi prepared with 50 per cent incorporation of foxtail millet flour was found acceptable without affecting sensory attributes and it was as good as control i.e roasted bengal gram flour burfi.

FSN-O-38

RESPONSE SURFACE OPTIMIZATION OF GERMINATED SETARIA ITALICA FLOUR AND ITS APPLICATION IN NOVEL FOOD PRODUCT DEVELOPMENT

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Background Foxtail millet (Setaria italica L.) is an important cereal and nutritious food in traditional diets. Setaria italica act as a potential functional food ingredient and a supplementary protein source to most cereals, due to its high lysine content. The intrinsic nutritional and therapeutic properties of millet is enhanced by germination. The purpose of the present study was to optimize germination parameters and its utilization in food formulations. Materials & Methods Optimization of germinating temperature and time on proximate, antioxidant , phenol, flavonoids and tannin content of Setaria italica flour was carried out by using response surface methodology (RSM).Central Composite Rotatory Design (CCRD) was used for the optimization of independent variables (germinating temperature and time ) to obtain an enhanced germinated setaria italica flour. Results The high value of R2 for all the responses Protein (0.9), Fat (0.7), Carbohydrate (0.8), Ash (0.4), Phenol (0.8), Flavonoid (0.8), Tannin (0.8), DPPH (0.8) and Fibre (0.6) validated the model. Non-significant lack of fit (F-value) for each response further validated the model. Protein, Ash, fibre, flavonoid, phenol and DPPH were significantly (p<0.05) affected by germination bioprocess. The processing variables namely germinating temperature and time positively minimised the antinutrient called tannin, carbohydrate and high energy yielding nutrient known as fat. Those were the target parameters emphasised for reduction by means of germination and hence achieved.The optimal values obtained for the enhancement of germinated setaria italica flour were 33Å°C (germinating temperature) and 72hr (time) with high desirability. Conclusion Germinated setaria italica flour could offer inherent health benefits especially phytochemicals to the consumer. Furthermore, the results of this study explore the possible potential utilization of germinated millet grains in food formulations.

FSN-O-39

STANDARDISATION OF PRESERVED CANDY FROM WATERMELON RIND

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Background- Tropical fruit watermelon is abundant in supply during summer season and 1/4th of the fruit is getting wasted as rind and increases trash and this work was done to utilise waste product from market and thereby reduces the solid waste especially in street food markets. Material & Methods- Collected watermelon rind from nearby fruit vendors and a pre-cleaning was done; then cut dices were blanched and slow process candying method was carried out till it reaches 68Â°C brix using osmotic dehydration process that involves slow impregnation of syrup. During which colour and essence were also added and compared with commercial tutti frutti product. Then drained and dried at 45Â°C and 60Â°C separately and tested for every 6 hours up to 24 hour drying time. Results- It can be seen that the drying temperature and time significantly affected the moisture content and water activity of the dehydrated candy. The moisture content and water activity significantly decreased with increasing drying temperature and time. The hardness and
stickiness of the watermelon rind candy slightly increased with increasing drying time at 45 °C and 60 °C. Conclusion- Watermelon rind candy that was dehydrated at 45 °C for 18 h was the most preferred sample by the panellists as it received the highest score for texture, taste and overall acceptability attributes.

FSN-O-40
TO DEVELOP AND ASSESS THE ACCEPTABILITY OF A NUTRIENT RICH WEANING MIX INCORPORATING CAULIFLOWER GREENS- UTILIZING THE DISCARDED

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Background- Timely introduction of nutritionally balanced weaning food is the key to optimum growth for infants post six-months of life. The commercially available weaning foods are expensive and generally contain high amount of sucrose, sodium and preservatives. Hence there is a need to develop a cost-effective nutrient dense weaning mix using unexplored ingredients as an alternative to these foods. Thus in present study, a nutrient rich weaning feed incorporating cauliflower greens was developed. Its acceptability and shelf-life was assessed. Material & Methods- One-serving (30 grams) of standardized powdered mix contained rice, greengram whole, soybean, flaxseeds, cauliflower greens and carrots in the amounts 11.5g, 10g, 2.5g, 0.5g, 2g and 3.5g respectively. Two items- pancake and sweet-porridge were selected for sensory evaluation. Sensory trails were conducted using 9-point hedonic scale on fifteen semi-trained panelists (mothers of children of age 1-3 years). Nutritive value of the mix was determined by proximate analysis and shelf-life by microbial analysis at a NABL-accredited laboratory. The overall acceptability of the developed product was checked against the control product using paired t-test. Institutional Research Advisory Committee had approved the study. Informed consent was taken from all the panelists. Result- Pancake and sweet-porridge had sensory acceptability of 84% and 88% respectively. The overall acceptability of the developed products was significantly higher when compared to controls (p<0.05). The nutrient analysis revealed that the developed mix had higher carbohydrates and proteins, and lower fats as compared to control. One-serve of developed mix contributed about 12%, 27% and 5% of daily RDA for 1-3 year old children for calories, protein and fats respectively. The shelf life of the mix was found to be 20-days at room temperature and 30-days on refrigeration. Conclusion- The developed mix has a good scalability as a nutritious alternative to the contemporary weaning foods available in the market.

FSN-O-41
FISH CUTLET PREPARED FROM FRESH WATER FISH VARIETIES AND COMPUTATION OF NUTRITIVE VALUE OF THE PRODUCT

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FISH CUTLET PREPARED FROM FRESH WATER FISH VARIETIES AND COMPUTATION OF NUTRITIVE VALUE OF THE PRODUCT Soumya.P.S Kerala Agricultural University, Vellaya, Thrissur soumyahsc@gmail.com

Abstract Fish is recognized as an excellent source of protein, containing all the ten essential amino acids in desirable concentrations for human beings and available at cheaper rate. The present study, on â€œValue addition of fresh water fish varieties and computation of nutritive value of the productsâ€ was aimed at evaluating the nutrients and developing products from two fresh water fish varieties namely tilapia (Tilapia mossambica) and katla (Catla catla). Thus, in addition to the role of income generation, value addition helps to increase the acceptability of the fish which is presently under utilized. The fresh fish varieties were analysed for chemical constituents like moisture, fat, protein, calcium, phosphorus, iron and vitamin A. Yield of fish muscle was found to be high in fresh water species like katla (78 per cent) and tilapia (75.5 per cent). The fish cutlet was prepared following standard procedures and it was packed in polythene covers and stored for a period of two months. The peroxide value of the cutlet was found to increase with the storage period with significant variation. Fish cutlet made of katla fish had the highest acceptability throughout the storage period. Computation of nutritive value of cutlets per packet (4 cutlets, 20g each) revealed a high protein content in tilapia (11.92g) and vitamin A in katla (93.12Âµg). Key words - katla, Tilapia, cutlet, peroxide value

FSN-O-42
STANDARDIZATION, SENSORY PROFILE AND ACCEPTABILITY OF LOW CALORIE GRAPEFRUIT PRESERVED PRODUCTS FOR NIDDM PATIENTS IN TELANGANA, INDIA.

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Statement of the Problem- The obesity epidemic is driving the increased prevalence of type 2 Diabetes mellitus. Excess body weight is associated with the risk of cardiometabolic complications, which are major causes of morbidity and mortality in T2DM. Hence, the tart and tangy Grapefruit with multiple health benefits from addressing issues of excess weight and glycemic control simultaneously was selected for the study. The purpose of this study is to develop, determine the sensory properties and assess the acceptability of low calorie Grapefruit preserved products for non-insulin dependent diabetic patients using artificial sweetener Methodology & Theoretical Orientation- Majority of people with type 2 Diabetes are overweight or obese, and weight loss is a recommended treatment strategy. Thus, low calorie preserved products like Grapefruit spread and grapefruit ketchup incorporating artificial sweetener Sucralose in place of sugar were developed. The basic recipes of spread and ketchup were modified, standardized according to the Indian palate and threshold for bitterness then subjected to sensory evaluation for better assessment using a hedonic scale. NIDDM patients were selected to conduct the acceptability study. Findings- Excess weight is an established risk factor for type 2 diabetes thus adding sucralose was safe in adding sweetness and cutting bitterness. Grapefruit is known for its bitter taste but sensory evaluation revealed ketchup to be less bitter. Acceptability study carried out on diabetic patients revealed that Grapefruit ketchup was more desirable than the Grapefruit spread Conclusion & Significance- The dramatic increase in obesity associated in part with major worldwide changes in caloric intake and dietary composition, has focused attention on lifestyle intervention to ameliorate caloric imbalance therefore the inclusion of low calorie preserved Grapefruit products maybe recommended to the pre diabetic and diabetic patients to delay the long term complications and add variety to the diabetic diet and achieve glycemic control.

FSN-O-43

ENCAPSULATION OF PROBIOTIC BACTERIA (LACTOBACILLUS PLANTARUM MTCC5422) AND ITS STABILITY IN GASTROINTESTINAL CONDITIONS

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Encapsulation of Probiotic Bacteria (Lactobacillus plantarum MTCC5422) and its Stability in Gastrointestinal Conditions R. Rajam Assistant Professor (L-II), Department of Food Technology Bannari Amman Institute of Technology, Sathyamangalam, Erode - 638 401 E-mail- rajam@bitsathy.ac.in Background- Probiotics are live microbial supplements which provide numerous health benefits to humans. Microencapsulation of probiotic bacteria is an established technique to sustain the survival of probiotic bacteria and enhance the viability during processing conditions and delivery in the gastrointestinal tract. However the survival depends on various factors including encapsulation technique, wall material, processing and storage conditions etc. Material & Methods- Probiotic (Lactobacillus plantarum MTCC5422) microcapsules were prepared using whey protein isolate (WPI), denatured whey protein isolate (DWPI), and sodium alginate (SA) as a carrier materials in different combinations and core to wall ratios (1:1, 1-1.5) by spray drying (SD) method. The microcapsules were evaluated for the powder properties, encapsulation efficiency, storage stability (60 days) and gastrointestinal stability. Result- SD method yielded excellent powder properties such as spherical shaped microcapsules (20 Åμm to 100Åμm) with acceptable level of moisture content (4.5 to 7.0 %), lower hygroscopicity and good flowability. The morphology studies revealed that the particles are spherical in shape. SD method also exhibited maximum up to 93% encapsulation efficiency, better protection during storage and in simulated gastric and intestinal conditions (modified MRS broth - pH 2 and 0.3% pepsin, 4h). The cells encapsulated in DWPI+SA showed higher stability. Moreover, all the encapsulates of 1-1.5 core-to-wall ratio had improved relative cell viability than 1-1 due to increased wall material concentration. Conclusion- Hence, spray drying method has significant potential in the manufacture of high quality spray dried microcapsules with substantially lower processing time and denatured whey proteins had a better protection than the undenatured protein wall material.

FSN-O-44

EFFECT OF PROCESSING OF GRAINS ON FUNCTIONAL PROPERTIES OF COMPLEMENTARY FOOD MIXESAPURVA

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Background- Complementary foods with adequate nutrients and nutrient density are critical to provide optimal nutrition to young children also prevent growth faltering and undernutrition. However, high proportion of children from poor socioeconomic status receives cereal based bulky preparations with low nutrient density. Processing techniques can improve functional properties of grains, thereby improving nutrient density, digestibility and availability. This study was undertaken to find out the effect of processing of grains on functional properties of Complementary food mix. Materials and Methods- Locally available grains were subjected to roasting and tempering. Locally available staple grains were subjected to roasting and tempering. Roasting was done on medium flame until the grains changed colour (15-20 min/kg grains). Grains were tempered in water (1 ml/100g grains) at 37°C in incubator for 24 hours. The unprocessed, roasted and tempered grains were grained to flour (mesh size 0.1cm), to this food sources of micronutrients were added. Unroasted were served as control. The mixture were packed in suitable packaging material and analysed for functional
properties. Water absorption capacity (WAC), dispersibility, bulk density and viscosity were estimated of the mixes. T test were used to study the effect of processing technique. Results- WAC of processed formulations was significantly lower than control. Bulk densities, dispersibility and viscosity of the formulations were significantly lower from control. Bulk densities of mixes ranged between 0.601 ± 0.08 to 0.723±0.05. Dispersibility of mixes ranged between 82.67 ± 0.816 to 76.67±1.033. Conclusion- It has been observed that processing techniques improved functional properties of grains which in turn improved the nutrient density of mixes.

FSN-O-45

IMPACT OF FILLERS IN IMPROVING THE STRENGTH ATTRIBUTES OF POLYSACCHARIDE BASED COMPOSITE EDIBLE FOOD PACKAGING FILMS

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Edible Packaging is a consumer friendly guard made of edible materials for a food product which ensures security of the food it carries. It serves as a better alternative to overcome the impacts of synthetic polymers and impose positive footprint on the ecosystem. Major objective of this paper is to evaluate the impact of fillers-Wheat fiber and Oat fiber incorporation on the strength attributes of polysaccharide based composite edible packaging films. Methodology of the study was designed to develop polysaccharide based composite edible packaging films at laboratory scale from Cassava, Potato and Seaweed. The variations of the films were developed by the addition of two different plasticizers- sorbitol and glycerol and two different fillers â€“Wheat fiber and Oat fiber. The films developed were tested and compared for its strength attributes such as thickness, tensile strength, elongation at break, stress at break, strain percentage, moisture content. Overall findings of the study gave a clear cut view on the impact of wheat fiber and oat fiber on the strength of the polysaccharide based composite edible packaging films. Keywords- Edible Packaging, Filler, Mechanical Stability, Plasticizer.

FSN-O-47

KALANCHOE PINNATA À€“ A LESSER KNOWN PLANT WITH MORE MEDICINAL BENEFITS

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Background- The prevalence of kidney stones (Urolithiasis) is affecting 12% of world population at the age of 20-30 years and it happens more frequently in men than women, but now a dayâ€™s kidney stones are found in young childrenâ€™s at the age of 5 years also and their main cause is not drinking enough fluids and high intake of ultra processed foods. To highlight the properties of Kalanchoe Pinnata as herbal remedy for kidney stones. Material and Methods- 30-35 research papers were selected from Pub Med, research scholar, science direct, herbal medicine and other reputed journals. Result- Kalanchoe Pinnata has significant ability to dissolve (calcium oxalate) that is most common element in forming stones in urinary tract and also carry lots of phytochemicals such as flavonoids glycosides like quercitrin, kamferol, alkaloids, carotenoids and saponin. These flavonoids prevent forming of calcium oxalate element and CaOx crystal deposition in renal tubules. Kalanchoe Pinnata plant extract also reduces the size of calcium oxalate stone and has treatment and preventive action in urolithiasis. And also cure Properties such as Diuretic and Antiurolithic, anti diabetic, anti microbial, anti inflammatory, anticancer, anti ulcer, wound healing, Antileishmanial,Anticonvulsant,Antiproliferative,Hepatoprotective, Immunosuppressive and Immunomodulatory by leaf extract of Kalanchoe Pinnata which contain phenolics compound, tannins, titerpenses, steroids, lipids, cardienolides. Conclusion- Considering the properties of Kalanchoe Pinnata herb, a study should be conducted to develop a product and treat kidney stone by Kalanchoe Pinnata as herbal remedy.

FSN-O-48

FUNCTIONAL PROPERTIES OF NYCTANTHES ARBORTRISTIS À€“ WASTE MANAGEMENT STUDY
Background- Prevalence of gout is the most common form of inflammatory arthritis in men (5-27 per 1000 men). Gout rarely occurs in children and women before menopause. In gout 65% patients are suffering from socioeconomic class. Gout has been increasing although public awareness about the condition is extremely poor. Some genetic factors are important risk for development of gout. The drop out flower is used as a medicine purpose and it is also help in waste management. To highlight the properties of Nyctanthes Arbortristis as herbal remedy for gout. Material and Methods- 20- 25 papers were selected from different Pub Med, research scholar, science direct and other reputed journals herbal medicines. Result- Nyctanthes Arbortristis contain various properties of phytochemicals and pharmacological in the plant. Phytochemicals present in plants are flavonoids, glycoside, oleanolic acid, essential oils, tannic acid, carotene, friedelin. The decoction of N. Arbortristis flowers are used in treatment of gout. Anti-filarial activity the chloroform extract of the flower and a pure compound isolated from N. Arbortristis plant exhibit larvicidal activity against Culex quinquefasciatus, common filarial vector. It is used as a anti- allergy, anti- anxiety, anti- aggressive, anti- filarial, anti- diabetic, anti-malarial, anti-trypanosomal potential. Conclusion- Considering the properties of Nyctanthes Arbortristis, it can be used as a herbal remedy in gout.

FSN-O-49

SCANNING ELECTRON MICROSCOPY AND ELEMENTAL DISPERSIVE X-RAY ANALYSIS OF LOW GLYCEMIC INDEX (LGI) RICE, BROWN RICE AND COMPARE TO WHITE NORMAL RICE

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Scanning Electron Microscope (SEM) is one of the most powerful tools for carrying out detailed ultrastructures and elemental composition of biological materials. This could produce highly magnified images of an object. The SEM provides information on specimen surface (fine surface topography). Elemental Dispersive X-ray Analysis (EDAX) is a powerful tool for microanalysis of elemental constituents. To study the ultrastructural characteristics of Low Glycemic Index rice (LGI), brown rice for qualitative as well as elemental composition quantitative aspects pattern of by EDAX ray method of and compare to normal white rice. For SEM analysis as standard procedure is used for SEM and EDAX-ray methods Goldcoating (600ÅÈ) at sputter coating unit E-1010 (Hitachi Japan) at high vacuum. Scanned under SEM (S3400NHitachi Japan) at 15KV pictures were taken in different magnifications. For EDAX-ray analysis accessory (Model 7021-H-Make Horiba England) used. Scanning Electron Microscope studies of rice kernels showing starch granules packed compactly in orthorhombic and paracrystalline form within the cellular boundaries of the kernel. The creamy hue of the kernel is due to the paracrystalline nature of starch granules, which are refringent in light; these kernels are graded as good quality rice. SEM Showing the starch granule is also semi polygonal shape it is because of less pressure against other granules in Low Glycemix index rice sample 2 and 3. SEM of brown rice showing aluron layer in the outer surface of rice kernel. EDAX-ray analysis of sample 2 of LGI rice showing Phosphorous 0.19 and Potassium 0.17. In sample 3 LGI rice, Sodium Na 0.26, Chloride (Cl) 0.19 Potassium (K) 0.17 and Calcium (Ca) 0.11 more percentage compare to normal rice. In the brown rice Carbon 65.43, oxygen 37.89, sodium 0.34, phosphorous 0.09 potassium 0.16 chloride 0.05 and calcium 0.13. The results of the present findings useful for the role of elemental analysis in normal cereal grain production however this is first microscopically study showing normal structure in all rice kernels. It is observed in the previous study the SEM and EDAX-ray analysis of rice grains showing various ultrastructure and elemental composition also showing different values compare to normal grains. This type of study will be useful for to compare with control and damaged rice to avoid consumption of rice apparently normal from the storage commodities particularly from godowns. It is also useful to warn poor people in villages to avoid consumption of rice stored for more than three years or damaged rice (old rice) from markets.

FSN-O-50

FINGERPRINTING GC-MS AND LC MS-MS PROFILE OF ETHANOLIC EXTRACTS OF ROASTED SOY BEAN (GLYCINE MAX. L.)

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Soybean, a Subtropical edible plant species which is native to south eastern part of Asia. It has a long history for its edibleness of more than 5000 years ago . Now it is a most important crop among the world mainly cultivated for its protein and oil content. Analytical
The chemistry of medicinal plants is experiencing incessant growth in the recent decade. Keeping that in view, this study was aimed to examine and explore the bioactive components and its chemical composition. The chemical composition of phyto estrogens and phospholipids present in the ethanolic extract was determined by high-performance liquid chromatography. The ethanolic extract analyzed by GC-MS technique showed the presence and identification of 20 compounds. The identified important compounds of high biologically active were . The compounds in the ethanolic extracts of roasted soybean were characterized by liquid chromatography-mass spectrometry and the profiling indicated that several different types of esters were present in the active extracts. This findings of this provides scientific evidence to some of the medicinal uses of roasted soybean (Gycine max.L).

FSN-O-51
DIELECTRIC MICELLAR MINING AND PYROGENIC GRANULAR STRETCHING IN CHANNELIZATION AND LOCALIZATION OF PLANTAIN-PULP STARCH-MATRIX LATTICE
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Culinary banana aka plantain pulp provides several autotrophic phytochemical substituents that serve calorie-nutrient purpose and promotes potential health benefits in heterotrophic human body. Human civilization introduced genus Musa since ancient times of agriculture-food supply chain, the breeding-harvesting technologies of crop-produce evolving and triumphing although its processing-preservation treatments of end-product still trailing. The problem with older heat treatments such as conduction and/or convection is that it causes premature or random energy distributions which consequently evoke uncontrollable hydrothermal disturbance or collapse particularly in heat-sensitive microgranular vicinity. The technical odds can be rejected and replaced through applying highly selective and effective thermodynamics; in current study we tried to transform hot-air oven dried plantain pulp powder with known microwave potentials to validate its technological efficacy in a food factory as well as household facility. The dielectric dehydration induced via volumetric microwave heat resonance significantly (p<0.5) lowered water-activity (aw) and porosity simultaneously through amplifying tapped bulk density (I) and mean particle size (Z), evidenced by enhanced oil absorbance (%OAC) in test (MPF) flour. The failure of framing effective heat-moisture exhaust vents and exchange pumps in raw (RPF) along with purified (starch) samples signified the necessity of starch-matrix lattice channelization and localization respectively. The dipolar discharge entrapped in the micellar-matrix due to penetrable pyrogenic mining developed visible hue difference, especially in the yellow-brown spectra and assisted DPPH-radicle scavenging activity. The physical-modification viz. radioactive dielectric-dipole expansion derived probably from tandem phenyl-lyranose pair shuttling and stretching delivered proper vibrational and rotational Raman-line/mid-FTIR pattern. The applied double polarization density relaxation dual-process allowed co-transformation and co-extraction in undertaken starch-matrix complex. Former helps in swelling and gelling by engaging and exchanging hot vapor viscosity while the latter assists the purification of micellar/granular phases under trans-ionizing suspensions such as alkaline liquid (0.2M NaOH solution) soaking used here.

FSN-O-52
A STUDY ON EVOLVEMENT AND SENSORY ACCEPTABILITY OF PRODUCTS DEVELOPED FROM TERMINALIA ARJUNA - AN EXPLORATION ON TRADITIONAL HERB.
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Abstract- Non-communicable diseases are the major cause of death worldwide and its incidence are increasing every past day due to lifestyle as well as environmental changes. Herbal medicines have been used since ages to cure and prevent various diseases, one such blessing of nature is Terminalia arjuna, an ancient ayurveda herb that is known for its cardioprotective effect. The bark powder is being used in Asian subcontinent for various treatment like anginal pain, hypertension, cholesterol etc. It is mostly available in other parts of the world as well in the form of herbal powder, tablets, tea etc. Various studies support presence of polyphenolic compounds such as flavonoids, phenolics, tannins and glycosides as major bioactive compounds present in which are responsible for vast potential health benefiting properties such as prevention of chronic diseases, antioxidant activity and promotion of overall health. The present study focused on the development of different products (nutritional bars & chips) using T. arjuna. The process for making products were standardized using suitable concentrations of T. arjuna. The products were consecutively analyzed for their sensory acceptability.

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using a 5-point hedonic scale. On applying statistical tests, significant difference (p<0.05) were observed among different samples of developed variants. The findings of the present study may help in developing commercial products for effective utilization of unexplored attribute of T. arjuna. Keywords- Terminalia arjuna, cardioprotective, hypertension, antioxidant, etc.

**FSN-O-53**  
**A POSITIVE CHANGE TOWARDS TO IMPROVED VEGANISM- ALTERNATIVE TO EGG**

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Green gram dhal is a nutrient-rich food. They’re packed with minerals like potassium, magnesium, iron, and copper. In addition to this, they also contain folate, fiber, and vitamin B6, apart from loads of high-quality protein. Rich in B-complex vitamins. The folic acid present in it also helps maintain healthy brain function and in the production of DNA. Green gram dhal also contains some amounts of vitamin E, C and K. The green gram dhal is mainly cultivated in East Asia, Southeast Asia and Indian Subcontinent. Guar Gum is also known as Goma Guur which is frequently used as a food additive in many processed foods. It improves digestive health, lowers cholesterol and manages the blood sugar level. Veganism is the practice of avoiding the use of animal products, particularly in diet, and an associated philosophy that rejects the commodity from that of animals. Veganism is a form of food consumption pattern. The vegan diet is low in cholesterol and many essential vitamins and minerals like Vitamin C, Vitamin D, Calcium, etc. Vegan foods generally reduce the risk of cardiovascular diseases, cancer and Diabetic Mellitus. Vegan egg is such type of product where it acts as the replacer of eggs. The Vegan Egg is made from algae flour, which is made from microalgae. Both the Vegan Egg and algae flour itself is gluten-free, vegan, allergen-free, soy-free. Hence vegan diet is good for developing countries like India where availability of good quality protein in low price can reduce the risk of malnutrition. The vegan eggs acts as a best alternative for animal eggs and also provides same level of nutrients to all the vegans. This can use in places of egg irrespective of the purpose because of its same nature.

**FSN-O-54**  
**IMPACT OF SUPPLEMENTATION OF MILLET ICE CREAM FOR UNDERNOURISED SCHOOL GOING CHILDREN (6-12 YEARS)**

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ABSTRACT IMPACT OF SUPPLEMENTATION OF MILLET ICE CREAM FOR UNDERNOURISED SCHOOL GOING CHILDREN (6-12 YEARS) P.Santhiya1 and PA.Raajeswari2, Post Graduate Student1, Assistant professor2, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore Ice cream is a delicious, delicate and nutritious which makes everyone to come behind and relish its taste. Freezing and aerating a pasteurized mixture of ingredients including milk products, sugar, emulsifiers, stabilizers, flavoring compounds and water is the technique behind its preparation. The dairy foods of the future promise to be healthful and functional. Finger millet (ragi) is one such product. In India now-a-days, there is an increased interest in finger millet due to its excellent nutritional value and health benefits. Finger Ice cream represents a sector in dairy industry where the most value addition has taken place in the past two decades. The nutritional value of finger millet is better than other cereals. It is rich in protein, iron, calcium, phosphorous, fiber and vitamin A, vitamin B. Ice cream is made by churning and chilling a mixture containing high-fat milk or cream, fructose or glucose based sweeteners, usually in the form of corn syrup and flavorings such as vanilla or chocolate the rich, creamy consistency of ice cream, a food that can affect our health in both positive and negative ways. Incorporation of highly nutritious ingredient like ragi ice cream will help in improving the nutritional as well as functional properties of ice cream. Ice cream faces a problem of high fat content 12-14 percentage. Its good thickening and water binding properties it is hypothesized that incorporation of finger millet in ice cream as a functional ingredient can result in reducing the amount of stabilizer used and effectively function as a fat replacer in ice cream. Hence, the finger millet ice cream can be used as a supplement for protein energy malnutrition.

**FSN-O-55**  
**EFFECT OF NATURAL, BACK-SLOPE AND CONTROLLED FERMENTATION METHODS ON THE QUALITY CHARACTERISTICS OF SELECTED FINGER MILLET (CO14) FLOUR**

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Abstract for oral presentation

Background

Malnutrition is one of the major crises in India; nearly 40% of the Indian children were suffering from malnutrition. Millet is one of the major groups of low-cost cereals, considered as a rich source of macro and micronutrients, fibres and phytochemicals. The fermentation process increases the major and micro-nutrients, probiotics, digestibility and bioavailability and reduces the anti-nutrients. Hence, this present study carried out to evaluate the effect of traditional and specific fermentation methods on the quality characteristics of a selected finger milled (CO-14) variety. Materials and methods The finger millet (CO-14) obtained from TNAU, was made into slurry and subjected to various fermentation methods including natural fermentation (kept at 37°C for 40h), Back-slop fermentation (naturally fermented slurry at 5% was added as a starter culture and fermented at 37°C for 40h) and controlled fermentation (slurry was sterilized using γ-irradiation of 5kGy followed by the addition of LAB starter culture and fermented at 37°C for 40h). The quality characteristics including proximate composition, physicochemical properties, functional properties, microstructural properties and functional groups were analysed. Result The results show that the carbohydrate and fat content of the fermented finger millet slurry significantly increased in natural fermentation (72.37%-77.20%, 1.96%-2.20% respectively) and back-slop fermentation method (77.20%-76.21%, 1.96%-2.27% respectively) compared to the controlled fermentation (76.87%-76.27%, 1.78%-2.11% respectively) whereas in terms of protein, it was significantly reduced in controlled fermentation (6.22%-4.29%). There wasn't a notable significant difference between the fermented samples concerning to the physio-chemical and functional properties. Microstructural properties were showing a significant difference between the fermented samples. Conclusion From the results, it is evident that the traditional fermentation method could be utilised with the modern advanced techniques (application of specific bacterial culture) to produce more value-added products to eradicate the malnutrition from the community and also could be used to provide, supplements to the protein-related inborn error of metabolism.

Nutrition and Health Policy Research

NPR-O-01

Fish consumption pattern of Indian population

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Background- The importance of fish in the diets of people has been increasing because of its proven health benefits. It is considered as an irreplaceable animal-source, providing essential nutrients of high bio-availability which are found in limiting amounts in the diet. The paper analyses the fish consumption pattern among the Indian population and the factors affecting the pattern of fish consumption. Materials and methods- Secondary data from NSSO reports, FAO reports, Census 2011 and Fisheries statistics from the Department of Animal Husbandry and Dairying, Government of India were analysed to arrive at the conclusions. Statistical tools such as frequencies and percentages, have been used to express the results. Results- As per the reports of FAO, the per capita average annual consumption of fish and fish products in India was 5.2 kg in 2010 which contributes to around 13% of animal protein. The average monthly per capita consumption of fish is higher in rural India (269gms) than urban India (238gms), however the expenditure on fish is less in rural India. But urban population was found to spend more on meat than fish. The percentage of households consuming fish is more in rural India (28.2%). Lakshadweep tops in fish consumption with 4.24 kg per person per month and the least amount of fish is consumed in Chandigarh (0.008 kg). Nearly 80% of households of Lakshadweep consume fish. Access to fish in the floodplains of western India and the coastal regions are the reasons for the high consumption. But contradictions can also be seen. For example, although Andhra Pradesh tops in fish production (2.35 million tonnes), the consumption of fish in the region is second lowest (0.131 kg/month) among the Indian coastal states. Similar is the case with Gujarat, although being a top producer of marine fish (0.72 million tonnes), lags behind in fish consumption (0.052 kg/month). Among the 9 coastal states and 2 islands, the number of households consuming fish is less than 50% in Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Tamil Nadu. In Goa, Kerala, West Bengal, Andaman and Nicobar islands and Lakshadweep islands, the number of households consuming fish is more than 80%. Although Gujarat has the highest mainland coastline in India, and 52.6% of its population inhabits the coastal districts, the consumption of fish is very less. Conclusion- The pattern of consumption of fish in India does not solely depend upon the production of fish and availability but also on various other social and cultural reasons.

PR-O-02

DETERMINANTS OF HOUSEHOLD CONSUMPTION OF PULSES IN INDIA â€“ A MULTI-LEVEL MODEL APPROACH

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Background- Pulses can play an important role in achieving nutritional security in India through the provision of quality protein. Before promoting pulses, it is imperative to understand the patterns of consumption and production of pulses across districts and the drivers of consumption. In this study we examine the household and district-level factors of availability, accessibility and affordability
that affect household intake. Materials and Methods- Data on pulse consumption was obtained from the 68th round of the Consumer Expenditure Survey National Sample Survey Organization (2011-12) and on district annual pulse production (2011-12) from Area and Production Statistics, Ministry of Agriculture and Family Welfare. Multi-level linear modelling of household pulse consumption was performed with district-level pulse production, household and district-level covariates. Results- Average availability, i.e. annual production surplus in a district is positively and significantly associated with household pulse intake. In terms of affordability, a 10-rupee decline in a district’s mean pulse price can improve the average annual household intake by 1.607 kg, while a 1000-rupee increase in a household’s monthly expenditure improves it by 1.87 kg. Accessibility to markets, (distance of the district to the nearest tier-I or II city) was significantly negatively associated. Household-level characteristics like maximum education attainment by a woman in the household and the household’s engagement in pulse production were positively and significantly associated with household pulse intake. These effects were significant even after adjusting for mean per capita expenditure of the district.

Conclusions- Affordability, market accessibility and regional availability of pulses are vital aspects for a household’s pulse intake, which is a cheap source of protein. A whole host of household and regional-level characteristics are at play and policies to promote nutrition security and improve pulse consumption cannot prioritize one over another.

NPR-O-03

A REVIEW OF TRENDS IN INFANT AND YOUNG CHILD FEEDING PRACTICES AND BOTTLENECKS IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS 2030 TARGETS IN INDIA

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Background- Optimal infant and young child feeding (IYCF) practices are critical to child’s survival, health, nutrition and development. India is committed to World Health Assembly- 2012, endorsement and Sustainable Development Goal targets on nutrition Material & Methods- Data from National Family Health Survey (NFHS) was analyzed for trends in IYCF practices in India. Reports and articles on IYCF practices were analyzed to summarize bottlenecks in achieving optimal IYCF. Result- Early initiation of breastfeeding showed a small increase from 23.4% (NFHS-3) to 41.6% (NFHS-4) at national level, despite substantial increase in institutional deliveries. Major bottlenecks were increase in institutional deliveries in private sector (especially Caesarean section) with lack of skilled staff, lack of antenatal counseling on IYCF and early introduction of infant formula. Increase in exclusive breastfeeding rate (0-6 month) was minimal, 55% (NFHS-4) compared to 46.4% (NFHS-3). Median duration of exclusive breastfeeding increased from 2 months (NFHS-3) to 2.9 months (NFHS-4) and any breastfeeding increased from 24.4 months (NFHS-3) to 29.6 months (NFHS-4). Important barriers were lack of supportive work environment, poor family and community-based support, use of pre-lacteal feeds and perceived insufficiency of breast milk. As per NFHS-4 only 45.7% of infants got complementary feeding along with continued breastfeeding between 6-9 months (a decline of 11% from NFHS-3). In children 6-23 months, only 10% had minimal acceptable diet. Socio cultural factors, lack of caregivers/health workers knowledge about frequency, quantity, consistency and variety of foods were important barriers for adequate complimentary feeding. Conclusion- IYCF practices have improved over the last two decades, however accelerated and consistent efforts with locally adapted IEC strategy for community awareness, skill based training of health care providers, forming community-based support groups, ensuring supportive environment at workplace, government investment in relevant policies and programme along with monitoring and evaluation is a need of the hour.

NPR-O-04

IMPACT OF FOOD PRICE SUBSIDY ON DIETARY DIVERSITY IN TAMIL NADU

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The present study attempted to address the impact of subsidized rice supply through public distribution system on dietary diversity and nutrition gain in Tamil Nadu as the state is considered as an innovative for all sorts of food security programs. We used NSSO data for the year 2004-05 and 2011-12, and propensity score matching technique to assess the actual impact of the subsidy program. Estimated results revealed that the subsidy on rice has significantly and positively impacted food consumption and nutritional intake of all households and varies depending on income categories in the state. The reallocation of increased purchasing power among poor was limited only to the staple food commodities of rice, millets, pulses and vegetables, whereas for middle and high income families have redistributed the gain of subsidy more towards high value commodities such as fruits, processed food and livestock products and consequently higher gain of fat and calcium. Thus extending the price subsidy for nutritious foods along with rice would help for diversified consumption pattern as well as healthy nutrient intake.

NPR-O-05

CORRELATION AND REGRESSION ANALYSIS OF NUTRITIONAL PRACTICES OF RURAL WOMEN- SOCIO - ECONOMIC AND DEMOGRAPHIC VARIABLES OF E - LEARNING INTERVENTION STUDY

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Keywords Practices Â· E-learning Â· KAP Â· Regression Background/Aims- Educating women through E-learning will eventually change the education map of the country. E-learning intervention study integrating 2D animation has been found to be better than traditional learning. The study aimed to study the nutrition and health practices of rural women and its correlation coefficient and establish its effect on socio-economic and demographic variables. Methods- A 2D animated film on basics of nutrition, health and hygiene was shown to 30 rural women of reproductive age group (15-49 years) belonging to three different villages for 6 months and post intervention data related to practices was measured using a standardized questionnaire. Correlation coefficient and regression between socio-economic and demographic variables and nutrition and health post practices scores was computed. Results- The post-practice scores showed age and family type positively significant whereas occupation highly negatively significant. Occupation, family type, income and urban contact had high significance and independent effects at 0.01 level with an R value of 21 per cent. Practice was an independent variable forming an integral part of peoples behavior. This study indicates there were several other factors responsible for such typically low R - squared values, thus it was necessary to include the confounding factors affecting practices of rural women to provide a better picture of the influence of dependent variables. Conclusion- Socio economic and demographic factors could not adequately describe the nutrition practices among rural women.

NPR-O-06

PROTEIN INTAKES OF PREGNANT WOMEN AND YOUNG CHILDREN IN RURAL INDIA Â€“ IMPLICATIONS OF PROTEIN QUALITY AND AN ADVERSE ENVIRONMENT

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Backgroundâ€“ A prevalence of 18% low birth weight (LBW) and 38% stunting in <5y were reported in the National Family Health Survey. While the quality of protein intake could promote positive birth outcomes and linear growth in children, the impact of adverse environments could add to the demand. Judging dietary protein quality is difficult without knowledge of indispensable amino acid (IAA) requirements, which is unknown in pregnancy. This study aimed to determine IAA requirements of pregnant women, and influence of adverse environments on IAA requirements of <5y children. These values were used to evaluate protein quality of their diets in relation to nutritional outcomes from a national representative rural survey. Methodsâ€“ Protein accretion rates and IAA composition of foetal tissue were used to determine IAA requirements in pregnancy. Environmental stress was assumed to increase IAA requirement by 20% in <5y children. Using these estimates, Digestible Indispensable Amino Acid Score (DIAAS) and risk of quality-protein inadequacy (using estimated average requirement cut-point method) were assessed in their diets, from the rural National Nutrition Monitoring Bureau (NNMB) survey. Spearmanâ€™s correlation was performed to evaluate association between dietary protein DIAAS and nutritional outcomes. Resultsâ€“ The IAA requirements in pregnant women were 30% and 60% higher for 2nd and 3rd trimester respectively compared to non-pregnant non-lactating women. The DIAAS corrected risk of dietary protein inadequacy was 77% in pooled NNMB dietary intakes of pregnant women, and 40% in <5y children. State-specific dietary protein DIAAS showed an inverse correlation with the prevalence of stunting, underweight and LBW (rs= âˆ‘0.73, P<0.05, rs= âˆ‘0.88, P<0.01 and rs= âˆ‘0.53, P= 0.09 respectively). Modest additions of animal source food improved the DIAAS estimates to â‰¥90%. Conclusionâ€“ Protein quality and environmental conditions should be considered while evaluating dietary interventions, which could inform the policy of supplementary nutrition programs for vulnerable populations.

Nutrition Education and Communication

NEC-O-01

THE SYNERGISTIC EFFECT OF VITAMIN D AND CALCIUM IN THE PREVENTION OF CANCER

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Background- Potentially all foods have nutritional value, aroma and taste, but now people are looking for other physiological properties such as acting as an antioxidant, boosting the immune system, aiding digestion and having anti-cancer properties. Methods- The high prevalence of vitamin D and calcium deficiency is combined with the discovery of increased risks of certain types of cancer
which is being accounted for several thousand premature deaths from colon, breast, ovarian and prostate cancer annually. This study makes an exploration through the epidemiological studies related to vitamin D, calcium and cancer risks. Studies were reviewed which were done on the cell lines to evaluate the anti-tumour effect of vitamin D and calcium. The purpose of this work is to put into the perspective, the correlation between vitamin D and calcium in underlying the prevention of certain types of cancer. The objective of this study is to portray the effect of Vitamin D and calcium rich diet on a healthy life is much broader than just basic nutrients. There is a very simple way to prevent many diseases. Eating well is best. Results- Vitamin D plays a key role in the prevention of cancer through its anti-proliferative, pro-apoptotic and anti-angiogenic effects on human cells. Vitamin D and calcium are metabolically interrelated and highly correlated dietary factors. It is observed that only combined calcium and vitamin D supplements could significantly reduce the general incidence of cancer of the breast, lung, colon, and uterus as well as of the lymphoid and myeloid system. Conclusion- Vitamin D and calcium was found to positively affect cell differentiation. They are promising candidates in functioning as a stimulating factor in the prevention of certain types of cancer.

NEC-O-02

ATTITUDES TOWARDS FOOD SAFETY, PERSONAL HABITS, ENVIRONMENTAL HYGIENE AND SAFE FOOD HANDLING PRACTICES AMONG RESTAURANT WORKERS IN CHENNAI AND THE IMPACT OF AN AWARENESS PROGRAMME ON THEIR KNOWLEDGE OF FOOD SAFETY

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Background- The present study was planned to assess the attitudes towards food safety among food service personnel working in restaurants in Chennai city and to evaluate the impact of an awareness program on their knowledge. Personal habits, environmental hygiene and safe food handling practices followed by participants in the study was also observed and documented. Materials & Methods- 100 food service personnel working as food handlers in restaurants in Chennai city, were selected as participants for the study. Data on attitudes of workers towards food safety, employeeâ€™s opinion on attitude of their colleagues in terms of hygiene when working with food, personal habits, environmental hygiene and safe food handling practices followed were collected. An awareness program was conducted and its impact on food safety knowledge was assessed. Results- Highlights of the study are as follows, â€œ 90.6 percent of females agreed that additional education on food safety is important, compared to male participants (86.8 percent). â€œ Wearing clean cotton uniform was followed by 95.6 percent of the participants, wearing head cap by 72.1 percent, wearing apron by 70.6 percent and wearing proper footwear by 82.4 percent. â€œ 86.8 percent were following the practice of washing hands before and after handling raw meat and produce and 80.9 percent were using separate cutting boards for raw meat and vegetables. â€œ 68 percent were following the practices of putting broom and mop properly after use, keeping dumpster lids closed and dumpster areas cleaned and storing pesticides as cleaning agents away from food stuffs. â€œ 84 percent of participants answered all questions on knowledge assessment on food safety correctly. Conclusion- Imparting of knowledge on food safety will lead to better attitude and practices of food safety. This will lead to higher standards of personal hygiene, and food preparation and service, thereby ensuring safe food for the consumers.

NEC-O-03

THE ASSOCIATION OF SELECTED VARIABLES WITH THE NUTRITIONAL STATUS OF TYPE II DIABETES PATIENTS- A CROSS SECTIONAL STUDY

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Background- People with diabetes are likely to suffer from poor nutritional status for several reasons including their change in food pattern, reduced physical health, mental stress, affected body functions and disease affected budget; the situation gets most unpleasant when there is multiplication of these factors. Thus the present study has been conducted with the aim to appraise the association of selected variables with the nutritional status of type II diabetes patients. Materials and methods- A total of 500 type II diabetes patients who attended the outpatient department of one of the leading hospitals in Thiruvananthapuram were selected for the study. Details on socioeconomic profile, morbidity profile, anthropometric parameters, biochemical profile, clinical status and dietary factors were collected from the patients through direct interview method. From these data Physical Quality of Life Score (socio-economic variables), Life Style Score (lifestyle variables), Food Habit Score (dietary variables), Dietary Nutrition Index (nutrient intake), Clinical Signs Score (clinical signs and symptoms) and the Nutritional Status Index were worked and these scores along with selected individual variables like age of the patient, their monthly income and duration of disease were correlated with their nutritional profile.
to assess the interdependence. The statistical methods employed were Pearson’s Chi-square and Correlation analysis (SPSS version 21.0). Results: The relation was established based on the critical value $\pm 0.088$, those variables having values above+0.088 and below -0.088 had statistical significance. Thus it was found that, out of the selected variables, the duration of disease (-0.209), Physical Quality of Life Score (0.131) and the Clinical Signs Score (0.204) were found to have significant association with the nutritional status of the patients. Conclusion: The findings of the study suggest that the nutritional status type II diabetes patients is negatively associated with the duration of diabetes, where as positive association had been observed with improved physical quality of life and patient clinical signs.

**NEC-O-04**

**ASSOCIATION OF EATING HABITS AND BODY WEIGHT STATUS AMONG THE UNDERGRADUATE TRAINEES AT DIETARY DEPARTMENT OF SUMANDEEP VIDYAPEETH**

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**Background:** Obesity is inextricably linked with environmental, sociocultural as well as behavioural aspects. Ultimately, energy balance plays a major role in obesity. Increased intake of foods that are high in energy and fat are suspected as major contributors to rising levels of obesity. The present study was conducted to examine the association of dietary pattern in relation to extent of overweight and obesity among the students of Sumandeep Vidyapeeth. Objectives: To determine the association of dietary pattern of students studying in tertiary care institution with the Body Mass Index (BMI) as an index of overweight and obesity. Material and methods: A cross-sectional study was conducted in the campus of Sumandeep Vidyapeeth, Vadodara wherein students ($n=70$) were selected through purposive random sampling. A self-reported questionnaire including food frequency table and anthropometric measurements was used for data collection. Anthropometric measurements included height and weight, based on which their BMI was calculated. For statistical analysis, Microsoft excel 2013 was used. Results: The mean age of students was 20.67±0.82. The mean BMI was 21.33±3.60. A total of 18.5% of the students were obese, 12.8% were overweight and about 24.2% were having normal BMI. Only 13% of girls consumed high nutritive value foods daily. Majority of the subjects (41.4%) were consuming fast foods once a week, about 8.6% consumed wafers every day. Total consumption of HSFF was positively correlated with overweight status. ($p<0.001$). Conclusion: In conclusion, the findings suggested that dietary pattern high in HSFF (High fat sugar and salt) is associated with higher indices of overweight and obesity whereas dietary pattern comprising of foods like dairy products, sprouts, salads and GLVs is associated with lower indices of obesity. The findings would be baseline data for further research with interventions to change the faulty food pattern of youngsters through BCC. Key Words: BMI, HSFF, Dietary Pattern, Obesity

**NEC-O-05**

**IMPACT OF NUTRITION EDUCATION INTERVENTION ON THE NUTRITIONAL STATUS AND LIFESTYLE PATTERN OF FEMALE TEACHERS OF A COLLEGE**

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Women health is very important as it reflects the health of the family. Various factors have adverse effects on nutritional status of women. This is an interventional study which aims to impart Nutrition Education to female teachers of a college and study its impact on the Nutritional Status and lifestyle pattern. This study was conducted in Dr. B. R. Ambedkar University, Agra. The study sample belong to age group of 25-45years. Using random sampling a total number of 100 teachers were selected from the college. The study was conducted in three phases. In the pre intervention phase, basic demographic details, medical history, and the BMI of 100 subjects was found and categorized into Normal, Overweight, Obese, and Underweight, based on WHO criteria, 2004. The subjects that fall under normal category of BMI and/or having any medical history of illness/diseases were excluded from the study. In the second phase, data was collected using a structured questionnaire consisting of Anthropometric assessment (Height, Weight, BMI, Waist to Hip Ratio), Haemoglobin, Dietary Assessment (Three day consecutive dietary recall, food frequency) and lifestyle pattern of the subjects. Individual and group nutritional counselling to the subjects was given using a developed Nutrition Education tool. In the post intervention phase, the data was collected using the structured questionnaire and was analysed using statistical analysis. The results showed that the BMI of Underweight subjects improved from 17.3±0.5 to 18.9±1, followed by overweight individuals (26.6±1.36 to 25.5±1.57) and Obese Individuals (31±1.4 to 30.0±2.0) with a significant difference at $p<0.05$. The results also showed that...
there is a significant impact of Nutrition Education on Dietary and lifestyle pattern of the subjects (p<0.05). Thus it can be concluded that Nutrition education as a tool has an impact on nutritional status and lifestyle pattern of the female college teachers.

**NEC-O-06**  
**IMPACT OF NUTRITION EDUCATION AND QUINOA ON POST PRANDIAL VALUE IN DIABETES**

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**ABSTRACT**

Background- In diabetic subjects, type of cereal used has an impact on glycemia and nutritional therapy can help in management of Glycemic status. Objectives- To determine the efficacy of Nutritional Counseling and Quinoa supplementation on postprandial blood sugars in diabetic subjects. Methods- Patients were randomly divided into two groups. The experimental group (n=10) received nutritional counselling and Quinoa (Raw-60g) based meal at lunch for 28 days .The control group (n=10) received only nutritional counselling and were not given any supplementation. Results. In experimental group, there was a decrease in the postprandial blood sugars at the end of study period compared to the baseline (181.6 Â± 82.5 to 136.7 Â± 21.5 mg/dl) (p=0.09) however not significant. There was a statistically significant decrease in the intake of energy, carbohydrates and fats (p<0.05), with a non significant increase in protein intake (p=0.1). In the control group, there was a non-significant increase in the PPBS levels at the end of study period (217 Â± 83.4 to 228.4 Â± 101.1 mg/dl) (p=0.39).The control group subjects showed a statistically significant decrease in the intake of energy, carbohydrates, and fats (p<0.05) with a non–significant increase in the daily protein intake (p=0.17) at the end of study after nutritional counselling. The baseline PPBS (181.6mg/dl) levels statistically similar between the two groups, however, the PPBS levels at day10 (151mg/dl), day 20(149.9mg/dl) and end of study were significantly lower in experimental group as compared to the control group (p<0.05). Conclusion: Quinoa supplementation caused a significant decrease in PPBS levels . The study also shows the effect of nutritional counselling, as there was an improvement in the macro-nutrient intake status in the control group as well.

**NEC-O-07**  
**ASSESSMENT OF PERCEPTION OF MYTHS AND AWARENESS ABOUT DIABETES AMONG TYPE-2 DIABETES SUBJECTS IN SELECTED HOSPITALS IN MYSURU CITY**

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Myths and misconceptions are one of the barriers which impedes the diabetics from presenting their problem to a healthcare professionals. Therefore, health education plays a pivotal role in in increasing the awareness about diabetes and its complications, thereby reducing the number of deaths due to micro- and macro-vascular complications of diabetes. A short-term hospital based study was carried out to assess the awareness among 30 diabetics between 30 and 60 years, attending a government hospital and a corporate-multiplicity hospital in the city. A questionnaire was developed to collect information on baseline characteristics, anthropometric measurements, biochemical parameters, medical history, and life-style practices of the subjects and to assess their perception of myths and awareness about the disease, its complications and management and the results were evaluated according to the set local norms. Results of the study revealed that majority were obese and dyslipidemic, irrespective of the gender. Men showed a poor glycemic control than women though on medication, regardless of hospital they attended. Overall dietary and health care practices were poor among them. Most common myths prevalent among the study group were- diabetics should eat special foods only like ragi and millets in cereals, diabetics should never eat sweets and chocolates, all bitter tasting foods reduce blood sugar level and eating to the end of study period compared to the baseline (181.6 Â± 82.5 to 136.7 Â± 21.5 mg/dl) (p=0.09) however not significant. There was a statistically significant decrease in the intake of energy, carbohydrates and fats (p<0.05), with a non significant increase in protein intake (p=0.1). In the control group, there was a non-significant increase in the PPBS levels at the end of study period (217 Â± 83.4 to 228.4 Â± 101.1 mg/dl) (p=0.39).The control group subjects showed a statistically significant decrease in the intake of energy, carbohydrates, and fats (p<0.05) with a non–significant increase in the daily protein intake (p=0.17) at the end of study after nutritional counselling. The baseline PPBS (181.6mg/dl) levels statistically similar between the two groups, however, the PPBS levels at day10 (151mg/dl), day 20(149.9mg/dl) and end of study were significantly lower in experimental group as compared to the control group (p<0.05). Conclusion: Quinoa supplementation caused a significant decrease in PPBS levels . The study also shows the effect of nutritional counselling, as there was an improvement in the macro-nutrient intake status in the control group as well.

**NEC-O-09**  
**EFFECT OF TRUWEIGHT PROGRAM ON THE KNOWLEDGE AWARENESS AND PRACTICES OF POLYCYSTIC OVARIAN DISEASE AMONG THE ENROLLED CLIENTS**

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Background - Polycystic ovarian disease (PCOD), observed among women in reproductive age where multiple cysts occur in the ovary affecting one in 15 women worldwide. Reasons are multifactorial and studies have shown that most women are unaware of the conditions resulting in further complications. Truweight is a diet and lifestyle management program. The objective was to ascertain the effect of truweight program on the knowledge awareness and practices of the enrolled PCOD clients. Materials And Methods- A descriptive study was conducted among 106 known PCOD clients (18 to 40yrs) using Purposive sampling technique for five months. Using structured questionnaire, Knowledge, Awareness and Practices (KAP) were assessed before and after Truweight programme. During the study, education related to healthy diet, awareness on symptoms, lifestyle habits and healthy practices in the day to day life through telephonic counselling, educational videos and blogs. Collected data were coded and subjected to suitable analysis and results were presented as mean, standard deviation and â€œtâ€œ™ test was conducted to assess the changes in the pre and post KAP. Results- Results revealed menstrual characteristics such as age at menarche for 52.83 per cent were between 10 to 12 yrs, majority had irregular cycles, lasts for < 3 days, and painful cycles. Initial mean scores of Knowledge, Awareness and Practice were 4.20±1.10, 4.68±1.04, 3.94 +1.16, respectively. Final mean scores of Knowledge, Awareness and Practice 9.30±0.97, 9.03±0.83, 9.13±0.99 respectively. Mean overall KAP scores were found to be significantly higher after the Truweight program at p < .01 indicating that following Truweight program improves knowledge, awareness of PCOD conditions and healthier diet and lifestyle practices. Conclusion: The result concluded that Truweight program will have an impact on overall health of the clients. The current study recommends that along with medication, diet and lifestyle modifications, imparting knowledge, creating awareness and training healthy practices will help in better management of PCOD. Keywords: PCOD, Truweight, Clients, Polycystic ovarian disease, Knowledge, Awareness, Practices

Sports Nutrition

SPN-O-01

DETERMINANTS OF KNOWLEDGE, ATTITUDE, AND PRACTICE OF SPORTS NUTRITION AMONG ADOLESCENT INDIAN KABADDI PLAYERS

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Background Ensuring adequate nutritional status is integral to the training of sports persons to achieve optimum performance. Studies have shown the dearth of adequate knowledge of nutrition among adolescent athletes. Kabaddi remains one of the popular traditional and emerging sports in India that demands physical strength and mental alertness. A paucity of information exists regarding the Knowledge, Attitude and Practice (KAP) of sports nutrition in adolescent Indian Kabaddi players and determinants of KAP of these players. Material and Methods Adolescent Kabaddi players (n=156) attending national-level tournament were recruited for the study. Information on socio-demographic background and KAP of sports nutrition was collected using pre-tested and structured questionnaire. Further, univariate and multivariate analyses were performed to identify the socio-demographic determinants of KAP in this group of players. Result The results showed that coaches were the source of nutrition information for three-quarter of players(76.3%). Three-fourth of players never used any supplements to improve their nutritional status. Nutrition knowledge scores were correlated to the practice scores (p=0.004) of the players. Female participants had significantly higher nutritional knowledge and practice scores, respectively (male vs. female- 4.4±1.6 vs 5.65±1.6; p=0.000) (male vs. female- 4.8±1.6 vs 5.4±1.4; p=0.014) than males. Age and gender-adjusted multivariate analyses showed that education status of mothers significantly influenced the nutritional knowledge (ÂŸ(95%CI)-1.07(0.24,1.90) (p=0.012) and practice (ÂŸ(95%CI)-0.60(0.06, 1.13) (p=0.029) of the participants. Participants from rural areas compared to urban living settings had significantly higher nutritional practice scores (ÂŸ(95%CI)-0.79(0.29,1.29) (p=0.002). Conclusion The role of socio-demographic factors contributed to the variations in nutrition knowledge and practice among players. Considering the impact of socio-demographic factors on KAP of nutrition, mandatory sports-specific nutrition education is recommended to all the players during their training to ensure their optimum nutritional status.

SPN-O-02

"EFFECTIVENESS OF DIETARY INTERVENTION REGIME IN RELATIONSHIP TO EXERCISE KINETICS AMONG ELITE PROFESSIONAL SWIMMERS."

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Background - Training and recovery are the two important cornerstones of athletic success. Besides fueling physical performance, nutrition has an important role in athletes overall well-being. Optimal nutrition tends to help athlete to recover faster, prevent injuries and stay focused. Adequate nutrition assists in the ability to train intensely, as well as in muscle recovery and metabolic adaptations to endurance exercise. Methodology- With this backdrop proposed investigation was performed to evaluate inter-relationship between

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exercise physiology and dietary adequacy among swimming athletes of urban Mysore region. Investigation was conducted using standardized checklist with oral interview method by randomized sampling technique. Results- Significantly energy and protein inadequacy were noted among non-swimmers in comparison to professional swimmers. Respectively vitamins and minerals inadequacies were observed among non-elite swimmers. Despite nutrient inadequacy was noted among both groups in comparison to RDA 2010. Dietary adequacy of trained athletes has to be optimized to ensure maximum adaptation towards very intense and long-duration physical loads. Anthropometry has been positively related to stroke rate, stroke length and stroke velocity. Highly significant relationships were found between 50 and 400 mts freestyle sprint and the mean power of arms and legs. Flexibility is important for stroke form especially in the recovery and pull phase. Vo2 max is very closely related to a 400 mts swimming performance. Particular attention should be focused on female athletes. Conclusion- Evident nutrition education intervention found to support competitive swimmers at risk of physical injury, psychological harm along with poor recovery, diminished health and ultimately altered performance. KEYWORDS- Swimming athlete, Dietary Adequacy, Recovery, Nutrition, Flexibility, Nutrition Intervention.

**SPN-O-03**

**ASSESSMENT OF B-VITAMINS STATUS IN ATHLETES PARTICIPATED IN LOW STATIC HIGH DYNAMIC GAMES**

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**Background**- Adequate micro nutrient intake by athletes have a crucial role to maintain their physical strength and stamina and also for better performance. B-vitamins help in metabolism and promote tissue repair. Objectives- The aim of the present study was to assess Vitamin B6, B-12 and folic acid status in athletes. Methodology- This cross sectional study included both male (n= 72) and female (n=44) athletes participated in low static high dynamic games by point time convenient sampling technique. Non consecutive 3 days diet recall method was used for dietary assessment. Fasting blood was drawn for biochemical assays. Anthropometric and exercise related data were collected by using standardized protocol. Descriptive statistics and t-test was done for statistical analysis. Pearson correlation was used to determine the association between dietary intake and serum levels of B-vitamins. Results- Biochemical assays of serum Vitamin- B6, B-12 and folic acid was found within normal range in both the sexes and serum folic acid level was significantly higher (p=0.0) in female athletes whereas serum B6 level was higher (p=0.01) in their male counterpart. Dietary assessment showed an insufficient intake of vitamin B6 where as folic acid and B-12 intake was adequate when compared with Indian Recommended Dietary Allowance. 42% of total participants reported as using dietary supplements and in some cases they exceeded the RDA values for particular nutrient. There was a significant association (p=0.00) between dietary Vitamin B-12 intake and serum B-12 level. Conclusion- This study reported normal serum level of b- Vitamins in both male and female participants. Expert professional suggestions and assistance and a thorough investigation is strongly advised before any supplementation program.

**SPN-O-04**

**IMPACT OF â€œSYNBIONIC SUPPLEMENT ON ATHLETESâ€**

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Sports nutrition is the foundation of athletic success. It is a well-designed nutrition plan that allows active adults and athletes to perform at their best. A sports nutrition diet may vary day to day, depending on specific energy demands. Sports nutrition is unique to each person and is planned according to individual goals. The energy required for living and physical activity comes from the food and fluid intake. The right food type, caloric intake, nutrient timing, fluids, and supplementation are essential and specific to each individual. Each one of the basic substances of the food has specific function in providing nourishment for the sportsman, under the physical, mental and emotional strains of competition. The athletes diet should be high in carbohydrates, moderate in proteins and low in fat. Meal timing and type is important for the athlete. The introduction of synbiotics into human diet is favourable for the intestinal microbiota. When probiotics and prebiotics are combined, they form a symbiotic. Fermented dairy products, such as yogurt and kefir, are considered as symbiotic because they contain live bacteria and the fuel they need to thrive. Symbiotic foods beneficially affects the host by improving the survival of live microbial content in the gastrointestinal tract and by selectively stimulating the growth of health promoting bacteria. Adaptations to exercise might be influenced by the gut microbiota, which plays an important role in the production, storage, and expenditure of energy obtained from the diet. Healthy bacteria improves digestion by increasing the
bioavailability and absorption of proteins and fats, which can reduce nausea, bloating, intestinal inflammation, hypersensitivity which are the common complaints in athletes during and after training.
(WC), systolic blood pressure (BP), and triglyceride concentrations were inversely associated with vitamin D concentrations. 84% are with deficient levels of vitamin D. Conclusion- Vitamin D deficiency was found to be common in Indian women. Elevated WC, BP, and triglycerides were found to inversely associate with low serum levels of 25(OH)D. Improving vitamin D status would be useful in improving the health in middle-aged urban women.

**CLN-P-03**

**PERCEPTION TOWARDS NUTRITION SUPPORT IN CANCER PATIENTS UNDERGOING RADIATION THERAPY**

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**Background**- Under or over-eating & their adverse health consequences result from some core beliefs (conventional & unconventional) as well as the knowledge of the inherent composition of food intake. Studies have indicated the need for nutritional support in this regard. Objective- To examine the relationship between the perception of need for nutritional support and the prevalence of specific needs, perceptions, and their beliefs in nutritional support. 

Methodology- A Likert-Scale Survey questionnaire was floated among adult cancer patients (receiving radiation therapy & having consented to participate in the survey) in Cytcare Cancer Hospital, Bangalore to understand their perceptions on nutritional support. Results- A total of 151 patients (21% having breast cancer & 19% having head & neck cancers) participated in the survey that spanned from September to November 2018. Out of the respondents, while forty five percentage were found to be overweight, a majority sixty-five percent were deemed as well-nourished (as per SGA (Subjective Global Assessment)). When it came to perceptions on the preferences of specifics about the nutritional support administered to the respondents, 94% preferred nutritional counselling, 91.3% preferred ideas to improve food intake, 76.1% preferred oral nutritional supplements, 5.9% opted for parenteral nutrition and hydration & 5.9% preferred tube feeding. Further, around 57.1% of the respondents preferred receiving nutritional intervention at the first instance of diagnosis or treatment while 95.3% consented that the nutritional support team were the best medical staff to provide the requisite nutritional support. Conclusion- Cancer patients expressed a greater need for nutritional support at the instance of diagnosis or treatment with higher preference towards obtaining consultations from Dietitian rather than other medical staffs. Also, patients lacking the ability to eat did not prefer enteral or parenteral nutrition. Key words- Perception, Dietitian, nutrition support, oral nutrition supplement, cancer, subjective global assessment (SGA).

**CLN-P-04**

**NUTRITION MANAGEMENT IN HEAD AND NECK CANCER PATIENTS UNDERGOING RADIATION THERAPY**

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**Background**- Patients suffering from head & neck cancer, which happens to be the seventh most common causes of malignancy in the world(as per WHO 2014 reports), are subjected to several nutrition-related difficulties such as difficulty in eating, alterations or loss of taste, mucositis, xerostomia, nausea, vomiting, fatigue, dysphagia and weight loss with the treatment-procedure adding to the magnitude of these problems. Objective - To minimize malnutrition and improve the quality of life (QoL) in head and neck cancer patients through prophylactic nutrition interventions. Material & methods - The single-centred nutrition education method was administered to all adult head & neck cancer patients undergoing radiation therapy in Cytcare Cancer Hospital, Bengaluru. Retrospective Data obtained from a pool of 50 patients, who had undergone radiation therapy during the month of June to August 2018 (Group A), was analysed & compared with prophylactic nutrition education group of 50 head & neck cancer patients from September to November 2018 (Group B). Outcome measures were QoL-assessed using EORTC 30 and nutrition status assessed using SGA at baseline and end of treatment. Result - When compared to the standard practices of Group-A (p < 0.01), Group-B, which received prophylactic nutrition education, demonstrated significant improvement in QOL & Nutritional Status accompanied by minimal loss of body weight post the treatment getting fully administered. Conclusion - Nutritional education backed by prophylactic treatment resulted in significant improvement of QoL and nutritional status compared with standard practice in patients undergoing cancer treatment. Key words- Head and neck cancer, Quality of life (QoL), prophylactic nutrition intervention, nutrition status, body weight.

**CLN-P-05**

**MONITORING ENTERAL FEEDING PRACTICE, FACTORS IMPEPING TO ATTAINING OPTIMAL NUTRITIONAL GOALS FOR ICUS PATIENTS IN A TERTIARY CARE HOSPITAL**

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Background- The purpose of this study was to evaluate the factors which prevent the attainment of daily feeding goals for reaching optimal nutritional goals in ICUs. Method- This study was a three months observational study and used a descriptive research design. This study was conducted on 48 patients in medical and trauma ICUs of PGIMER, Chandigarh who were on enteral feeds. Daily documentation of feeding practice and potential barriers to the reaching optimal nutrition for first ten days of admission was recorded. Actual intake was expressed as the percentage of prescribed volume (a success is defined as 90% or more) and it was guided by the protocol but adjusted to individual patient conditions by the intensivist. Results- Out of 48 eligible patients 52% (25 of 48) were males, 60% of patients were between 40-60 years age group. The mean age was 39.4 Â± 15.1 years. The mean time of enteral nutrition (EN) initiated was 10.31 Â± 9.6 hrs and 100% were on bolus feeding. The mean number of interruption in EN was 3.9 Â± 3.3 days. The ICU mortality rate was 22.9% (11 of 48). The withhold amount of enteral formula constitutes about 25% of prescribed calories, protein and 21% of enteral volume. About 35% patients (17 of 48) severely underfed in terms of calorie and protein. A significant discrepancy between prescribed and delivered nutrients was demonstrated during 10 consecutive days from ICU admission. The most common reasons for non attainment of daily feeding goals were feed being held for diagnostic procedures 43.75% (21 of 48), Gastro intestinal complications 27% (13 of 48). Conclusion- The records revealed an unsatisfactory feeding process. Initiating better feeding techniques like continuous feeding to avoid the Gastro intestinal complications. Meticulous recordings of intake and interfering factors help to uncover inadequacies in ICU feeding practices.

CLN-P-06

ASSESSMENT OF NUTRITIONAL STATUS USING DIETARY AND BIOCHEMICAL PARAMETERS IN SUBJECTS DIAGNOSED WITH PRE-DIABETES

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ABSTRACT Background--Pre-diabetes is a condition with blood glucose levels higher than normal but not high enough to be diagnosed as Diabetes. Considerable number of people in the pre-diabetic stage will go on to develop type 2 Diabetes. Most people with pre-diabetes are asymptomatic but are considered to be at high risk of developing Heart disease and stroke. Objectives--To assess the nutritional status using dietary and biochemical parameters in subjects diagnosed with pre-diabetes. Methods--This study was carried out on 30 subjects of both gender between age 30-70 years. They were given predesigned questionnaires to obtain information on demographic, family history, dietary pattern and food frequency. The parameters analysed were glucose and lipid profile in fasting condition. Results-- The study showed more prevalence of pre-diabetes between 51-60 years age group showing FBS about 100 to 125. Among all subjects 50% were hypertensive and the causative factor found to be low physical activity, high carbohydrates and fat intake. Lipid profile (HDL, LDL, VLDL) of the subjects was normal. Most of the subjects BMI and Waist/ Hip ratio was towards obesity. Abdominal obesity was found to be more in females than male subjects. Conclusion-- In the present study, Low physical activity, high carbohydrates and fat intake were found to be the major causative factors of pre diabetes an obesity. Diet counseling was given to the subjects to delay the condition of pre diabetes to diabetes. Life style and diet modification especially increasing physical activity was advised to the subjects.

CLN-P-07

VITAMIN D COMBINED WITH VITAMIN K CO-SUPPLEMENTATION PREVENTS HYPERGLYCEMIA VIA ACTIVATING GAMMA-GLUTAMYL CARBOXYLATED GROWTH ARREST SPECIFIC PROTEIN 6 (GLA-GAS6) IN TYPE 2 DIABETES

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Background- Growth arrest specific protein 6 (Gas6) have recently attracted scientific attention because of its important role in various health disorders including insulin resistance and impaired glucose metabolism associated with type 2 diabetes (T2D). Interestingly, the functional activities of Gas6 have been regulated by the vitamin K (VK)-dependent gamma-carboxylation of its glutamic acid residues. Moreover, vitamin D supplementation has also been found to stimulate the synthesis of gamma-glutamyl carboxylated (Gla) proteins. This study examines the hypothesis thatVD and VK co-supplementation may reduce the impaired glucose metabolism via activating Glu-Gas6 in T2D. Methods- Patients with T2D and age-matched healthy controls attending clinic at CSIR-North East Institute of Science and Technology have been included in this study. The plasma levels of VD, VK, Gla-Gas6, Gas6, fasting glucose, insulin, and HbA1C were measured in all subjects. The effects of VD and VK co-supplementation on glucose metabolism were examined using high fat diet (HFD)-fed male albino mice model of T2D. Oral glucose tolerance assay, plasma
biochemical assay, immunoblotting, immunoprecipitation, and ELISA were performed to understand the molecular mechanism. Data were analyzed statistically by using Sigma Stat statistical software. Results- Circulating VD, VK, and Gla-Gas6 were significantly lower in patients with T2D. Interestingly, Gla-Gas6 or Gla-Gas6/Gas6 ratio was significantly and inversely correlated with fasting glucose in T2D patients. Moreover, Gla-Gas6 and Gas6 were also positively correlated with VK and VD, respectively, in T2D patients. This suggests that VD and VK co-supplementation may reduce the hyperglycemia via augmenting Gla-Gas6. Further animal studies demonstrated that combinatorial supplementation of VD (67 IU/kg BW, 8 wks) and VK (3 µg/kg BW, 8 wks) at their physiological doses reduced the glucose intolerance and fasting glucose and increased the plasma Gla-Gas6 levels compared to those seen in either VD or VK alone supplementation in HFD-fed T2D mice. VD and VK co-supplementation also stimulated the Gla-Gas6/P3K/pAKT/GLUT4 signaling pathway of glucose metabolism in skeletal muscle tissues of T2D mice. Conclusion- The present study for the first time demonstrates the beneficial effect of VD and VK co-supplementation in preventing hyperglycemia via activating Gla-Gas6. The outcome of the study will be beneficial for the development of a novel adjuvant therapy to achieve better control of glycemia and that may improve the lives of T2D patient population.

**CLN-P-08**
COMPARISON OF ACUTE GLYCEMIC AND INSULINEMIC RESPONSE OF FOSSENCE™ WHEN ADDED/SUBSTITUTED INTO AN ORAL GLUCOSE CHALLENGE- AN ACUTE, RANDOMIZED, CROSS-OVER, DOUBLE BLIND CLINICAL TRIAL

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**Background-** Prebiotic fibers demonstrate a range of health benefits including attenuation of postprandial glycaemia. Objective of this study was to determine whether, FossenceTM, a sweet tasting, soluble non-viscous short-chain fructo-oligosaccharide (scFOS), will attenuate postprandial blood glucose and insulin levels when added to a carbohydrate challenge or when it is substituted (30%) for available carbohydrate. Material & Methods- Study used a randomized controlled cross-over design for which 25 healthy adults (40±14years) were recruited. In separate tests, each subject consumed, in randomized order, either 50g Dextrose (50Dex), 50g Dextrose+15g FossenceTM (50Dex+15FOS-addition), or 35g Dextrose+15g FossenceTM (35Dex+15FOS-substitution). Blood samples (finger prick method) were collected at fasting and 15, 30, 45, 60, 90 and 120 min after start of test meal ingestion. Plasma glucose and serum insulin were analyzed utilizing standard methods. Results- Addition of FossenceTM to a carbohydrate challenge (50Dex vs 50Dex+15FOS) showed no significant difference in glucose peak levels, incremental glucose levels or incremental insulin levels at any time point. Substitution of carbohydrate by FossenceTM (50Dex vs 35Dex+15FOS) showed that glucose IAUC and insulin IAUC for 35Dex+15FOS was significantly lower than of IAUC by 50Dex (p<0.002 and p<0.0003, respectively). At 60 and 90 min, plasma glucose levels were significantly lower after 35Dex+15FOS meal compared to 50Dex (p<0.0001). Incremental insulin levels were significantly lower at 45, 60 and 120 min after 35Dex+15FOS meal compared to 50Dex (p<0.02). Peak insulin levels were significantly lower after 35Dex+15FOS when compared to 50Dex consumption (56.9±5.5 vs 80.0±9.1 μIU/ml; p<0.001). Conclusion- Results demonstrate that adding 15g of FossenceTM to glucose load does not significantly change 2h glucose or insulin IAUC, neither does it modulate postprandial glucose or insulin levels but 30% substitution attenuates postprandial glucose and insulin levels. Therefore partial substitution of carbohydrate using FossenceTM may be an effective way for individuals wanting to reduce sugar intake.

**CLN-P-09**
COMPARATIVE BIOAVAILABILITY OF SYNTHETIC B12 AND DIETARY VITAMIN B12 PRESENT IN COW AND BUFFALO MILK- A PROSPECTIVE STUDY IN LACTOVEGETARIAN INDANS

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**Background-** In humans, oral uptakes of CN-B12 and HO-B12 are similar. Employing an animal model, it is demonstrated that, though the two forms of B12 are absorbed alike, they distribute differently within the body. HO-B12 has tendency to accumulate mainly in liver. These findings question whether the two vitamin forms are of equal value for improvement of B12 status. The present study was undertaken to compare biomarkers of B12 status during four weeks of supplementation with equivalent amounts of B12, administered in either vitamin capsules (CN-B12), cow milk (dietary HO-B12), or buffalo milk (dietary HO-B12), in Indian individuals with a low B12 status. Material & Methods- Three groups (n = 22, 23, 22) received daily oral doses of cyano-B12 (2 Å—
CLN-P-10

DEVELOPMENT OF LOW GLYCAEMIC INDEX FOODS FOR PREVENTION OF DIABETES

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Background- The Glycaemic index is a measure of the food power to raise blood glucose concentration after a meal. For healthy eating, foods with low glycaemic index are recommended .Utilization of the low glycaemic index and high fibre foods in the diet of diabetics should be included to maintain the glucose level and for long term control of diabetes. Hence the existing study was designed to develop low glycaemic index products for prevention of diabetes. Methods - The low glycaemic index products were developed by incorporating low glycaemic index food stuffs . These products were evaluated for sensory attributes , nutrient content and microbial count. The cost of each product was calculated. The clinical implication of these products was carried out on 10 healthy female subjects belonging to age group >18 years and the glycemid index of the developed products was determined. Results - It was observed that developed low glycaemic index products were highly acceptable for all the organoleptic parameters . The highest protein content was recorded by Multigrain roti (21 g) followed by Mix pulse Roll (20.12 g) whereas highest fibre content was recorded by Millet mix (3.11 g) followed by Millet Namkeen (2.75 g). Shelf life of developed products was studied. Safe storage period for Millet namkeen was 1 month, and for Multigrain Roti it was 2 days All the products under the study were found to be of low glycemic index category with GI value <55. The lowest glycemic index was found in Millet mix (30.22) followed by Millet Namkeen (34.53). Conclusion - The glycemic index of developed products was <55 . It was in the range of 30.22 to 40.90.Hence the inclusion of these developed low GI products in the daily diet is the preferable option for the dietary management of diabetes mellitus.

CLN-P-11

THE INDISPENSABLE ROLE OF FLORA ON IMMUNE SYSTEM METABOLISM

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This study has been done to analyse the effect of nutritional elements on human immune system. Immune cell function and metabolism are closely linked. Many studies have now clearly demonstrated that alterations in cellular metabolism influence immune cell function and that, conversely, immune cell function determines the cellular metabolic state. Several studies have demonstrated that under nutrition is associated with immune suppression, which leads to both increased susceptibility to infection and protection against several types of autoimmune disease, whereas over-nutrition is associated with low-grade, chronic inflammation that increases the risk of metabolic and cardiovascular disease, promotes auto reactivity, and disrupts protective immunity. Higher and lower nutritional value changes the metabolism in which the micro biota plays a fundamental role in invading immune system. In return, the immune system has largely evolved as a means to maintain the symbiotic relationship of the host with these highly diverse and evolving microbes. When operating optimally, this immune system-micro biota alliance allows the induction of protective responses to pathogens and the maintenance of regulatory pathways involved in the maintenance of tolerance to innocuous antigens. This phenomenon is proposed to account for some of the dramatic rise in autoimmune and inflammatory disorders in parts of the world where our symbiotic relationship with the micro biota has been the most affected. Keywords- Immunological nourishment, metabolism, microbes, autoimmune and inflammatory disorder.
Assam is traditionally a rice growing area. Rice plays a pivotal role in the socio-cultural life of the people of the state. The crop has enormous diversity in the region, which has resulted due to highly variable rice growing ecosystems. Besides, the region is inhabited by a large number of ethnic groups whose preference also varies from one another. All these factors are responsible for evolution of a large number of varieties in the region. Most of these have been in use from time immemorial with traditional method of preparation. Unknowingly people have selected many useful cultivars, which have commercial value in the present day world in which people prefer to have varieties of tastes. The science of food processing and preparation technique is based on the understanding of physical and chemical change that occur during processing. The knowledge can be used to combine food ingredient in diverse ways to prepare innumerable products with delicate flavour and colour which delight the senses. Food preparation technique is very much a part and parcel of the culture of the region. Each region has its own method of blending flavors to bring about acceptable combination. It is necessary to retain or produce desirable appearance, colour, flavour and moisture in the course of preparation. To achieve the ends, it is necessary to understand the method used in the preparation of food. The paper deals with indigenous and improved processing techniques and method of rice practiced by the Assamese community. Key Words - Rice, Food processing , Assam

IMPACT OF SOCIO-ECONOMIC STATUS ON NUTRITIONAL CONDITION OF CHILDREN IN SAMASTIPUR DISTRICT.

ABSTRACT Background -- Child malnutrition is one of the most vital global health problems concerning in most of the poor communities leading to higher mobility and mortality. 43 percent of Indian children under 5 years age are underweight and 48 percent are stunted due to chronic under nutrition. Bihar is considered to be one of the most food unsecured state in India so focus is required on various dimensions and indicators of nutritional status. Several studies indicated that consumption of protective foods such as pulses, leafy vegetables, milk and its products are inadequate. The condition of malnutrition mainly manifested in children. Hence an attempt has been made to assess the impact of socio economic status on nutritional condition of children. Method and materials- - Sample of 100 children in the age group of 3-8 years were selected from Pusa Block of Samastipur district (Bihar) using random sampling method. An interview schedule was formulated to get information regarding socio economic profile like type of family, size of family, education and income of the family along with consumption of the food materials to assess the nutritional condition. Result -- 72 percent of the family belonged to joint family. More than half (58%) of respondents belonged to large family, two third (76%) of the mother were illiterate. Educational status of 67 % family was poor. About 50 % of the respondent family were not having stable income and they were ill paid. A large section of the children suffer from malnutrition as they belonged to landless and poor house holds. Lack of nutrition knowledge and faulty food habits are the main cause of malnutrition. Most of the children (about 70%) were not getting adequate amount of protective foods specially pulses, green vegetables and milk etc. only seven percent were consuming animal food products. Conclusion -- Our finding suggests that for eradication of malnutrition and for improving nutritional condition
of the society, the first task is to improve socio-economic status of the population specially education level and income level of the family.

CMN-P-03

PHYSICAL ACTIVITY AND DIETARY HABITS OF TYPE 1 DIABETICS IN NORTHERN REGION OF KERALA

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Background- Type 1 diabetes get worse by the lack of physical activity and the dietary patterns of the patients. Therefore, it is essential to measure the dietary habits and physical activities of type 1 diabetes patients. Method- A total of 45 samples aged between 8 â€Ŗ 18 years were selected for the study enrolled in the Kerala Type 1 Diabetes Welfare Society through purposive sampling technique. The study was conducted using a structured questionnaire. Results- About 80% of adolescents do not have a regular exercise pattern, and among the 20% most of them do aerobic exercises. Both children and adolescents do not practice yoga. An equal percent (55%) of both children and adolescents participate in sports activities conducted in school. Majority of adolescents (>90%) agreed that exercise or physical activities keep their body healthy and fit. Children have a better quality of life in the health and activity subscales than adolescents (t=0.835< tα=1.591). Majority (>80%) of type 1 diabetics never skip breakfast but only a fewer (<18%) type 1 diabetics skip breakfast monthly or weekly. About 40.7% of adolescents and 16.6% of children consume junk foods. More than 60% of both children and adolescents consume cereals, other vegetables, pulses and green leafy vegetables daily. Very few (<15%) of them reported consuming sweet items monthly. Conclusion- As the type 1 diabetics are a part of the Kerala type 1 diabetic welfare society they have good knowledge in nutrition and diet so that they were aware of the dietary patterns and health care but the importance and need for physical activity must also be improved to lead a healthy life.

CMN-P-04

IMPACT OF IMPROVED NUTRITION GARDEN FOR DIET DIVERSIFICATION AND NUTRITION SECURITY OF RURAL HOUSEHOLDS IN JHARKHAND.

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Impact of Improved Nutrition Garden for Diet Diversification and Nutrition Security of Rural Households in Jharkhand. Rekha Sinha, Bindu Sharma and Nilika Chandra Department of Home Science, Birsa Agricultural University, Ranchi. Email; sinharekha_05@yahoo.co.in Background- Inspite of green revolution and several national nutrition programme, the prevalence of undernutrition, especially multiple micronutrient deficiencies continues to be of public health significance in India particularly in the state like Jharkhand where bulk of tribal lives. Low access to micronutrient rich food is found as major cause of micronutrient deficiency. Vegetables are micronutrient dense foods and are of great importance to the nutrition of population. Keeping this in view, demonstration on improved vegetable nutrition garden was selected as one of the interventions. Material & Methods- Demonstration on improved nutrition garden on an area of 6m x 6m were conducted at 25 locations in 3 villages of Kanke block of Ranchi District. Critical inputs like vegetable seeds, fruit saplings and Vermi compost were provided. Farmers were imparted off campus training on layout and scientific cultivation of vegetables. Result- The results showed that 159.48 kg of vegetables were obtained in 6 months from demonstration model of 36 m2. Significant enhancement (P<0.05) in the intake of GLVs and other vegetables were observed. Conclusion- The demonstrated model of 36 m2 has potential to meet the nutritional need of a family comprising four members. Keywords- Nutrition garden, micronutrient, demonstration, diversification

CMN-P-05

IS SUN EXPOSURE, PHYSICAL ACTIVITY, LACK OF PROPER DIETARY INTAKE, SUN SCREEN USE AND SKIN COLOR A FACTOR THAT RESULT IN VITAMIN D DEFICIENCY?

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Background- Deficiency of Vitamin D is credited as rare in tropical country like India. Nowadays vitamin D deficiency has become a major public health problem and is widespread among healthy school going adolescents. Methodology- 100 samples of age 10-15
years (both gender) were selected and divided into two groups (A and B of 50 each) based on serum vitamin D status using judgement sampling method. Data was collected using questionnaire. Nutritional status, physical activity details and sun exposure details were assessed and analyzed using SPSS. Result - Vitamin D deficiency (86%) (<20 ng/ml) and insufficiency (14%) (21-29 ng/ml) was found among healthy school going adolescents of group B. Deficiency were found to be higher in female (56%) than in male (44%). Statistically significant association was found with outdoor activity (p=0.004) during weekdays and weekends (p=0.001), physical activity (p<0.005) and gender (p=0.04). No statistically significant association was found in skin color (p=0.08), way of clothing (p=0.20) and sun screen use (p>0.05). Height, weight, BMI age and sex specific centile, waist to hip ratio was found normal. The dietary intake of vitamin D was insufficient in both the groups. Conclusion - Vitamin D deficiency and insufficiency is seen in samples who were healthy. This could be due to changing lifestyle with increased confinement. So a good sun exposure between 11 am to 2 pm and physical activity would help one to enhance the serum vitamin D levels.

CMN-P-06

AGING AND/OR EXCESS CALORIE-INDUCED COGNITIVE IMPAIRMENT IN MALE HUMANS- INFLUENCE OF PHYSICAL ACTIVITY.

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TITLE - AGING AND/OR EXCESS CALORIE-INDUCED COGNITIVE IMPAIRMENT IN MALE HUMANS- INFLUENCE OF PHYSICAL ACTIVITY. Authors Name- Aindrila Das1,2, Samir K. Ghosh 2,3, Goutam Paul2 and Mrinal K. Poddar1 Affiliation Address - 1Department of Biochemistry, University of Calcutta, 35, B.C. Road, Kolkata - 700 019, India. 2Department of Physiology, University of Kalyani, Kalyani, Nadia - 741 235, West Bengal, India. 3Department of Physiology, Syamaprasad College, Kolkata-700 026, India. Abstract Background - To study the influence of excessive calorie intake and physical activity level on cognitive performance of a micronutrient deficient randomized population in urbanized areas of West Bengal, India. Methods - The present cohort study was carried out with 357 young (30.13± 0.24 yr) and 287 aged (58.62 ± 0.29 yr) human male subjects. Participantsâ€™ socio-economic status (Kuppuswamyâ€™s socio-economic scale), health status (health assessment questionnaire; HAQ) calorie and micronutrient consumption (Diet Survey - Three 24h Recall), cognitive function (Mini-Cog, 6-Item cognitive impairment test; 6-CIT) and self- reported physical activity level (PAL) (using questionnaire) were assessed. Results - Cognitive functions were found to deteriorate significantly (p<0.05) in aged subjects consuming At Par (AP) (Required amount) calorie in comparison to the young of the same calorie consuming group. CE (Excess calorie) consumption (> 30% of requirement) did not affect (p>0.05) cognition of young subjects compared to their AP calorie consuming counterparts. But the aged subjects consuming CE diet showed significant (p< 0.05) decrease in cognitive activity compared to AP calorie diet consuming subjects of the same age group. While low PAL adversely affected cognition in both young and aged population, high PAL showed strong positive influence on cognitive function which was independent of age or calorie intake. Conclusions â€“ Results of the present study suggest that Aging-induced cognitive loss and excess calorie-induced cognitive impairment, among subjects with micronutrient deficiency, are prominent with low PAL, while high PAL masked the influence of aging and excess calorie-induced cognitive deterioration. Choice of appropriate diet along with maintenance of an active lifestyle with optimum calorie consumption may help to prevent/compensate aging- and excess calorie-induced cognitive loss and/or impairment. Key Words- Ageing, cognition, excess calorie, physical activity level.

CMN-P-07

NUTRITION IN HUMANITARIAN EMERGENCIES - A REVIEW SUNITA B RESEARCH SCHOLARFOOD PROCESSING AND NUTRITION DEPARTMENT KARNATAKA STATE

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Nutrition In Humanitarian Emergencies- A Review

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Abstract Major food shortages can be a primary feature of an emergency, as in drought or floods that lead to famine, or they may be a consequence of war, economic disaster, or population displacement. The often serious protein-energy malnutrition and micronutrient deficiencies that inevitably follow such shortage add greatly to the burden of disease and mortality, slow - or even impede altogether - socioeconomic recovery, and make intense additional demands on scarce resources. The nutritional problems that inevitably follow such shortages add greatly to the burden of disease and mortality, slow the process of socioeconomic recovery, and make intense demands on scarce resources. It defines the nutritional needs of the individuals in emergency situations and offers a comprehensive overview of the major nutritional deficiency diseases and micronutrient deficiencies likely to be encountered in such circumstances. Hunger and malnutrition are rampant among refugees and displaced populations, representing currently around 40 million people worldwide, many of whom â€“ infants, children, adolescents, adults and older people â€“ suffer from one or more of the multiple forms of malnutrition. Besides wasting, deficiencies of iodine, vitamin A and iron are common in emergency-affected populations. In addition, scurvy, pellagra and beriberi frequently occur in populations entirely dependent on food aid. The level of risk of malnutrition in emergencies depends on factors such as the degree of civil security, food availability and accessibility, access to health services, and adequacy of assistance delivery. Methods for assessment and surveillance of the nutritional status of the population are provided, including analysis and interpretation of data and reporting of results. The indicators for, and organization and monitoring of, both general and selective feeding programmes for nutritional relief are to be considered, majorly the prevention, treatment, and control of the communicable diseases that are common in emergencies are to be focused.

CMN-P-08

PREVALENCE OF PREMENSTRUAL SYNDROME AND ITS EFFECT ON DIETARY INTAKE OF MACRONUTRIENTS OF WOMEN(30-40YRS) IN PANCHKULA (HARYANA)

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Background- Pre Menstrual Syndrome, commonly known as PMS is one of the most common disorders of reproductive age. It is characterized by symptoms such as anorexia, weakness, mood swings and changes in food intake to name a few. Materials and Methods- Objective of the study was to assess the demographic and nutritive profile of 100 females between the age of 30-40 years; divided into 2 groups- 50 during normal days (Group A) and 50 during PMS days (Group B). A purposive sample was prospectively taken from Panchkula. Questionnaire cum interview method comprising of structured and closed-ended questions was used. Analysis of data was done using SPSS software, version 25. Results- It was observed that 63% and 37% of respondents fell in the age group of 30-34 years and 35-40 years respectively. Maximum respondents i.e. 68% were graduates and postgraduates, however, only 37% were working. Term PMS was known to 74%. PMS duration in 57% of respondents was 0-2 days. The decreased interest of work, lack of energy, irritability, fatigue and sleep disturbance were felt majorly. The nutritive assessment was done on the two groups by dietary recall wherein macronutrient intake was significantly low in group B. Average intake of calories in group A and group B was 1919.79± 63.38 kcal and 1645.76± 136.44 kcal respectively. The average intake of protein in group A and B was 50.5±2.67 gm and 42.7±2.05 gm respectively. The average intake of fat in group A and B was 38.8±2.41 gm of fat and 33.9±2.69 gm of fat respectively. Conclusion- Education does not aid in reducing the prevalence of PMS felt by respondents. Eating habits were significantly affected during PMS. Respondents need to be made to improve their lifestyle in terms of appropriate food intake and physical activity to keep PMS at bay. Apt use of technology through educational apps, videos may help the purpose.

CMN-P-09

HOUSEHOLD FOOD INSECURITY AND NUTRITIONAL STATUS OF 6-59 MONTHS CHILDREN OF SINDHUPALCHOK DISTRICT, NEPAL

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Food insecurity and malnutrition among children are common in Nepal. However inadequate data exists. The objective of study is to examine the association between household food insecurity (HFI) with anthropometric status in children under 5 years old. This study used three dependent measures of food security to assess the magnitude of household food insecurity and its consequences on nutritional status of children in Sindhupalchok. An analytical cross-section study was conducted on a sample 298 mother/children pairs who were victim of earthquake residing at sindhupalchok district. Food access was measured as household food insecurity access scale (HFIAS), household dietary diversity score (HDDS), and food consumption score (FCS). Anthropometric measurement was then used to determine if children were underweight (weight-for-age), wasted (weight-for-height) and stunted (height-for-age) based on WHO reference. Statistical Package for the Social Science (SPSS) version 20 and World Health Organization (WHO) Anthro version 3.2.2 were used for analyzing the data. Chi-square test and Fisher exact test were used to identify the association of food insecurity
ASSOCIATION BETWEEN NUTRITIONAL STATUS AND SLEEP DURATION AMONG SELECTED INDIAN ADOLESCENTS (14-15 YEARS) OF MUMBAI,

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Background-- Adolescents period , is accompanied by social changes, school demands and hormonal changes that modify the circadian rhythms of sleep. Also due to use of electronic equipments causes an inadequate sleep duration. Relatively, sleep deprivation can lead the adolescents to make unhealthy dietary choices at night which could have negative effects in their lifestyle. Method- A purposive randomized survey was carried among 14-15 year old adolescent boys and girls (n=290) studying in 9th-10th grade in schools/private classes located in selected areas of Kandivali, Vile Parle and Byculla, Mumbai from 25th October to 9th November 2017. Pre-tested questionnaire was designed to obtain self reported general information and details of daily sleep pattern like total time spent during night sleep, daytime naps, differences in sleeping timings/waking on weekdays versus weekends,study pattern such as late night /early morning155.3cm, time took and aids to help fall asleep. Similarly nutritional status was determined by 24 hour diet recall. A specific food frequency questionnaire of foods choices commonly consumed at night was prepared anthropometric details like height, weight was obtained by researchers and Body Mass Index (BMI) was calculated and compared with Indian Council Of Medical Research standards. Since neck circumference is a useful marker of obesity it was also measured for the adolescents by using standard techniques. The obtained data was then analyzed using T-test, Kendall correlation test, and chi-square test. Macro-nutrients calculated from 24 hour diet recall were compared with Recommendary Dietary allowances for adolescent girls and boys. Results-- The mean height for boys was 160.5 cm SD and for girls it was SD. There was no significant difference in the weight of boys and girls, however there was a significant difference in the mean height of the boys 160.5±9.3 cm than girls 155.3±12.4 (p<0.009). The mean neck circumference of boys 32.0 cm SD was slightly higher than girls 30.6 cm SD. It was observed that height, weight and BMI of the adolescents who were not getting enough sleep was significantly increased (p<0.05). Conclusion-- Inverse relation between sleep duration time and BMI provides strong evidence that sleep duration is an important adolescent obesity risk factor. Keywords-- nutritional status, sleep pattern ,assessment, selected Indian adolescents.

A META-ANALYSIS OF THE LIVING AND WORKING CONDITIONS OF MIGRANTS IN SOUTH INDIA

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A meta-analysis of the living and working conditions of migrants in South India Shifa J and Mini Joseph, Asst. Professors in Home science, Govt. College for Women, Thiruvananthapuram Background- Human migration is the movement by people from one place to another with the intentions of settling, permanently or temporarily, in a new location. This paper reviews the status of the migrant workers of Southern India. Materials and methods- This paper used a meta-analysis approach using secondary data sources. A detailed review of all relevant studies related to migrant workers of Andhra Pradesh, Kerala, Karnataka, Maharashtra and Madhya Pradesh were done through systematic electronic literature search. The search engines used were Google Scholar, Research Gate, Infibnet and Pub Med. Twenty published papers in indexed journals in the last five years were reviewed. The keywords used were Migrants, Andhra Pradesh, Kerala, Karnataka, Internal migration, Health Services Result- The studies from Kerala and AP showed that the migrant population were young (18-28 years). An important reason for migration was the huge family which has to be provided for. The major sectors where migrants were employed include construction and repair, carpentry, small businesses, agriculture and factories. Access to health care services for all migrants was inadequate due to ignorance of the services and resources to access it. No medical benefits were available for migrants in AP. Migrants were often verbally demeaned. Other issues include inadequate food, insecurity, poor sanitation and hygiene, harassment by government and police, inadequate schooling facilities for children and lack of
contact person in the cities for help during emergencies. However, they were able to remit substantial cash to their parent villages. Conclusion- The study gives an insight into the migrantsâ€™ needs and aspirations. There exists a large lacuna in the living, working and health conditions of this vulnerable population.

CMN-P-12
MATERNAL AND INFANT DETERMINANTS OF MALNUTRITION AMONG CHILDREN AGED 12-24 MONTHS IN A RURAL BLOCK OF HARYANA

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Introduction- Malnutrition is an important predictor of morbidity and mortality in children especially in rural areas. Maternal and social factors influence in a long way in contributing prevalence of malnutrition among under five children. Aims and Objectives- 1). To find out prevalence of stunting and wasting among 12-24 months age Indian children. 2). To find out maternal and infant determinants of malnutrition prevalent among 12-24 months old children. Material and Methods- The study was undertaken in community development block Beri, which serves as the field practice area of Department of Community Medicine Pt. Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak. Sample size calculated to be 109 based on prevalence of 48% at 95% level of significance and an allowable error of 20% in the study. A total of 110 infants were enrolled in the study. A pretested, semi-structured interview schedule was administered by visiting them house to house. Results- Total 110 children were studied and out of these 56% were malnourished. Most of the malnourished children were moderately malnourished and very few were severely malnourished. Low maternal education was associated with increased prevalence of malnutrition. Pre-lacteal feeds were given to majority of children. Recommendations- There is a need to understand socio-dynamic structure of a family, as it varies in different communities which is influencing the nutritional status of a child. ASHA workers can be involved to motivate antenatal females and lactating mothers to make them aware about low birth weight babies and malnutrition.

CMN-P-13
PREVALENCE OF IODINE DEFICIENCY DISORDER IN INDIA AMONG LACTATING WOMEN- A REVIEW

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Background- IDD constitutes a major nutritional deficiency disorder in India. To combat the devastating situation of IDD, the government of India implemented the National Goitre Control Programme in 1962, now called NIDDCP, 1992. Gov mandated universal salt iodization in 1984 which was started in 1986. Lactating women and infants are more perceptible to low iodine intake because of the high demands (WHO 2007; Remer T et al, 2010). In the lactating woman, iodine deficiency leads to intellectual disability, endemic cretinism, neonatal hypothyroidism and hyperthyrotropenemia and growth retardation. A number of studies have been conducted to collate all the data gathered by such studies conducted and provide an overview of the prevalence of IDD among lactating women in India. Methods- Studies published in various national and international journals are reviewed to gather data on prevalence of IDD. Results- Studies have shown that though WHO define India as an iodine sufficient country, pockets of iodine deficiency still exists. Few studies have shown high prevalence of iodine deficiency among lactating women, there is limited information available on it. Conclusion- The prevalence has increased as indicated by studies in the last decade. Projections for future also estimate a similar trend. Need of the hour is to track down and closely monitor the prevalence of IDD by undertaking operational research and assessing the current magnitude of the problem of iodine deficiency and assess the impact of iodized salt intervention programme and strengthening ongoing health, nutrition education programmes on IDD for evaluating the effect of corrective measure and health policies also. Keywords- Lactating women, infant, IDD

CMN-P-14
ASSOCIATION OF DIETARY DIVERSITY SCORE (DDS) AND OVERWEIGHT AMONG ADOLESCENTS

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Background Dietary diversity had long been recognized as an important component of diet quality. High DDS is considered as a protective factor against many metabolic disorders including obesity. To fulfill the additional requirements of various nutrients during adolescence, diversification in daily diet is an essential food based approach. Material and methods Study was conducted among 100 overweight and 100 non-overweight school going adolescents (16-18 years) of Kottayam district, Kerala. DDS was determined by counting the number of food groups included by a household/individual over a reference period. The DDS was calculated on a 10 point scale adopted and modified from Food and Agricultural Organization (FAO)-Dietary Diversity Questionnaire. Results High DDS (score >6) was observed more among non-overweight subjects (32%) than overweight subjects (8%). Majority from both the groups (74%) had a medium DDS (score 4-5). Chi-square test indicated a highly significant (P<0.01) association between low DDS and overweight. Being the staple food of Kerala cereals was consumed daily by all the subjects. The daily intake of vitamin A rich yellow vegetables (50%), dark greens (24%) and pulses (58%) was more among the non-overweight subjects. Dietary diversity with respect to egg (47%) and flesh foods (47%) indicated a higher score for overweight group. About 95 percent of overweight and 77 percent of non-overweight subjects consumed other vegetables daily. Consumption of fruits was found be poor with only 10 and 11 percent of overweight and non-overweight subjects respectively reporting its daily inclusion in their diet. Conclusion These results highlight the need for an imposed daily intake of beneficial food groups such as vitamin A rich vegetables, green leafy vegetables, fruits and pulse among adolescents. Dietary diversity can provide sources of both nutrients and medical agents that contribute to preventive as well as curative nutrition and socio-cultural well-being.

CMN-P-15

DIETARY HABITS OF TYPE II DIABETES MELLITUS PATIENTS AMONG DIFFERENT SOCIOECONOMIC GROUPS

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Background- Diabetes mellitus, a chronic metabolic noncommunicable disease (NCD), has attained epidemic proportions worldwide. Incidence of type 2 diabetes mellitus is increasing worldwide. Socioeconomic status is closely linked with health problems; the low socioeconomic status and education level have been associated with the prevalence of diabetes mellitus. Moreover, still controversy whether diabetes mellitus is a disease of low socioeconomic status and high socioeconomic status. The main objective was to assess the socio economic status and to study the food pattern and diet of type 2 diabetes mellitus patients. Methodology Samples were selected for the study by using purposive sampling technique, the target groups was taken into APL (50) and BPL (50) groups between the age group of 35-80 years. Interview schedule was used to collect the information. Result- In the present study the socioeconomic status of majority (60%) of the selected samples are upper middle and 70% upper lower according to the kuppaswamy scale. In case of education majority (60%) of the samples from APL group were having high school as their educational qualification followed by post high school,primary and middle school and 20% post high school. Whereas in BPL Group the majority (54%) of the samples were having high school,post high school and graduate. From the study 60% of them were daily consume wheat whole and 100% of samples consume sugar cane daily. carbohydrate consumption was also high in both the sample group. The usage of plantain stem and colocasia stem was using occasionally. Thus the fiber consumption was less for both the sample groups. Conclusion. From the study revealed that lack of knowledge, physical activity, uncontrolled dietary habits and low socioeconomic status are the main factor that increases the risk of diabetes mellitus. So an awareness regarding diabetes and diabetic diet was imparted to the samples using (PPT)

CMN-P-16

NUTRITIONAL INTERVENTION ON THE SYMPTOMATOLOGY OF ATTENTION DEFICIT HYPERACTIVITY DISORDER

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Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral disorder, which affects three to five percent of all school going children and generally manifests itself before the age of 7 and is characterised by impulsivity, hyperactivity and inattention. Children with ADHD demonstrate a range of poor long-term psychosocial outcomes. The Strengths and Difficulties Questionnaire (SDQ) may be used to screen children for a range of psychiatric disorders, including ADHD. Principal management options include medication (methylphenidate and atomoxetine are the first line), parent training programmes and school based interventions.It is important to provide a dedicated child mental health specialist service for children with ADHD.In addition to following the National Institute for Health and Clinical Excellence (NICE) guidelines, the authors recommend the use of wider systemic approaches and early
intervention to optimise the effectiveness of recommended treatment options. Numerous studies have reported that supplemental nutrients such as omega-3 fatty acids, vitamins, zinc, magnesium, and phytochemicals may provide moderate benefits to ADHD patients. Avoidance of food allergens, food chemicals, and chelation therapy may also provide some relief to ADHD patients. Elimination of chocolates, maida, bakery confectionaries, soft drinks, and junk food in the diet and replacing them with foods rich in zinc and omega-3 fatty acids as per the Recommended Daily Allowance (RDA) may reduce the ADHD symptoms in children. ADHD is a complicated condition in which nutritional and environmental factors play major roles. Larger studies are needed to determine optimum multifactorial treatment plans involving nutrition, environmental control, medication, and behavioral/education/speech/physical therapies. Keywords- Attention deficit hyperactivity disorder, diet intervention, DSM IV criteria, diet elimination, nutritional status.

CMN-P-17

DIETARY INTAKE OF CHENNAI URBAN ADULTS IN RELATION TO RECOMMENDED DIETARY GUIDELINES DURING THE 10 YEARS FOLLOW-UP OF CURES COHORT STUDY.

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Background- Data on longitudinal dietary intake of the Asian Indians is important in the context of prevention of chronic diseases. However, such study in Asian Indian continues to be sparse. Methods- The trends in dietary intake of adults in Chennai city over a 10-year follow-up were evaluated. Data on dietary intake were obtained from participants in the Chennai Urban Rural Epidemiological Study using a validated food-frequency questionnaire at 2 time points (2003 and 2013). General Linear Model (GLM) was considered for data analysis. The compliance to WHO guidelines was assessed. Results- The findings of the study shows that white rice based dishes continue to provide bulk of the dietary glycemic load (>70%). although the intake of fruits and vegetables increased, majority of the population consumed less than the WHO recommendations of 400g/day. There was an increase in total calories primarily from fat. Over 80% of the population consumed fats and oils, added salt and dietary sodium levels above, and MUFA, n3 PUFA%E and potassium below, the recommended national guidelines. The intake of edible oils, legumes, nuts and animal foods intake had also increased (p<0.01). An increase in the use of sunflower oil, contributed to higher n6/n3ratios. Conclusion- In summary diets in urban south India still remains high in carbohydrates mainly refined cereal staples contributing to a high glycemic load. This combined with a significant increase in total calories would continue to increase the risk of chronic diseases like diabetes. Overall, most food choices still do not meet the recommended guidelines to prevent chronic diseases.

CMN-P-18

DIETARY HABITS AND NUTRITIONAL SCREENING OF BANGALORE CITY POLICE FROM TYAGARAJNAGAR

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BACKGROUND- Adolescents were selected for conducting this study as it is a period where final growth spurt occurs and where changes in physical, biochemical and emotional development is seen. The rapid emergence of adolescent obesity in India over the last decade has led to increasing concern about the diets of adolescents. Since food habits adopted during adolescents are likely to be maintained during adulthood, it is important to identify the correlates of adolescent dietary behaviors. OBJECTIVE- To study the frequency of convenience food consumed, Purchasing pattern and source of purchase among adolescent group. MATERIALS & METHOD- Survey was conducted in University of Mysore among 260 adolescents(32male, 228female) between 14-19 years. A detailed questionnaire was prepared and distributed among the subjects for collection of data. RESULT- Majority 58% subjects were between 16-18years, 77% were staying in residence and most of them(87%) were from middle income group.75% were non-vegetarians. Convenience food consumption showed tea/coffee was consumed daily(88%), soft drinks was consumed fortnightly(33%). 94% of total subjects never consumed alcohol. Fresh fruit juice was used fairly. Bakery stuff like cakes(45%),biscuits(29%) and bread(31%) was used weekly but 64% had chocolates daily. Chats like, masala-puri(43%) and churmuri(10%) was consumed daily and pani-puri (31%) on weekly basis whereas, chips was consumed by majority-92% subjects. 43% were consuming fried foods weekly like baji and pakoda. 29% of the total subjects disliked samosa. Fast food like noodles and gobi-manchurian were used weekly with 50% and 56% respectively but pizza(19%) and burger(32%) was consumed fortnightly. Only 32% of the subjects used ready-to-eat foods fortnightly. It was important to know the source of purchase of these foods which showed that maximum 79% was from the snack bar next was bakeries and hotels with 74% and 70% respectively. Very limited subjects used supermarkets and restaurants. But only 15% preferred home food. It was observed that 46% of total subjects had an expenditure of 200-400rs per month and 11% had an expense of 50-100rs per week.CONCLUSION- Considering these aspects from the study it was observed that adolescents are more prone to eating outside foods or rather convenience foods than consuming a proper, healthy and nutritious food. Eating habits are independent of culture, emotions, peer influenced. Hence adolescents need encouragement. Health and educational professionals associated with adolescents could communicate in the development of healthy eating guidance to provide positive health benefits among adolescents and their families. KEYWORDS- Adolescents, Convenience foods, Eating Habits
EFFECTIVENESS OF WELFARE PROGRAMS ON NUTRITIONAL SECURITY OF FARM WOMEN- A STUDY IN COASTAL ODISHA

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Food security is the core affictions of poor people and it became a chronic condition for farmers of India. The women are the backbone of agricultural workforce. Several government programs were going on for involvement of the poor farmers especially aimed at providing nutritional stability and food security through generation of income to the village households. The present study was carried out to assess the effectiveness of welfare programs on nutritional security of women in agriculture sectors in the selected coastal districts of Odisha during the year 2013-2016. MGNREGA was found to be most popular among farmers and it was directly related to income of the target groups. The inclusion criteria was that the households having a married couple with minimum family size of 4 members and the respondent is engaged in agricultural activity aging more than 35 years. Thirty samples from each groups were selected randomly from the MGNREGA and Non-MGNREGA groups so a total 60 samples were selected in the study. We observe significant difference in means between the groups both for income (t=4.38*, p<0.05) and expenditure (t=3.47*, p<0.05). The mean BMI of Non-MGNREGA was lower (16.00±1.38) than the MGNREGA (19.37±2.71) groups. Nutritional status like intake of energy, protein and folic acid was statistically significant in MGNREGA households compared to non-MGNREGA households (p<0.05%). From the study it was clear that MGNREGA had a positive impact on the income of the respondents ultimately leading towards nutritional security.

A STUDY ON THE NUTRITIONAL IMPACT OF KERALA FLOODS 2018 ON THE KUTTANAD RESIDENTS OF ALLEPPEY DISTRICT

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Background- Floods had created a huge havoc for the state of Kerala during the months of August and September 2018. While sickness and homelessness were perhaps the most visible problems for affected populations, malnutrition combined with micronutrient deficiencies was not uncommon and equally serious. Objectives- This study envisaged understanding of the nutritional implications of an emergency situation. The main focus of the study was to identify the nutritional lacunae that occurred in the families displaced during the floods. It aimed to check the adequacy of nutrient intake of each family. Methodology- Case study method of 25 families from the Kuttanad area, Allepey District, Kerala was chosen for the study. Structured questionnaires were used to assess the general information, socio-economic profile, diet history, dietary intake patterns, food deprivation, acquired diseases or illnesses, sanitation and hygiene, nutritional deficits, economical damage and losses. Three Day Recall method was used to collect the foods consumed while they were at the refugee camps. The food intake pattern was assessed with the help of Food Frequency Chart. Nutritional needs and food rations were calculated using the RDA tables. Water Sanitation and Hygiene (WASH) tool was used to check the availability of potable water. A DaLA (Damage and Loss Assessment) tool was also used to determine the damages and losses that occurred in each family. Nutritional status of the family members was assessed by their body composition analysis and determination of the waist-height ratio. Result- Flooding not only had a negative economic impact, but also affected their immediate environment. The floods caused direct damage on the rice and mixed crops productions. The emergency food provisions met the hungry pangs of the people but were nutritionally inadequate. The availability of potable water was another huge problem. They used small water filtration techniques for drinking water. But those techniques seemed ineffective. The mobile health care systems included specialist doctors, nurses to take care of the patients. Emergency response provided food distribution for vulnerable groups, mobile clinics and health care, emergency shelter and household kits, water purification tablets, water storage containers and hygiene materials. However emergency response was still difficult to control the grim situation. Migration and relocation were even more difficult for people due to heavy rains. Conclusion- In this study the nutrition needs of the affected population were analysed and thus concluded that it was note adequately met. The disaster management team should consider supply of nutritionally adequate foodsin their emergency kits especially if the period of strife is prolonged. Further adaptation strategy is strongly needed for local people.
CMN-P-21

EFFICACY OF FORTIFIED FOOD ON COMBATING MICRO-NUTRIENT DEFICIENCIES IN TRIBAL ADOLESCENT GIRLS

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Background- The negative synergy between poor micronutrient status and deficiencies in the developing world is detrimental in the age of adolescence. This study addresses the impact of double fortified (Iron and zinc) probiotic food product (DFP), and/or nutrition education in reducing the risk and prevalence of iron and zinc deficiencies in the tribal adolescent girls of Attapadi, aged between 13-17 years. Materials and Methods- The entire study is paced in four phases where the socio-demographic profile, anthropometric, clinical signs and nutrition knowledge is estimated at base line and end line and supplementation using double fortified probiotic food product and/or nutrition education is imparted to alleviate iron and zinc deficiencies across the selected geographical locale. The data is collected and validated using tools given by WHO. The development and standardisation of the DFP and fortification using a commercial premix is done and physiochemical, nutritional, microbial and sensory parameters are carefully estimated via standardised protocols. The sample size is divided into two arms where one is imparted with nutrition education and the other is given supplementation with DFP coupled with nutrition education for a period of six months. The data collected is analysed statistically by comparing both the base line and end line thus evaluating the study outcomes. Result- The study is expected to provide significant evidence by reducing the targeted micronutrient deficiencies through the probiotic food chosen as a fortification vehicle to supplement the targeted study group. Conclusion- This research hopes to provide significant evidence that the double-fortified probiotic food product reduces the targeted micronutrient deficiencies in the sample population across the selected geographical locale. This can become a model strategy for implementation of large-scale intervention schemes at policy level in developing India.

CMN-P-22

PREVALENCE OF OSTEOPENIA AMONG MIDDLE AGED FARM WOMEN WORKERS (35-50 AGE)

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Osteopenia is a condition where bone mineral density is less than normal level 1 SD (+1 or -1 normal level )(standard deviation ).This decreased bone density leads to bone fragility .Like osteoporosis ,osteopenia also occurs more frequently in post menopausal women due to diminishing oestrogen level.Women have lower bone mass than men.The purpose of the study is to know about the prevalence of osteopenia among farm women.Women after the age of 30 years are prone to calcium depletion from bones and tend to more prone to osteopenia which leads to osteoporosis .Farm women are categorized as moderate to heavy workers.They do not consume a proper balanced diet due to lack of time,poor economic status and awareness .Many studies have been done on osteoporosis and osteopenia among pre and post menopausal women with celiac disease .Comparative studies have been conducted on young breast cancer survivors and normal women .Studies also reveal that lack of vitamin D ,dietary calcium ,lifestyle practices and family history predispose to osteopenia. The prevalence of osteopenia increases with advancing age.The lifestyle of farm workers markedly differ from that of normal women.Therefore this study aims of assessing the socio economic and nutritional status of farm women with special reference to their Bone Mineral Density (BMD).It will be challenge to diagnose and adequately treat all osteopenic patients but first step is to protect the osteopenic patients with highest risk for future fractures.The study will check on the prevalence of osteopenia .The study will also attempt to device intervention strategies to combat and rectify osteopenia among farm women and offer a suitable solution to mitigate the problem.

CMN-P-23

MITIGATING ANAEMIA AMONG ADOLESCENT GIRLS BY SIMPLE FOOD PRACTICES

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MITIGATING ANAEMIA AMONG ADOLESCENT GIRLS BY SIMPLE FOOD PRACTICES B.AKSHAYA, 2ND M.SC FSN, DR.S.THILAKAVATHY, ASSISTANT PROFESSOR DEPARTMENT OF FOOD SCIENCE AND NUTRITION
ABSTRACT Iron deficiency is the most common and widespread nutritional disorder in the world, affecting a large number of children and women in developing countries. It is the only nutrient deficiency which is significantly prevalent in industrialised countries. Anaemia among adolescent not only reduces their work capacity, and immune competence but also has an adverse effect when they attain motherhood. India with two hundred and forty three million adolescent has the largest population of adolescent in the world. Unfortunately, India also happens to have the largest proportion of underweight adolescent girls, about 47 % girls. Iron deficiency anaemia is due to insufficient dietary intake or absorption of iron to meet the body’s needs. Increased iron intake is also needed to balance blood losses due to heavy menstrual periods. Iron is essential part of haemoglobin, and low iron levels result in decreased incorporation of haemoglobin into red blood cells. Food based approaches represent the most desirable and sustainable method of preventing micronutrient malnutrition. Regular consumption of iron rich foods like dates, sesame seeds, Bengal gram dhal, peanuts, figs and green leafy vegetables can and improve iron status. Promoting the consumption of these foods and preparing simple snack based on these foods improve haemoglobin level. The intake of green leafy vegetables is less among girls, so it can be made in the form of powder and given with rice or mixed with juice and given. The intake of vitamin c is important for absorption of iron. Vitamin c rich foods like lemon, orange should be taken along with iron rich foods. The intake of vitamin c in the form of juice helps to absorb the iron content in the blood. Anaemia can be reduced by introducing simple iron rich foods in our diet.

CMN-P-24
PREVALENCE OF ANEMIA AMONG SCHOOL CHILDREN IN TRIVANDRUM DISTRICT KERALA, INDIA.

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Anemia is a major public health problem which affects mainly women and children. Iron deficiency is the major cause of anemia. Anaemia prevention programmes like WIFS (Weekly Iron folic acid supplementation) exists in the country. The purpose of the study is to assess the prevalence of Anemia among school children of Thiruvananthapuram district. The study was carried out from July 19th to September 18th 2019. We screened 532 school children of age 10 to 18 years from two government schools of the district. The dietary pattern, consumption of WIFS, deworming status, details of menstruation etc. were collected by using a standardized questionnaire. The anthropometric measurements such as height and weight were collected. Hemoglobin levels of the participants were estimated with HemoCue Hb 301photometer. SPSS version .16 was used to analyse the data. Prevalence of anemia was 24.1% in the studied population, of which 59.2% mild, 40.8% moderate and 1.6% was severely anemic. The prevalence of anemia among male participants was 10.2% and females 31.2 %. The highest prevalence of anemia was seen at the age of 15 to 18 in the study population. The consumption of green leafy vegetables and iron rich food are poor in the population. The intake of green leafy vegetables is less among girls, so it can be made in the form of powder and given with rice or mixed with juice and given. The intake of vitamin c is important for absorption of iron. Vitamin c rich foods like lemon, orange should be taken along with iron rich foods. The intake of vitamin c in the form of juice helps to absorb the iron content in the blood. Anaemia can be reduced by introducing simple iron rich foods in our diet.

CMN-P-25
WHICH OBESITY INDICES - BODY MASS INDEX, WAIST CIRCUMFERENCE, AND WAIST-TO-HEIGHT RATIO SHOW STRONG LINK TO METABOLIC RISK FACTORS IN URBAN OVERWEIGHT - OBESE AS TOOL IN CLINICAL COUNSELLING?

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The retrospective observational study was conducted to understand the prognostic link of three Obesity indices- body mass index (BMI), waist circumference (WC), waist-to-height ratio (WHtR), to predict at risk for Metabolic Syndrome (Met S) risk factors -elevated levels of blood pressure (BP), Glycosylated Haemoglobin (HbA1c) and Total cholesterol to HDL ratio (TChol/HDL).

EXN-P-02
ANTIOXIDANT ACTIVITY OF SELECTED ORGANIC GREEN LEAFY VEGETABLES

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The present study was envisaged to assess the antioxidant activity of selected organic green leafy vegetables to explore the alkaloids and tannin content, total antioxidant activity and total phenol content in the selected green leafy vegetables. The experimental procedures were found to determine the antioxidant activity. Standard procedures were used to assess the alkaloids and tannin content, total antioxidant activity and total phenol content. Twelve different leafy vegetables collected from Payyanad Village,
Malappuram District, Kerala were used for the analysis. Alkaloid and tannin content assessed in the selected green leafy vegetables revealed that drumstick leaves, curry leaves, chekkurmanis, green amaranth and amara leaves showed a positive result to alkaloids test. The presence of tannins was found only three selected green leafy vegetables. Pumpkin leaves, chekkurmanis and curry leaves showed the positive results for the presence of tannins. The leafextract for free radical scavenging activity was determined by 2, 2-diphenyl-1-picrylhydrazyl (DPPH) method. Vitamin C was used as standard in DPPH assay for comparing the antioxidant activity of green leafy vegetables. Among the twelve selected green leafy vegetables only three of them have a radical scavenging activity. They are pumpkin leaves, sambar cheera and bottle gourd leaves. Total phenol content was determined by using Folin Ciocalteu method. Gallic acid was used as a reference for total phenol content. With regard to the total phenol content of selected green leafy vegetables commonly used leafy vegetables like curry leaves drumstick leaves, chekkurmanis, red amaranth, green amaranth and amara leaves have high content of phenol. It was found that there is no correlation between total antioxidant activity and total phenol content. Hence it is summarised that green leafy vegetables have antioxidant activity and this will helps to reduce several chronic and degenerative diseases including atherosclerosis, heart diseases, diabetes mellitus and cancer, etc.

EXN-P-03

COMPARISON OF ACUTE GLYCEMIC AND INSULINEMIC RESPONSE OF FOSSENCE® WHEN ADDED/SUBSTITUTED INTO AN ORAL GLUCOSE CHALLENGE- AN ACUTE, RANDOMIZED, CROSS-OVER, DOUBLE BLIND CLINICAL TRIAL

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Background- Prebiotic fibers demonstrate a range of health benefits including attenuation of postprandial glycaemia. Objective of this study was to determine whether, FossenceTM, a sweet tasting, soluble non-viscous short-chain fructo-oligosaccharide (scFOS), will attenuate postprandial blood glucose and insulin levels when added to a carbohydrate challenge or when it is substituted (30%) for available carbohydrate. Material & Methods- Study used a randomized controlled cross-over design for which 25 healthy adults (40±14 years) were recruited. On separate days, each subject consumed, in randomized order, either 50g Dextrose (50Dex), 50g Dextrose+15g FossenceTM (50Dex+15FOS-addition), or 35g Dextrose+15g FossenceTM (35Dex+15FOS-substitution). Blood samples (finger prick method) were collected at fasting and 15, 30, 45, 60, 90 and 120 min after start of test meal ingestion. Plasma glucose and serum insulin were analyzed utilizing standard methods. Results- Addition of FossenceTM to a carbohydrate challenge (50Dex vs 50Dex+15FOS) showed no significant difference in glucose peak levels, incremental glucose levels or incremental insulin levels at any time point. Substitution of carbohydrate by FossenceTM (50Dex vs 35Dex+15FOS) showed that glucose IAUC and insulin IAUC for 35Dex+15FOS was significantly lower than of IAUC by 50Dex (p<0.002 and p<0.0003, respectively). At 60 and 90 min, plasma glucose levels were significantly lower after 35Dex+15FOS meal compared to 50Dex (p<0.0001). Incremental insulin levels were significantly lower at 45, 60 and 120 min after 35Dex+15FOS meal compared to 50Dex (p<0.02). Peak insulin levels were significantly lower after 35Dex+15FOS when compared to 50Dex consumption (56.9±5.5 vs 80.0±9.1 μU/mL—min/ml; p<0.001). Conclusion- Results demonstrate that adding 15g of FossenceTM to glucose load does not significantly change 2h glucose or insulin IAUC, neither does it modulate postprandial glucose or insulin levels but 30% substitution attenuates postprandial glucose and insulin levels. Therefore partial substitution of carbohydrate using FossenceTM may be an effective strategy for individuals a wanting to reduce sugar intake

EXN-P-04

IMPACT OF AJWAIN (TRACHYSPERMUM AMMI) L. SEED EXTRACT IN THE PREVENTION OF RANCIDITY IN GROUNDNUT OIL

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Background- Herbs and spices have been used for both culinary and medicinal purposes for centuries. It is well known that natural bioactive components extracted from herbs and spices have high antioxidant properties and are used in many food applications. Natural antioxidants from plant sources are potent and safe due to their harmless nature. Products from some of the natural resources such as spices continue to be used in pharmaceutical preparations either as crude extracts, fractions, pure compounds or analogous compounds from highly active isolated compounds. Research into their role as contributors of dietary polyphenols, known to possess a number of properties associated with increasing the shelf life of food products by preventing oxidation of oil components. Usage of natural antioxidants in food preservation helps to have a long shelf life and thereby ensuring the freshness of the product. Challenge is to investigate the bioactive properties of these foods within a nutritional context (that is investigating whether or not such properties are evident at levels at which herbs and spices are consumed). Keeping in view of the intensive studies for natural preservatives, present
investigation was designed to assess the nutraceutical properties of ethyl acetate fraction of methanolic extract of ajwain seeds (Trachyspermum ammi L.) and its sub-fractions. Peroxidation of oil affects the palatability and health benefits of oil because of the byproducts of peroxidation. In the present study the percentage peroxidation was more in untreated groundnut oil, but was lesser in ethyl acetate fraction added groundnut oil. This inhibitory role of the extracts can be due to the presence of phenolics which contributed to its antioxidant property. The nutraceutical properties exhibited by Trachyspermum ammi L. are due to the synergistic action of the phytochemicals in the extract and reflection of different types of compounds in them.

**EXN-P-05**

**GENETIC VARIANTS OF BETA CASEIN IN AMRUTHMAHAL CATTLE**

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Milk proteins consists of two major groups called Whey and Casein protein groups. Casein protein is further classified as alpha s1, alpha s2, beta and kappa proteins. Beta casein protein is 209 amino acids proteins which exist as several variants, A1 and A2 types are common. A1 and A2 beta casein differs in amino acid at position 67, which is histidine for A1 and proline for A2. A1 beta casein with weak histidine bond and upon exposure to proteolytic enzymes in gut breaks down to release bioactive beta casomorphin-7 peptide. This molecule is said to be responsible for chronic diseases such as diabetes, coronary heart disease and arteriosclerosis. The study was conducted on 25 Amruthmahal cattle, Blood samples (15ml) were collected from jugular in an EDTA coated vials and stored. Genomic DNA was isolated from blood using high salt method. Amplified Created Restriction Site (ACRS) method as described by Lien et al (1992) was used to differentiate the A1 and A2 variants. The primers CASB122F and CASB67R were used to amplify a 251bp fragment. PCR conditions involved an initial denaturation at 940C for 5 min followed by 35 cycles of denaturation at 940C, annealing at 650C and extension at 720C for 1 min each, followed by final extension at 72 0C for 10 min. The PCR product was checked on 1.5% agarose gel. The PCR product was subjected to restriction enzyme digest with TaqI enzyme at 650C for 5 h and PCR RFLP variants were checked on 3% agarose gel. The PCR RFLP gel revealed single band in all the fifty samples, indicating presence of only A2 type of alleles in the Amruthmahal cattle, Hence, Amruthmahal cattle is having only A2A2 genotype thus A2 beta casein protein in its milk, which has better health benefits upon consumers.

**EXN-P-06**

**FATTY ACID PROFILE OF BUTTER FAT (AMRUTHMAHAL CATTLE)**

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Fatty acid composition is said to be one of the important factor which influence the butter quality and taste. Fatty acid composition depends upon feed intake, season and breed. In the present study, the milk samples were taken from the farmers, butter was prepared by traditional method and butter samples were analyzed for complete fatty acid profile at National Accredited laboratories ie., CFTRI, Mysore and TUV SUD South Asia Pvt. Ltd., Bengaluru. The results were compared with the earlier reports on butter of Swedish and Poland dairy cattle. It revealed the presence of cis-11-eicosenoic acid (C20-1) in Amruthmahal butter and it has significant anti inflammatory effects. The total saturated fatty acids are lesser in Amruthmahal when compared with the European cattle. Higher levels of saturated fatty acids are said to have negative effects upon health. Saturated fatty acids such as stearic and palmitic acids are non atherogenic in nature, means that they do not increase the bad cholesterol. The stearic acid in Amruthmahal cattle are in higher levels indicating the better quality. The main saturated fatty acid which is atherogenic is myristic acid, the levels of this fatty acids in Amruthmahal is much lesser when compared with the European cattle thus again indicates better quality of the Amruthmahal butter. However, the level of linoleic acid which is said to lower the risk of coronary heart disease is lesser in Amruthmahal when compared with the European cattle. The short chained fatty acids like butyric, capric and caproic acids are easily digestible, but do not play any role in flavour of butter and these fatty acids are lesser in Amruthmahal butter when compared with that from European Cattle. Hence the butter from Amruthmahal Cattle has superior flavor and better quality when compared to that from European cattle.
EXN-P-07

MICROBIAL FERMENTATION OF FOSSENCE among others UNDER SIMULATED HUMAN PROXIMAL COLONIC CONDITION AND ASSESSMENT OF THE METABOLIC ACTIVITY

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Background- Short-chain Fructo-oligosaccharides (sc-FOS) are dietary fibers known for their prebiotic activity. Fossence among others, sc-FOS molecule was evaluated in vitro for its potency to modulate the overall microbial fermentation (pH and gas production) and metabolite (short chain fatty acids (SCFA) and lactate) production. Material & Methods- Microbial metabolic activity of Fossence among others (5g/L) was assessed in a simulated human proximal colon using optimal medium for 48h. Results were compared with blank and sugar control (medium supplemented with representative amount of fructose, glucose and sucrose) to study the effect of free sugars present in Fossence among others. Reactors containing sterile medium were inoculated with 10% fecal slurry from healthy human volunteer and anaerobically incubated at 37°C. pH, gas production, substrate assimilation (using HPAEC-PAD) and SCFA production (using GC-FID) were measured at 0, 4, 6, 8, 10, 24 and 48h. This experiment was conducted at ProDigest, Belgium. Results- Fossence among others was completely utilized by the fecal consortium in the test media within 10h after the start of the incubation. Fermentation of Fossence among others showed accumulation of lactate and enhanced levels of acetate (34.38±0.38mM), propionate (20.93±0.56mM) and butyrate (4.93±0.03mM) which led to the reduction in media pH. Total SCFA was 61.91±0.87mM. Final mean total gas production in the test media was 36.2kPa. Conclusion- Fossence among others fermentation resulted in enhanced SCFA production, reported for various health benefits. Butyrate is an energy source for human colon epithelial cells. Propionate helps in lowering triacylglycerol secretion rates by inhibiting the fatty acid synthesis in liver and is involved in controlling the cholesterol synthesis. Acetate contributes in controlling the cholesterol synthesis. SCFA production also causes decrease in the colonic pH which helps in solubilizing minerals and inhibiting pathogenic bacteria. We conclude that Fossence among others is a potent prebiotic fiber and may be included in the daily diet to offer health benefits to individuals.

EXN-P-08

NUTRIENT PROFILE AND MINERAL BIO-ACCESSIBILITY OF FINGER MILLET

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Background- Finger millet is nutritionally known for its high fibre, iron and zinc content. India is facing double burden of over nutrition leading to obesity and diabetes on one hand and micronutrient deficiencies (under nutrition) such as iron deficiency anaemia and zinc deficiency on the other. In this context, finger millet (FM) varieties were evaluated for their nutrient composition, and zinc (Zn) and iron (Fe) bio-accessibility. Materials and Methods-FM (GPU 67, GPU 28, KMR 340) varieties were evaluated for proximate composition of dietary fibre, phytic acid, Fe and Zn by AOAC methods, while dietary fibre and phytic acid were determined by kit method. The bio-accessibility of Fe and Zn was determined by enzymatic digestion & dialysis method in vitro. Results- GPU 67 showed higher iron and zinc content(4.2;0.28mg/100g respectively)than GPU28(3.5;0.13mg/100g respectively) and KMR 340(3.1-0.18mg/100g respectively). GPU 28 had lower iron, zinc, phytic acid, carbohydrate and fat content compared to the other two varieties. However, protein and dietary fibre content were similar in all 3 varieties (range 7.7-8.0g/100g; 11.1 -12.4 g/100g respectively). Bio accessibility of iron and zinc was highest with GPU 28 (27.1, 15.2% respectively) compared to the other two varieties, in spite of its low content of these minerals. Conclusion- GPU 67 FM showed lower bio-accessibility of Fe and Zn despite its higher content, which suggests that higher content of minerals may not necessarily lead to higher bio-accessibility. However, more detailed studies are warranted to understand factors on bio-accessibility so as to help scientists develop better FM varieties.

EXN-P-09

QUANTIFICATION OF DIETARY ADVANCED GLYCATION ENDPRODUCTS (dAGE) OF COMMONLY CONSUMED INDIAN FOODS AND ITS USE IN DAGE DIET PLAN

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Quantification of dietary Advanced Glycation Endproducts (dAGE) of commonly consumed Indian foods and its use in dAGE diet plan Mookambika Ramya Bai1a, Gayathri Rajagopal1a, Shobana S1a, Geetha Gunasekaran1a, Vasudevan Sudha1a, Srinivasan
Vedantham2, Gokulakrishnan3, Ranjit Mohan Anjana1b, Ranjit Unnikrishnan1b, Ganesh Jeevan1a, Kamala Krishnaswamy1a, Vasudevan Sudha1a, Viswanathan Mohan* 1b Background- Advance Glycation End Products (AGEs) have been linked to NCIDs like diabetes as well as complications of diabetes. Studies have reported that dietary Advance Glycation End products (dAGEs) could be a potential source of AGEs in the body. dAGEs are produced as a consequence of cooking methods such as grilling, broiling, roasting, searing and frying. Consumption of Western diets low in AGEs have been reported to decrease metabolic risk markers. There is a need to quantify the AGE content in commonly consumed Indian foods. Methods- Foods were selected from the Chennai Urban Rural Epidemiology Study using a validated semi-quantitative Food Frequency Questionnaire. Ninety-six foods were selected (including convenience and fast foods purchased from local establishments) and some were prepared using standardized recipes at a test kitchen. Foods were assessed for AGE content using Advanced Glycation End Product (AGE) Competitive Enzyme Linked immunosorbent assay Kit. Results- A low dAGE meal plan was devised based on the first two quartiles (median). The mean AGE content in the low dAGE diet plan was 1568.5mg/100g food, example of foods with low dAGE content are arerasam, spicy gravy and for high dAGE diet was 3380.3 mg/100g food, example of high dAGE content are onion oothappam, pongal (purchased from local restaurant). There was a significant difference between the low and high dAGE foods (p value<0.001). Conclusion- Diets low in dAGE can be effectively planned for therapeutic purpose to reduce metabolic risk factors in Asian Indians.

EXN-P-10
SOLAR DRYING TECHNOLOGIES FOR TURMERIC AND OTHER NUTRITIONAL PRODUCTS- A REVIEW

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Background- The solar energy has attained considerable acceptance in the recent times. The requirement to find cleaner and economical energy makes solar dryers a strong alternative to the fuel and electricity. Various researches are carried out and different type of solar dryers such as direct, indirect dryers with forced or natural circulation and mixed mode dryers are being designed and developed world wide to cater to the drying requirements of different agricultural products. Material Method- The review paper compares the different drying technologies and gives an insight in the different strengths of each type of dryer and their area of utility. Conclusion- Various modifications in the conventional solar dryers have been discussed which improves the drying efficiency and reduce the drying times for the particular agricultural products. Key words- Solar energy, Direct, Indirect dryer, Mixed mode, Forced Circulation Category- Experimental Nutrition

EXN-P-11
EVALUATION OF FOOD HYGIENIC PRACTICES OF THE STREET FOOD VENDORS AND SAFETY OF SELECTED STREET FOODS IN THIRUVANANTHAPURAM

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Background- Food vendors in India are generally unaware of food regulations and have no training in food-related matters. They also lack supportive services such as water supply of adequate quality and rubbish disposal systems, which hamper their ability to provide safe food. This poses a risk of infection to the consumers of these foods. Objective- To determine the sanitary conditions of vending sites as well as food handling practices of street food vendors in Thiruvananthapuram District was the main objective of this study. Awareness of food safety practices and knowledge regarding the hygienic handling of foods was also assessed in the study. Methodology- 100 street food vendors from four different regions of Thiruvananthapuram district were chosen for the study. 12 street food samples based on their varying degree of processing from these four regions were selected for the microbial quality analysis. The methods adopted for the study were interview method, observation and experimental methods. The information on the socioeconomic background, sanitary practices, personal hygiene, and food handling practices were collected from the vendors using a well-structured questionnaire and checklist. A tailored leaflet was used to impart nutrition and food safety knowledge to the vendors. Data was entered and analyzed with the help of MS Excel. Result- The results revealed that majority of the respondents belonged to an age group above 50 years and 64% were males. Out of the total respondents only 34% of the respondents had achieved high school level education. 48% of the vendors do the vending business because of unemployment. 81% of vendors did not received any food safety training. The Personal hygiene of the food handlers revealed that 97% of the vendors sold their food items without wearing gloves. Microbiological assay revealed that high temperature processing of foods make them microbiologically safe for human consumption by killing pathogenic organisms. Conclusion- Street foods play a vital role in the lives of street food vendors and consumers alike. However, the quality of these foods is poor, which is evident from the level of microbial contamination in these foods and the unhygienic states of the street food handlers. Therefore, a fine tuning in terms of quality and hygiene of these street vended foods is the ardent need of the hour.
EXN-P-12

ALMOND GUM- A POTENTIAL POLYSACCHARIDE FOR THE NEAR FUTURE

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Almond gum is an edible gum obtained from bark of the sweet almond tree, prunus amygdalus. The injured bark secretes the gum when it gets dried up, looks like white or brown colored little rocks or ice stones, collected and used for various medicinal purposes like to treat diarrhea, dysentery, stomach ulcer, helps in gaining weight and it is a natural coolant which reduces the body heat. It can be incorporated in snacks and juices and can be consumed by all age groups including children. The nutrients present in almond gum are protein, fat and carbohydrate. The carbohydrate includes arabinose, xyxitol and galactose. The antioxidant property of almond gum, that is polysaccharides in almond gum and almond gum hemicellulose polymer has free radical scavenging activity and helps in treating the diseases like cancer, heart disease etc. Almond gum is used as a novel edible coating for cherries, tomatoes and vegetables to delay the ripening during post harvest and to increase the shelf life and quality of the food. Almond gum is used as a coating agent to decrease the oil absorption and to increase the moisture content of fried potato chips and as a result helps in improving the sensorial and nutritional qualities of fried potato chips. Almond gum is also used in pharmaceutical industries as emulsifier, thickener, binder, and stabilizer. Almond gum a natural polymer so it is used as a binder in formulation of tablets and used as mucu adhesive polymer for buccal drug delivery. To conclude almond gum helps in the formulation of capsule and has therapeutic agents with no side effects due to its high nutritive value and antioxidant property.

EXN-P-13

GROWTH AND NUTRITIONAL VALUE OF MICROGREENS CULTIVATED IN SOIL, WATER AND COCONUT COIR COMPOST

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A trending food product which is gaining popularity due to its properties viz flavour component, as a garnish and also high in phytonutrients is- Micro-greens. These are young, tender and edible cotyledonary leafy greens which requires 7-8 days to grow and are harvested after sprouting as shoot. Its production requires a protected environment and can be cultivated in any medium such as water, soil and coconut coir compost. They are a rich source of bioactive components such as vitamins, minerals, and antioxidants. But due to rapid deterioration, the shelf-life of micro-greens is too short. They can contribute, directly or indirectly, to preserve and improve the biodiversity and environmental sustainability, increase food and nutritional security. Soil cultivation is the common type used for cultivating. This method breaks down the soil crust, making easy penetration of water, nutrients, and air, in turn making it available for the plant. Hydroponics method provides healthy, clean and grit-free seedlings. It is a speedy process as all the nutrients required are directly absorbed by the plant. Coir pith cultivation enhances the nutrient content, water holding capacity, maintains moisture and reconditions the soil. This review aimed to evaluate the growth, nutritional value and shelf life of various micro-greens cultivated in soil, water, and coir pith compost, for proper management of this special production.

EXN-P-14

PHYTOCHEMICAL AND ANTIOXIDANT CONTENT OF TENDER MANGO (MANGIFERA INDICA) LEAVES

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Mango (Mangifera indica) is commonly called as Aam or Amba. This plant naturally grows in India and also in South East Asia and in Indo-Malayan region. The fruit, root, bark and leaves are used by all Indians to cure various diseases and disorders. Various parts of the plant are used as dentifrice, antiseptic, astringent, diaphoretic, laxatives, tonic and diuretic. Mango plant kills the entire pathogenic microorganisms. It is specially used in control of diabetes, diarrhoea, dysentery, syphilis, ulcer, diabetes, gall and kidney stone, sunstroke, tuberculosis, anaemia, asthma, intestinal disorder, blood purification, nasal bleeding, lowers blood pressure as well as hypertension and also in burns, piles and heart diseases. Mango leaves have been claimed to possess antioxidant properties by many investigators. Antioxidant is the property of phytochemicals which are non-nutritive plant chemicals that have protective or disease preventing properties. Mangiferin, xanthone glycoside, isomangiferin, tannins and gallic acid derivatives are the bioactive components found in the plant. It also stimulates the human system, induce protective enzymes in the liver or block damage to genetic materials. Mango leaves are also rich in vitamin C, B and A. There have been many claims about the anti-diabetic properties of mango leaves as given by many investigators in number of researches. Mango leaves possess a potential hypoglycaemic effect as these influence blood sugar. Although review articles on this leaves are already published, but this review article aims to compile all the updated information on the phytochemical activities of tender mango leaves. Mango leaves are extracted with absolute alcohol (methanol and ethanol) and water and can be used for the study.
EXN-P-15
DEVELOPMENT OF VALUE-ADDED YOGURT BY INCORPORATING WATERMELON SEEDS, KIWI FRUIT AND SEA BUCKTHORN JUICE

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**Background**
Fermented milk products have been consumed for several thousand years. Yogurt is one of the most unique fundamental fermented milk products and is often included in healthy food lists for good reasons. In spite, having immense nutritive quality watermelon seeds, sea buckthorn berries and kiwi fruit are underutilized and neglected by the Indian population. Therefore, the current study was conducted to find out the nutritional and acceptability characteristics of yogurt developed using watermelon seeds milk, kiwi fruit and sea buckthorn juice. Material and methods- The various proportion of watermelon seed milk (25%, 50%, 75% and 100%) was mixed with commercially available milk to form yogurt. Also, a different proportion of kiwi fruit and sea buckthorn juice was added (5%, 10%) to enhance the flavor and nutritive properties of yogurt,. Proximate compositions of the raw materials and developed products were determined using AOAC methods, 1995. Calcium and iron content were estimated following the NIN (2008) methods, Folin-Denis (1970) and Folin-Ciocalteau (1980) methods were used for the estimation of tannins and total phenols. Results- The final proportion of combinations (i.e., 25% watermelon seed milk and 10% kiwi fruit and sea buckthorn juice) was selected using 9-point hedonic scale and further subjected to nutritional analysis. The results showed that the protein content of yogurt was improved from 3.04g to 6.53g. Ca and Fe content were also increased from 144.6mg to 151.3mg and 0.21mg to 0.51mg respectively. Incorporation of kiwi fruit and sea buckthorn juice also enhanced Vit. C content from 0.62mg/100g to 12.31mg/100g of the yogurt.

**Conclusion**
Thus, it could be concluded that the addition of watermelon seed milk, kiwi fruit and sea buckthorn juice enhanced the nutritive value of the yogurt and was also acceptable by the consumers.

EXN-P-16
ROLE OF SINGLE NUCLEOTIDE POLYMORPHISM IN ZIP14 DURING COLON CANCER PROGRESSION IN SOUTH INDIAN POPULATION

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**Background**
Colorectal cancer is a neoplastic diseases of the large intestine which can be derived from both inherited and somatic genetic alterations and the prevalence in India is 4.2 and 3.2/100,000 for males and females. The rise in the prevalence of colon cancer can be attributed to change in diet. Zinc is one of the essential micronutrients that regulate many of the cellular processes and the concentrations are known to get depleted in patients suffering from colorectal cancer. Zinc homeostasis is highly regulated by transporters that belong to SLC39(ZIP) and SLC30(ZnT) protein family. This study aimed to understand the role of single nucleotide polymorphisms in Zip14 and its influence on the expression and zinc homeostasis in human colorectal cancer cases of south Indian origin Methodology- Blood and tissue samples from tumor, peri-tumor, adjacent non-tumor regions from 50 patients with confirmed diagnosis and blood samples from 50 healthy individuals have been collected and processed to monitor zinc levels by ICPMS, gene expression by using RT-PCR, SNP analysis by PCR-RFLP methods. Genomic DNA has been extracted from whole blood and processed for molecular analysis. Monitoring variations in Zip14 in DNA isolated from tissues and blood samples helps in delineating tissue specific changes with genetic background. Result- DNA analysis showed heterozygous condition of A˃C polymorphism in patients and controls, no significant association with the disease. There are no tissue specific variations have been observed with Zip14 gene, but expression has been decreased in peri-tumor and tumor tissues compared to non-tumours tissue. The levels of zinc also decreased in tumor tissues. Conclusion- Low expression of Zip14, decreased tissue zinc concentrations and not the single nucleotide polymorphism are associated with colorectal cancer progression in patients with south Indian origin.

EXN-P-17
INVITRO ANTIOBESITY AND HYPOLIPIDEMIC EFFECT OF STEAMED SOLANUM NIGRUM LINN. LEAF AND BERRY EXTRACTS

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**Background**
Solanum nigrum Linn. is a medicinal plant which belongs to the family solanaceae. The plant can be grown in various climatic conditions and is a storehouse of numerous therapeutic compounds. Present study is an attempt to study about the antiobesity and hypolipidemic effect of leaves and berries of the plant in vivo. Materials and methods- Twenty four young male sprague dawley...
rat were fed with high fat diet (HFD) for a period of 45 days and divided into three groups (6 animals/group). Normal control (Group I) was supplemented with normal rat chow. After induction of obesity, Groups II, III, IV and V were fed with HFD alone, HFD+standard drug, HFD+leaf extract and HFD+berry extract respectively for a period of 45 days. Weight of each animal was monitored every week. All animal were sacrificed, lipid profile and histopathology of adipose tissue were estimated at the end of study period. Results- Average mean body of Group IV and V which was treated with leaf and berry extract was on par (469.33±5.95 g and 480.33±6.50 g respectively) with that of group III which was treated with standard drug (458.00±7.40 g) and were significantly different from HFD control. The lipid profile of Group IV and V treated with leaf and berry extract exhibited significant difference with lipid profile of Group II (HFD control) and were on par with Group III (standard control). Groups IV and V exhibited varying sizes of adipose tissue with no inflammation in stroma while Group II (HFD control) exhibited has varying sizes of adipose tissue with fibrous stroma showing mild inflammation. Conclusion- Steamed Solanum nigrum Linn. leaf and berry extract can be effectively utilized as a nutraceutical remedy for obesity which occurs due to hypercholesterolemia.

EXN-P.18
DEVELOPMENT AND EVALUATION OF BROWNTOP MILLET INCORPORATED COCONUT COOKIES
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Cookies are popular baked products which are made in a wide variety of styles, using an array of ingredients. Flour and fats/oil being the common ingredients, sugar is used for sweet cookies, for savoury cookies salt and spices are used. Convenience and easy availability makes it a good vehicle for fortification. Cookies are rich in fat and carbohydrates; hence they can be considered as energy giving food and a good source of protein and minerals as well. Though the wheat flour is the major ingredient in the cookies, it can be partially replaced with the millet flour because of its health benefits. Thus, this study focuses on the standardization and development of coconut cookies incorporated with Brown top millet flour (BMTF). Materials and methods Initially the Cookies were develop by changing the ratio of wheat flour and the BTMF but keeping all the other ingredients constant for all the 7 varieties. The cookies were evaluated for its sensory attributes. The nutritional quality (AOAC) and the shelflife of the products were assessed. Results The cookies evaluated on a 9 point hedonic scale and the best accepted cookies (50-50) were considered for further evaluation and was compared with the cookies made of 100 percent wheat flour. The nutritional value of accepted BMTF cookies was on par with that of Wheat cookies with increased protein (>2.8 g) and iron (>14 %) content and decreased carbohydrate. Since, the fat content is slightly higher in BMTF, the shelf life cookies with the 50 % BMTF was marginally less compared that of cookies from wheat flour alone. Conclusion Considering the benefits of millets and the trends in food eating habits, an attempt had been made to incorporate the BMTF in the cookies. These BMTF cookies were on par with that of wheat cookies in their sensorial attributes and nutritionally better compared to wheat flour cookies.

EXN-P.19
INCORPORATION OF SPIRULINA IN LOW COST NUTRITIOUS RECIPES AND ITS HEALTH BENEFITS
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Seaweeds are one of nature’s wonder foods. They are one of the most nutritionally dense plants, also the most abundant source of minerals in the plant kingdom. Spirulina one of the seaweed is selected for the study. Spirulina is 100 percent natural and a highly nutritious micro salt water plant. The spiralshaped algae is a rich source of all vital nutrients especially proteins, vitamins A and iron. This algae has constituted a significant part of diet of many communities. Even though it is single celled, Spirulina is relatively large, attaining sizes of 0.5 millimeters in length. This is about 200 times bigger the size of most other algae, which makes some individual Spirulina cells visible to naked eye. It contains rich vegetable protein, multivitamins which is particularly lacking in a vegetarian diet. It has a wide range of minerals, high chlorophyll, which helps to remove toxins from the blood and boost the immune system. It contains a very high Concentration of bio- available source of iron and excellent during pregnancy and for those with anemia and it will not cause anemia. It is a rich source of vitamin B complex like B1, B2, andB3, Vitamin C, Vitamin D, Vitamin A. It is also incredibly high in calcium with over 26 times the calcium in milk, excellent for children and for pregnant women. So the low cost recipes are selected for value addition for this super food which can be affordable by all sectors of the society. It has many miracle effects in curing several nutrition and immune disorders. Key words; Spirulina, Vitamins, Minerals, Health, Recipe, Low cost.
EXN-P-20

QUANTITATIVE ESTIMATION OF MINERAL CONTENT FROM THE EDIBLE FLOWERS OF ALLIUM CEPA, CUCURBITA MAXIMA AND CARICA PAPAYA- A COMPARATIVE STUDY

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Objective- For centuries edible flowers have been an integral part of human nutrition being used as garnishes of individual dishes and also consumed fresh. This study estimates the mineral content of 3 edible flowers (per 100gm fresh flowers), namely Allium cepa (onion) flower, Carica papaya (papaya) flower and Cucurbita maxima (pumpkin) flower. In addition, I] A comparative study of the mineral content with four other commonly consumed edible flowers has been included. II] A comparative study of the 3 edible flowers with the mineral content of their respective fruits and leaves has been carried out. Method- Both macro-mineral and trace mineral contents were estimated by means of Plasma-Optical Emission Spectroscopy following Association of Official Analytical Chemists (AOAC, 1990) method. Result- Onion flowers contain the highest amount of Potassium, Calcium, Sodium, Zinc and Sulphur content while the pumpkin flowers have the highest quantity of Copper content. Onion flowers have the highest quantity of Calcium and Manganese when compared to its stalk and bulb. Papaya flowers are a rich source of Phosphorous and Copper, when compared to its fruit and leafy parts. The average Sodium and Potassium content of the test flowers are nutritionally sufficient and can be consumed for its high Calcium and Potassium content. Notably, Allium cepa flower is the only edible flower in this study with a detectable level of Sulphur content. Conclusion- The results conclude that Allium cepa, Cucurbita maxima and Carica papaya flowers contain sufficient quantities of essential minerals such as Calcium, Sodium, Potassium, Iron and trace minerals like Iodine, Sulphur, Manganese, Copper, Zinc and Lead. These flowers are also low cost, easily available and can be a potential source of microelements. Hence their consumption may open a new dimension for the nutrition security of our country. Keywords- edible flowers, minerals, Allium cepa, Carica papaya, Cucurbita maxima

EXN-P-20

IN -VITRO, ANTI-OXIDANT ACTIVITY OF METHANOLIC EXTRACT OF SYZYGIUM JAMBOS FRUIT AND SEED

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Objective To examine the antioxidant potentiality of methanolic extract of Syzygiumjambos fruit and its seed. Methods Extract of S. jambos fruit and its seed were studied for their antioxidant activity by DPPH Assay, Hydrogen Peroxide Radical Assay, Phosphomolybdate Assay (Total Antioxidant Capacity), Site Specific Hydroxyl Radical Scavenging Assay, Superoxide Scavenging Assay, Nitric Oxide Scavenging Assay. Results Results from the present studies are as follows- if¼ Themethanolic extract of Syzygiumjambos seed was found more effective in the DPPH radical scavenging activity than S. jambos fruit. The IC50 value of the methanolic extract of S. jambos seed, fruit and gallic acid were 35.59 Âµg/ml, 14.86 Âµg/ml and 18.56 Âµg/ml respectively. if¼ Total Antioxidant Capacity (IC50 ) value of the standard showed highest (433.8 Âµg/ml) than S. jambos seed (418.89 Âµg/ml) and S. jambos fruit (397.38 Âµg/ml) if¼ In the Site Specific Hydroxyl Radical Scavenging activity, S. jambos seed exhibited more scavenging capacity (535Âµg/ml) than the fruit (376.95Âµg/ml) and standard (334.6 Âµg/ml) if¼ Superoxide Radical Scavenging activity (IC50) value of methanolic extract of S. jambos seed was greater (226.06 Âµg/ml) than S. jambos fruit (118 Âµg/ml) and gallic acid standard (177.3Âµg/ml), if¼ In the Nitric Oxide Scavenging Assay, IC50 value of S. jambos fruit (189.5 Âµg/ml) was higher than the standard (153.96 Âµg/ml) and S.jambos seed (145.9 Âµg/ml). if¼ IC50 value of Hydrogen Peroxide Radical Scavenging activity of the methanolic extract of S. jambos fruit ( 81.4Âµg/ml) was observed higher than ascorbic acid ( 51.04 Âµg/ml). Conclusion Hence, these in-vitro assays indicate that methanolic extract of Syzygiumjambos fruit and its seed has high antioxidant activity which may be helpful in preventing the progress of various oxidative stresses and degenerating diseases. KEYWORDS- Syzygiumjambos, Fruit, Seed, Methanolic extract, Antioxidant activity
FORMULATION, NUTRIENT ANALYSIS AND EVALUATION OF LOW GI COOKIES INCORPORATED WITH HORSE GRAM (Macrotyloma uniflorum) AND PUMPKIN SEEDS (Cucurbita maxima)

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Background- The society is now heading to find an optimum alimentary diet which tries to promote the consumption of underutilized foods which are economical, nutrient dense promoting health, dietary diversification, food and nutrition security. Horse Gram and Pumpkin seed cookies will serve as a good nutritious snack in promoting good health having significant nutritional, therapeutic and pharmacological activities such as anti diabetic, antifungal, antibacterial, anti-inflammatory and anti-oxidant effects. Hence, the present study entitled “Formulation, Nutrient analysis and Evaluation of cookies incorporated with Horse gram and Pumpkin seeds” was carried out. Material and Methods- Cookies with three variations were formulated by incorporating horse gram and pumpkin seeds with proportions 75:25, 50:50 and 75:50. Organoleptic evaluation was done based on appearance, color, mouth feel, flavour, and overall acceptability and GI of cookies were assessed. A 5 point scale was used for organoleptic evaluation. Total anti ß- oxidant activity using DPPH method, vitamin C content using titration method and nutritive value of the cookies were analysed. Result- A2 variation (50-50) having equal proportion of horse gram and pumpkin seeds has got more consumer acceptability (4±1) than other two variations in terms of appearance, color, taste, flavour, mouth feel and overall acceptability. A1 (75-25) variation containing higher proportion of horse gram with IC50 value 130.73µg/ml showed higher antioxidant activity and vitamin C content (52.8 mg /25g). The glycaemic index of the cookies (25g) was found to be low, 58.82 compared to market available sugar free cookies. Conclusion- The developed cookies of variation A1 (75-25) incorporated with underutilized horse gram and pumpkin seeds was found to be healthy in terms of higher antioxidant activity, Vitamin C content and low Glycaemic index which can be prescribed to increase nutrition and health among diabetic patients. A2 variation (50-50) was only accepted in terms of taste and texture.

FORMULATION, NUTRIENT – ANTIOXIDANT ANALYSIS OF WINE DEVELOPED FROM ANNONA MURICATA WITH ANACARDIUM OCCIDENTALE L. AND CARICA PAPAYA L.

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Background- Fruit wines are now gaining more popularity among wine consumers because of their economic feasibility, nutrient density, strong flavours, unique colour, low alcohol content, yield, its role in reducing postharvest losses of underutilised fruits and malnutrition by promoting health and appetite. Soursop, papaya and cashew apple has gained more attention in recent years due to their nutritional, therapeutic, pharmacological and probiotic effects. The dietary polyphenols in wine are bioavailable and soluble serving as a good nutritional provider. Hence, the present study entitled “Standardisation, Nutrient ß- Antioxidant Analysis of Wine Developed from Annona Muricata with Anacardium occidentale L. and Carica papaya L.” were carried out. Method- Three variations of wine were formulated by incorporating cashew apple and papaya in combination with soursop pulp (1:1) and soursop alone. Organoleptic evaluation, consumer acceptability and supplementation of wine (30 ml/day) was done among underweight college going girls for 21 days. Total antioxidant activity of wine using DPPH assay, Vitamin C analysis using iodometric titration and composition of wine was assessed. Results- Sample A of noni alone scored higher in consumer acceptance (4.8 Â± 0.27), overall acceptability (4.0±0.89) and vitamin C content (1.24 mg/dl). Supplementation of soursop wine among underweight college going girls significantly increased the appetite and weight (1.2Â±1 Kg). Phenolic compounds are major contributors to the antioxidant activity in wine. The antioxidant activity of the extracts of noni fruit showed excellent activity(DPPH) as measured by the inhibition coefficient (IC50) which reflects an increase in the total antioxidant activity (IC50 value -130.9 Âµg/ml), which is comparable to that of both â-tocopherol and BHT compared to sample B and sample C. Conclusion- Even though, all three variations had high vitamin C content and high antioxidant properties, soursop wine was excellent. Supplementation of noni wine produced increased appetite and weight gain among underweight college going girls.
INCORPORATION OF PRODUCTS WITH PLANTAIN FLOWER AND ITS QUALITY EVALUATION

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Background- Plantain flower or banana blossom is cheaply available and low cost fruit consumed commonly. The post-harvest losses of this plant material leads to reduced use of plantain flower in the form of food products. Considering the need for processing plantain flower and promoting the use of it, this study was selected to incorporate it in dehydrated form in frequently used foods. Materials&Method- Genus MUSA variety of plantain flower was collected from local market, processed and made into powder. Plantain flower powder was incorporated in food products such as bread and chappathi in various combinations. The developed products were evaluated on the basis of sensory, nutrient analysis and nutritive value calculation. Results- The scores obtained in the sensory evaluation in terms of crust, aroma, shape, texture, mouthfeel, taste, appearance and overall acceptability of bread were evaluated by statistical analysis (mean and standard deviation) the third variation (70-30 ratio) scored highest mean value of 4.625Â±0.478. The scores of chappathi was assessed by appearance, colour, mouthfeel, flavour, taste and overall acceptability, second variation (72-8 ratio) scored highest mean value (3.75Â±1.258). Nutrients such as crude fibre (2.9, 2.2 g/100g), iron (1.4, 0.7 mg/100g), and magnesium (17.3, 21.0 mg/100g) were analysed in the most acceptable plantain flower powder incorporated bread and chappathi variations respectively. Conclusion- The study concluded that dehydrated plantain flower powder incorporation increased the fibre content of the products in bread and chappathi and the nutrient analysis revealed that products are rich in micronutrients such as iron and magnesium. Dehydration method reduced the wastage of plantain flower through spoilage and increases the self life.

DEVELOPMENT AND EVALUATION OF FIBER ENRICHED BAKED SNACKS

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Background. Vegetable by-products are considered as good source of dietary Fiber and other biologically important compounds. These by-products are inexpensive, non-caloric bulking agents for partial replacement of flour. The objective of this study was to enrich Fiber in baked snacks such as cup cakes and cookies by incorporating carrot pomace powder. Materials and methods. Fresh carrots were collected from the local market and then they processed to form freshly prepared carrot pomace powder. The incorporation of carrot pomace at different levels was done by replacing whole wheat flour with 15 g, 20 g and 25 g. Here sensory attributes and crude Fiber content of incorporated baked snacks were evaluated. Results. The sensory characteristics such as appearance, colour, mouth feel, flavour, taste and acceptability were evaluated and the scores were analyzed statistically by mean standard deviation. In cup cakes, the third variation (50-25) scored highest mean of 4.8 Â± 0.44 each for flavor, mouthfeel and acceptability. First and second variation (60-15 and 55-20) of cookies scored highest mean value for acceptability of 3.4 Â± 0.96 and 3.5 Â± 0.70 respectively. The crude Fiber content of carrot pomace incorporated cup cakes and cookies were analyzed and crude Fiber content in it was found to be increased from 1.6 g to 2.2 g/100 g and 1.1 g to 1.4 g/100 g respectively. Conclusion. The results of this study revealed that carrot pomace powder can be used as a good source of dietary Fiber for the enrichment of Fiber in the baked snacks. The enrichment of cup cakes and cookies with carrot pomace powder not only increased the Fiber content but also improved the sensory quality.

EVALUATION OF FOOD AND NUTRITION SECURITY AWARENESS AND EATING BEHAVIOUR OF LOW SOCIO- ECONOMIC WOMEN- A STUDY OF KISHANPUR PANCHAYAT.

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Introduction Food and nutrition security exits when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and food preferences, and quality to meet their dietary needs and food preferences and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life. Food and nutritional security both depend on food processing. One or more of a range of operations, storing, cooling, freezing, heating, fermenting, filtering, extracting, frying, drying, centrifuging, irradiating, microwaving and packing etc described as food processing. There are four food
In the context of food purchasing, low socio-economic and resource-poor people in both urban and rural areas have a high risk of food insecurity and eating disorders. The study involved randomly selecting women aged 40 to 50 to assess the relationship between food insecurity and eating behaviors. The results suggest that different puddings can improve nutritional status.

**Conclusion**

To avoid junk food and promote healthy eating, it is crucial to include locally available raw materials and blend them with various items that enhance the nutritive value of the pudding. Starting from khir to Mahuwa and Sweet potato, each pudding has its unique benefits and nutritional profile.

**FSN-P-06**

**TRADITIONAL PUDDINGS AND NUTRITIONAL SECURITY BY BLENDING TECHNOLOGY WITH TECHNOLOGY CEREMONIAL FOODS**

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Every place has its own culture, tradition of food. Bihar too has its own authentic and mouth-watering cuisine. The cuisine of Bihar is predominantly vegetarian, fish, chicken and mutton are taken sparingly. Some dishes for which Bihar is famous include khir, Makhan, Malpua, Dal pitha, Thekua, Titariya, Dal puri, Pedakiya, gujiya, Dal pitha, Thekua, Khajuriya, Dal puri, Pedakiya, gujiya, Tilauria, Badi, Muthia, Rasia, Lai, kadhi badi, Ramrus dhokla, Sag, Mahua and Sweet potato etc. Dietary habits of people in different regions are governed by the availability of foods and practices. Foods cultivated locally are the main criteria for food intake. There are many factors that influence the food intake. Diet is predominantly based on cereals. The primitive people always tried to mix cereals either with fruits, roots, beans and predominantly jaggery. The state of Bihar has a mixed culture ranging from Mithila in North to Gangetic plain of west to east Bihar and predominantly tribal, South Bihar. The various puddings listed above are prepared from locally available raw materials and mixing it with verities of items which enhance the nutritive value of that pudding. Starting from khir to Mahuwa and Sweet potato, Khi is a blend of rice, milk sugar/jaggery and dry fruits enhance the biological value, essential amino acid availability and many more. Apart from khir there are many puddings blended with technology can be a tool of removing nutritional deficiency and strengthening nutritional security. By blending technology in other puddings can ameliorate nutritional status. Conclusion so avoid junk and other non-tested food and return to local seasonal and regional food especially puddings used in various seasons have hopes. Chronic problem of protein calorie and other nutrient deficiency can well be fought by adopting traditional puddings.

**FSN-P-07**

**NUTRITIONAL AND SENSORY CHARACTERISTICS OF CAKE PREPARED FROM UNDERUTILIZED MILLETS OF HIMALAYAN REGION**

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**Background**

The underutilized crops are also known by other terms such as underexploited, non-conventional, new, promising, neglected or local crops. These crops include minor millets which are rich in nutrients and resistant to adverse climate conditions. These millets are grown in the interior and remote areas of Himachal Pradesh and losing their popularity although they are rich in nutrients.

The present study was undertaken to prepare a value-added cake from these millets because value addition can help to promote these crops for future use. Material & Methods- Underutilized millets viz. kodra, kauni, chinoo and shonkh were procured from local farmers of district Sirmaur of Himachal Pradesh. The cake was prepared by using rice, maize and millet flours in different formulations. Result- Cake prepared by using shonkh, rice and maize flour (87.78 %) was most acceptable after control (96.67 %). Control cake contained 20.12, 1.27, 23.75, 10.45, 2.18 and 42.23 per cent moisture, ash, crude fat, crude protein, crude fibre and
carbohydrate content, however the values for cake prepared by using millets ranged from 20.01 â€“ 20.24, 3.86 â€“ 4.32, 23.14 â€“ 23.92, 10.52 â€“ 11.13, 4.53 â€“ 6.95 and 34.50 â€“ 36.96 per cent, respectively. Conclusion- The data concerning the nutritional evaluation of the products revealed that supplementation of millets increased the nutritional value whereas, the results for sensory evaluation revealed that with supplementation of millets, the sensory scores decreased as compared to the control samples, but the products were found to be within the acceptable range. Development of value added products from these millets can enhance the post-harvest utilization of these underutilized millets at household level as well as commercial products.

FSN-P-08

NUTRITIONAL DEFICIENCY DISEASES NITESH KUMAR, SC ZOOLOGY
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Introduction Deficiency Diseases Are Diseases In Humans That Are Directly Or Indirectly Caused By A Lack Of Essential Nutrients In The Die Deficiency Diseases Are Commonly Associated With Chronic Malnutrition. Additionally, Conditions Such As Obesity From Overrating Can Also Cause .Or Contribute To , Serious Health Problems . Excessive Intake Of Some Nutrients Can Cause Acute Poisoning. Â€ŒDiseasesâ€œ Originally Referred To What It Says - Dis Â€œ Ease. A Person Who Did Not Feel At Ease Or Was Uncomfortable And Not Well Was Said To Be At A Dis-Ease . Now A Days Of Course When You Talk About Disease,We Mean A Particular Discomfort Caused By A Disfunction Of Some Part Of Body. Nutrition The Proces Of Eating The Right Kind Of Food So You Can Grow Properly And Be Healty Nutrients A Food Or Other Substance That Provides Energy Or Building Materials For The Survival ,Normal Metabolism And Growth Of A Living Organism. Deficiency The Inadequate Up Take Of Anything Is Ncaled Deficiency. Six Essential Nutrients There Are Three Micronutrients And Macronutrients Â€Œ Micronutrients -- 1. Minerals 2. Vitamins 3. Water Â€Œ Macronutrients -- 1. Carbohydrates 2. Fats 3. Protein Essential Nutrients Of Life There Are Thirteen Vitamins Such As Vitamin A , B1(Thiamine) , B2(Riboflavin) , B3(Niacin) , B5(Pantothenic Acid), B6 , B12 , D , E , K, C , Biotin , Follic Acid Carbohydrates --Glucose Fat (Lipid) --Linoleic Acid There Are Eighteen Minerals Calcium, Chlorine, Chromium ,Cobalt , Copper ,Iodine, Iron, Magnesium,Manganese ,Molybdenum,Phosphorus, Selenium, Silicon, Sodium, Sulphur, Tin, Vanadium, Zinc There Are Ten Amino Acids Histidine, Isoleucine, Leucine, Lysine, Methoinine, Nonsessential Nitrogen, Phenylalanine,Theonine, Tryptophan, Valine. One Protein And One Water Â€Œyour Body Can Make Whatever Else It Needs From These 45 Essentials Nutrientsâ€œ Calcium Is Essential For The Formation And Main Tenance Of Bones And Teeth,Blood Clotting,Normal Heart Beat And Hormone Secretion Calcium Essential For Formation Of Bones Deficiency Of Calcium Causes Teeth To Wear Away And Makes Bone Brittle . Oral Sign And Symptoms Incomplete Mineralisation Of Teeth,Rickets ,Osteomalacia,Osteoporosis,Bone Frailty,Increased Tooth Mobility And Premature Loss Deficiency Symptoms Of Calcium- The Symptoms Of Calcium Deficiency Are -- Bowlegs,Pigeon Breast,Knock Knees Of Children , Cramp Pains In Legs ,Delay In Sitting Up ,Crawling And Walking Of Babies Become Irregular, Nerve Become Extremely Irritable ,Poor Sleep Disorder , Weakness In The Bones Deficiency Diseases Of Calcium Arthritis,High Blood Pressure,Osteoporosis (Silent Killer), Osteoporosis Osteoporosis Is Defined As Â€Œ Disease Characterised By Low Bone Mass And Microarchitectural Deterioration Of Bone Tissue Leading To Enhanched Bone Frailty And A Consequent Increase In Fracture Riskâ€œ. Calcium Requirements During Pregnancy Calcium Decreases Risk Of Hypertension,Pre-Eclipsia,Low Birth Weight And Chronic Hyperton

FSN-P-10

ANTIOXIDANT AND ANTIMICROBIAL ACTIVITY OF AMLA (EMBLICA OFFICINALIS L.) SEED METHANOLIC EXTRACT
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Nutritional composition, fatty acids, antioxidant and antimicrobial activity of amla (Emblica officinalis L.) seed was investigated. The seed was manually separated from fruit, tray dried, ground and packed in polyethylene pouches. Amla processing yielded 13.97% seed powder. The seed powder was found to be a rich source of fibre (35.04%), calcium (146 mg/100g), iron (3.9 mg/100g) and polyphenols (2950 mg/100g). The fatty acid composition was determined by gas chromatography (GC) and gas chromatographyâ€“mass spectrometry (GCâ€“MS). It was found that the seed oil is rich in linolenic (48.1 %), linoleic acid (21.2 %) and oleic acids (11.2 %). Tannic acid of seed powder was quantified using HPLC analysis (2.27%). Antioxidant activity assays indicated a concentration of 0.12 and 0.38 mg/ml of seed powder was required for 50% inhibition of DPPH and ABTS radicals, respectively. The methanol extract of the seed was evaluated for antimicrobial activity by disc diffusion method, which showed that the extract was sensitive at 20Âµl concentration on Gram negative bacteria, Escherichia coli (ATCC-25922), Enterobacter aerogenes (MTCC-111) and Gram positive bacteria, Staphylococcus aureus (ATCC-25923). This study showcases the potential nutritional and bioactive composition of amla seed powder for beneficiation through food and pharmaceutical applications.
FSN-P-11

STUDY ON THE GROWTH OF MICROGREENS

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Background- The Study on the growth of microgreens were undertaken mainly >To study the growth of selected varieties of microgreens >To study about the climatic condition and type of medium required for the growth of the selected microgreens. >To analyse the proximate cost required for the cultivation of microgreens. Material & Methods- Selection of Sample- Microgreens are available in wide varieties and can be purchased from online shopping sites as well as from seed growing nurseries. The selection of samples were done based on their adaptability to grow in tropical climate. Selection of Tools- The tools required for growing microgreens include- a. Container b. Coco peat c. Water d. Microgreen seeds e. Aluminium foil paper Selection of Growing Medium The growing medium selected for the growth the microgreen was coco peat. It consists of a mixture of coco pit compost and coconut fibre in 2-1 proportions. It has the ability to retain and absorb water and maintains the moisture level for the growth of the greens. Cultivation of Microgreen Seeds a. Preparation of the trays- the trays used for sowing were of 29Ã—24Ã—6cm. b. Sowing of seeds-transfer the entire seeds in the packet into a glass and spread the seeds over the peat by shaking the glass so that it falls evenly. c. Covering the tray- cover the tray with an aluminium foil d. Watering the seeds- sprinkle water on the seeds, twice a day by removing the cover and then place the foil over the tray. Continue this for about 4-5 days and then remove the cover and place the tray in an area where it receives sunlight. Cost Calculation for the Cultivation of the Microgreens-Cost is an important factor which determines the buying capacity of people. The proximate cost required for the cultivation of microgreens were calculated . o Result- Growth of the Microgreens were analyzed and concluded that the selected varieties belonging to the Apiaceae family was having very slow growth whereas broccoli greens belonging to Brassicaceae family were having a rapid growth rate. The mint greens belonging to Lamiaceae family were also found to be with slow germination growth. One of the major result of the study was the Harvest of microgreens which were done once they reached a height of 4 inches and at this stage the microgreens are known as the baby leaf stage. The study also finds the medium used for the growth of microgreens that was coco peat which consisted of coco pit compost and coconut fibres in 2-1 proportion. The main result of the study was that of the cost calculation for the cultivation of microgreens and it was found that the total cost was only very less amount considered with the total production. o Conclusion- The selected varieties of microgreens was found to be grown in tropical climate.As it is found to be packed with micronutrients cultivation of microgreens with suitable growing medium will be an asset to encourage the healthy eating .

FSN-P-12

DEVELOPMENT OF VALUE ADDED BHAKARI (ROTI) BY UTILIZING HORSE GRAM (Macrotyloma uniflorum)

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DEVELOPMENT OF VALUE ADDED BHAKARI (ROTI) BY UTILIZING HORSE GRAM (Macrotyloma uniflorum)
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Abstract Background Horse gram is a potential grain legume having excellent nutritional and remedial properties. It is less expensive source of protein and is also rich in minerals. An attempt was made to develop value added Bhakari (Roti) by incorporating horse gram flour at different levels. Methodology Control product was prepared without incorporating horse gram flour whereas experimental product was developed with varying levels of horse gram flour. Sensory evaluation, nutritional analysis and storage study was carried out for the value added products. Results Bhakari was well acceptable at 20 per cent level of incorporation of horse gram flour. The proximate nutrient content of bhakari indicated that the moisture content of basic bhakari was 7.66 percent whereas for value added bhakari it was 8.2 percent. The protein content of basic and value added bhakari was 8.31 and 12.25 percent respectively. The protein content of horse gram flour incorporated bhakari was increased by 3.94 g. The fat content of value added bhakari was decreased by 0.07 g. The fiber and total mineral content of experimental variation sample was increased by 0.75 g (from 1.16 to 1.91 g/100g) and 0.62 g (from 1.21 to 1.83 g/100g) respectively. The increase in the fiber and total minerals content was statistically significant. The carbohydrate content of basic sample was higher (80.38 %) than value added sample (74.06 %). The calcium content of value added bhakari was increased from 26.5mg/100g to 60 mg/100g. About, 4.4 mg/100g of iron was noticed in value added bhakari where as, the iron content of basic bhakari was 3.83 mg/100g. The increase in iron was significant. Addition of horse gram to bhakari did not increase the values of micro mineral content i.e. zinc and manganese significantly. Bhakari can be stored up to 24 hours in air tight steel container at room temperature. Conclusion It can be concluded that horse gram flour can be utilized for development of value added bhakari.
FSN-P-13
IMPACT OF CHICKPEA FLOUR INCORPORATION ON SELECTED BAKED GOODS
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Background- The present study was undertaken with an aim to assess the protein consumption pattern and to develop protein and micronutrient rich baked products with incorporation of chickpea flour. All purpose flour is replaced with chickpea flour and wheat flour in order to make it nutritionally adequate. Baked products which are healthier than the normal snacks will also help in controlling many life style diseases.

Methodology- An online survey was conducted to assess the protein consumption pattern among the population. Buns and muffins were prepared using chickpea wheat composite flour in 10-90, 20-80, 30-70 variations. Physical properties of the products and composite flour were analyzed. Orognaoleptic and consumer acceptability evaluation was done for the products.

Result- From the survey it was evident that pulse intake was very low in the population. Most of the people were using fish on a daily basis; followed by egg, chicken, red meat. The analysis of physical properties of flour showed that the swelling capacity(17 ml) was high in 10-90, water absorption capacity (3 g/g) was high in 30-70, foaming capacity and moisture content were also high in 30-70 variation. Physical properties of the products showed that addition of chickpea flour increased the yield, water absorption capacity, and weight, whereas baking loss, moisture loss and thickness were decreased. The sensory and acceptability scores revealed that 10-90 variation in muffins and 20-80 in buns were acceptable. The nutritive value of the products increased significantly than the standard products. Nutrients like protein, folic acid, carotene, calcium, have shown significant increase.

Conclusion- It is evident from the study that the buns & muffins can be made with incorporation of chickpea flour without affecting the sensory properties. The outcomes of the study can be used as valuable information for development of nutrient dense baked products.

FSN-P-14
HEALTHY BENEFITS OF INDIAN HERBS
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Spices Were Some Of The Most Valuable Items Of Trade In The Ancient And Medieval World. Herbalist And Folk Practitioners Have Used Plant Remedies For Centuries , But Only Recently Have Scientist Begun To Study The Power Of Common Herbs And Spices. In The Current Set-Up,The Anti-Proliferative , Anti-Hypercholesterolemic , Anti-Diabetic , Anti-Inflammatory , Effects Of Spices Have Overtaken Importance , As The Key Health Concern Of Mankind Now A Days Is Diabetes,Cardio-Vascular Diseases,Arthritis And Cancer . Spices Or Their Active Compounds Could Be Used As Possible Ameliorative Or Preventive Agents For Thses Health Disorders. Spices Are Rich In Antioxidants,And Scientific Studies Suggest That They Are Also Potent Inhibitors If Tissues Damage And Inflammation Caused By High Levels Of Blood Sugar And Circulating Lipids. Because Spices Have Very Low Calorie Content And Are Relatively In Expensive,They Are Reliable Sources Of Antioxidants And Other Potential Bioactive Compounds In Diet. This Review Outlines The Role Of Some Spices Used In The Indian Kitchen For Its Flavour And Taste Which Are Potential To Maintain A Healthy Heart. Keywords Spices , Anti Â€“ Inflammatory , Anti Â€“ Proliferative,Hypercholesterolemia , Cardio Â€“ Vascular Disease , Diabetes.

FSN-P-15
HEALTHY BENEFITS OF INDIAN HERB
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Healthy Benefits Of Indian Herb The Species That Makes Up The Genus Mentha Are Widely Distributed And Can Be Found In Many Environments. Most Grow Best In Wet Environments And Moist Soils. Mints Will Grow 10-120 Cm Tall And Can Spread Over An Intermediate Area . Due To Their Trendiness To Spread Unchecked , Some Mints Are Considered Invasive. Mint Are One Of The Oldest And Most Popular Herb. There Are Many Varieties Of Mint Each Having Its Own Subtle Flavour And Aroma. Mint Has One Of The Highest Antioxidant Capacities Of Food. The Mentha Or Mint Family Refers To A Group Of Around 15 To 20 Plants Species. Allergies Mint Effectiveness In Relieving Seasonal Allergy Symptoms Revealing Promosing Natural Treatment. Breast Feeding Breast Feeding Offers Significant Benefits For Both Infant And Parent But It Can Cause Pain Anddamage To The Nipple Common Cold Mint Contains Menthol A Natural Aromatic Decongestant That Help To Break Up Phlegm And Mucus. Indigestion And Gas Mint Is Calming And Soothing Herb That Has Been Used For Thousand Of Years To Add With Upset Stomach Or Indigestion And It Increase Bile Flow. Skin Skin Applied Topically In Oil, Ointment Or Lotion, Mint Has The Effect Of Calming And Cooling Skin Affected By Insect Bites Rash. Oral Health Mint Is A Natural Anti Microbial Agent And Breath Freshness. Irritable Bowel Syndrome.
Potential Role In Preventing Gastric Ulcer Associated With Peppermint Oil

The use of peppermint oil has been found to be an effective and safe treatment for those suffering from abdominal pain or discomfort and heartburn. Gastric ulcer is giving it apotential role in preventing gastric ulcer associated with alcohol consumption. Nutrition two table spoons of fresh peppermint provides two calories. 0.12 grams of protein. 0.48 grams of carbohydrates. 0.03 grams of fat. 0.30 grams of fibre. Mint contains small amount of potassium, magnesium, calcium, phosphorous, vitamin C, iron and vitamin A3.

FNS-P-16

DEVELOPMENT OF VALUE ADDED PLANT BASED CURD FROM COCONUT AND SOYA BEAN

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The research in recent time is mainly focused on the plant based or non dairy milk alternative. The issue of perceived insufficient dairy milk supply is a frequently occurring problem and dairy milk allergy, lactose intolerance is increasing preference to vegan milk or dairy milk alternatives. Due to the health benefits and nutritional composition of the soybean and coconut milk, it is the best alternative for the dairy milk. Blended coconut and soybeans to extract milk were filtered through muslin cloth. Heating the milk is very important to increase the shelf life of the curd and to give warm temperature for the good bacteria (Lactic acid bacteria). The milk thus obtained was used to develop five varieties of plant based curds viz., coconut and soy curd (50%-50%), coconut soy sesame curd (75%-25%), coconut soy curd enriched with watermelon juice (90%-10%), coconut and soy curd enriched with sugar cane juice (90%-10%), coconut curd enriched with tulsi extract (95%-5%) and 1% lactic acid bacteria was used. Fermentation process duration and the fermented milk quality were tested chemically and organoleptically. The result shown that the most acceptable curd was sample 3 (90%-10% coconut soy milk-watermelon juice). The shelf life studies conducted through organoleptic evaluation ensured a definite shelf life of 2 days when stored at temperature 25-30°C and 10 days when stored at temperature 4-6°C. The research results thus developed value added plant based curd produced to be nutritionally and sensorially superior in most quality attributes than the conventional yoghurt. Plant based curd is the best option for the vegans to prevent malnutrition. Key words- dairy milk, Vegan milk, soybean milk, coconut milk, sugar cane juice and watermelon juice.

FNS-P-17

FOOD SAFETY MANAGEMENT OF PERISHABLE FOOD INDUSTRY OF MALAPPURAM

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Food is a substance which when consumed provides us energy and vital nutrients required by our body to lead a healthy life. Food safety is a term which states that the food is safe and fit for human consumption. In this pilot study, a KAP survey was done to access the knowledge level of 20 food handlers using a questionnaire, related to food safety. HACCP, personal hygiene and good handling practices. The inspection of the site was also done. The food handlers were trained for a month through powerpoint presentations, posters, charts, hand washing techniques. Activities like group discussions, debates were also organized which helped me to access the knowledge level of the food handlers. A takeaway pamphlet on 5 steps to ensure safe food was also designed and given to the food handlers so that they can read and implement them in their day to day life. Post evaluation was also done using the same questionnaire to see if the main objective of the study was attained that was increased knowledge level of food handlers with a change in their working style and implementing them in their day to day life. Chances of microbial contamination, cross-contamination, hazards were reduced because they were adopting good handling practices and following the food safety principles which helped them in retaining the shelf life of their perishable products like cakes, pastries, cookies, breads, buns, etc. Thus the consumers have an assurance that the food is safe and secure and it will help to maintain a healthy active life and prevent lifestyle diseases.

FNS-P-18

A SURVEY REPORT ON FORMULATION OF FISH FEED IN KHORDHA DISTRICT OF ORISSA

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Background- There are several goals and considerations in feed manufacturing, some of which are nutritional and some of which are non-nutritional. The primary goal is to improve profits of fish production by maximizing the nutritional value of a feedstuff or a mixture of feedstuffs at minimum cost. Fish feeds are unique compared to feeds used for terrestrial animals grown for food because fish feeds must be processed into water stable pellets, and for many species, must float on the water surface. Objectives- To calculate the nutritional value for different unknown sample for fresh water fish Material and methods- This study was performed in Orissa.
under district Khordha for the period of 2 months from February 2017 to March 2017 to assess the nutritive value of commercial fish feed available at Orissa. Design- To take 5 different unknown sample from CIFA, Bhubaneswar. Estimate the nutritional value by using different methods. Methodology- â€¢ Different types of ingredients are involved to make fish feed variety. Like, pellet floating feed are for Pangassius, Catla, Silver Carp, Prawn etc. pellet shrinking feed for Rohu, Commoncrap, Prawn etc. â€¢ Using Anthrone method for carbohydrate, Protein by Lowryâ€™s method and fat by Soxhlet method. Result- Protein found 15.28 mg/gm, Carbohydrate 1-2.9 mg/gm and Fat 2.5-4.5 mg/gm Conclusion and discussion- Feeding is the major factor which determines the economic gain from aquaculture. It is also the major cost in aquaculture practices. So the feed formulation is a significant one. The feed we give to fish must contain energy sources, minerals, vitamins, other major and minor elements etc. the correct proportion of the metabolites with lesser cost is the basic of feed formulation.

FSN-P-19
PROXIMATE ANALYSIS AND HEALTH BENEFITS OF NIGELLA SATIVA L. (BLACK CUMIN) -THE MAGICAL SPICE

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Background- Spices have been known for ages as effective therapeutic food. Black cumin is one of the oldest medicinal plants with scientific name of Nigella sativa L.belonging order ranunculales family ranunculaceae which is also known as black seed, kala jeera or mangrail. The main objective of this study is to do proximate analysis, antimicrobial activity and to assess the correlation between total phenolic content and antioxidant activity. Methods- Proximate composition analysis on the seeds of N.sativa was be carried out by standard protocols (Raghuramulu et al., 2003) for determining ash, fibre, carbohydrate and fat. Total protein contents by micro Kjeldahl method of AOAC. Phosphorus determinations are performed by the method of Fiske Subbarow method. Calcium is precipitated as oxalate and is titrated with standard potassium permanganate titration method. Iron is determined by total iron binding capacity. The antimicrobial activity was determined by cup-plate method. Antioxidant properties are determined using methanol extract from black cumin seeds using oxygen radical absorbing capacity (ORAC) and total phenolic contents. Results- The moisture, ash, fiber and content of N.sativa for 100g of the sample 3.8 gm, 4.5gm, 24.9gm and 40.6gm respectively. The carbohydrate content in 100gm of sample was 4.6gm. The protein content was found to be 21.6 gm per 100gm of sample. The phosphorous and calcium content per 100gm of sample were 52.7 mg and 86mg respectively. The phenolic content is the highest 3.53 gallic acid per gram of oil. Conclusion- As per my study Nigella sativa L. can be used in daily life as not only flavoring agent but also good antioxidant potential. The oil of this seed extract showed high amounts of antioxidant activity and its extracts have best properties against free radicals. This study can further extended for its clinical importance and benefit to hair and health.

FSN-P-20
UTILIZATION OF CARROT WASTE (CARROT POMACE) IN MAKING OF VALUE ADDED PRODUCT

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The use of waste food products has gained attention all over the world. This is partly because of the awareness among people regarding beneficial affects of bioactive compounds like carotenoids and dietary fiber with appreciable levels of several other functional components having significant health-promoting properties. The consumption of carrot and its products is increasing steadily due to its recognition as an important source of natural antioxidants having anticancer activity. This study was conducted to explore the possibility of utilization of waste residues (pomace) obtained during carrot juice extraction for the preparation of a value added product. The objective of this study was to development of a value added new product using food waste (carrot pomace) and studying the nutritional yield, shelf- life of the product and acceptability of the product. Material and methods- Fresh carrots were procured, manually peeled, washed with potable water and placed on a sieve to drain out surface water and were further used for juice expression by juicer. The recovery of carrot juice and pulp (pomace) varied from 60.0 to 63.87%. The carrot juice and carrot pomace were processed separately. Subsequently, the residue (pomace) was spread uniformly and dried in a hot air oven drier at 120Â°C for 6 hours. The dried pomace was ground to fine powder and sieved In the development of the product carrot pomace cake, trials were tired with varied proportion of carrot pomace powder with 20% and 50% replacement of wheat flour. Chemical analyses includes determination of carbohydrates, fats, protein, crude fiber, dietary fiber. Their, shelf life , sensory evaluation where also done. Conclusion- The nutritional yield of the cake supplemented with 50% carrot pomace was higher than the controlled sample cake and slightly higher than the cake replaced by 20% carrot pomace.
INTERVENTION OF MICRO AND MACRO NUTRIENTS NUTRIENTS

Tejaswini Padakatti Research Scholar Food Processing and Nutrition department Karnataka State Akkamahadevi Womenâ€™s University vijayapur tipadakatti@gmail.com Dr Renuka Meti Associate Professor Food Processing and Nutrition department Karnataka State Akkamahadevi Womenâ€™s University vijayapurenukabujurke1@gmail.com Poster Intervention Of Micro And Macro Nutrients- A Review 1Tejaswini Padakatti, 2Renuka Meti, 1Sunita. B. 1 Research scholar, Dept. of Food Processing & Nutrition, Karnataka State Akkamahadevi Womenâ€™s University, Vijayapura â€“ 586 108, Karnataka, India 2 Associate Professor, Dept. of Food Processing & Nutrition, Karnataka State Akkamahadevi Womenâ€™s University, Vijayapura - â€“ 586 108, Karnataka, India

Abstract Macronutrients have traditionally been regarded as a means to satisfy basic energy needs for cellular homeostasis, while amino acids are considered necessary for anabolism and protein synthetic machinery of the cell where as Micronutrients are one of the major groups of nutrients which is required by our body which include vitamins and minerals. Vitamins are necessary for energy production, immune function, blood clotting and other functions meanwhile; minerals play an important role in growth, bone health, fluid balance and several other processes. There are several potential interventions to address micronutrient and macronutrients deficiencies in emergency-affected populations- few interventions that might help the population includes firstly providing a more varied diet which is very difficult. The major source of many essential micronutrients is fresh food, particularly fruit, meat, vegetables, and dairy products. It is very difficult to procure, ship, store, and distribute such food to large populations who are often located in remote places. Markets within the population can sometimes supply more varied foodstuffs, but people often do not have the money to purchase food in a market. Secondly provide micronutrient and macronutrients supplements to groups as risk. For example, give all pregnant women iron tablets to prevent the development of iron deficiency anemia during the pregnancy. However, supplementation programmes have notoriously low coverage and compliance. For these reasons, they do not often have a large effect on micronutrient deficiency. Thirdly Fortify the relief food distributed which has become the most common intervention; however, because fortified relief food is more expensive than unfortified food, programmes on tight budgets sometimes cannot afford it. Also, fortification does not work well for some micronutrients. For example, vitamin C is relatively unstable and does not last in foods which are stored for a long time or cooked at high temperatures.

FUNCTIONAL FOODS ARE GAINING MORE INTEREST IN RESEARCH AS THEY HAVE MANY HEALTH BENEFITS. Studies on fruits, flowers, herbs and their antioxidant, free radical scavenging is gaining much importance, as they prevent some chronic illnesses. Different plant parts including flower possess various phytocompounds and hence used in different application both culinary and curative. Present study aimed to determine the physico-chemical and functional properties of edible flowers infused with black/green teas. Proximate composition was carried out by AOAC official methods. The total phenolic content determined by us ciocalteu reagent while, the antioxidant capacities were measured by DPPH, ABTS, and FRAP assays. Results showed that highest ash in the flowers of Chrysanthemum (8.57%), fat in Banana (7.76%), protein in Moringa (23.12%), and fibre in Hibiscus (30.44%). Total polyphenol was high in Pomegranate (20.18 g GAE/100g). Antioxidant activity determined by ABTS was highest in Marigold (79.6%). Reducing power determined by FRAP activity showed changes in the active phenolic constituents.

PREPARATION OF MANGO LEAVES INCORPORATED HEALTH MIX FOR DIABETICS AND DETERMINING GLYCEMIC INDEX

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The common endocrine disorder affecting more than 100 million people worldwide is diabetes mellitus. Type II diabetes mellitus is a progressive chronic disorder caused by combinations of insulin resistance and decreased pancreatic B-cell function caused by both genetic and acquired abnormalities. Effective and safe medications can improve the management of diabetes and decrease complications. Medicinal plants serve as an alternative medicine due to less side effects and low cost. According to Ayurveda, mango...
tree and its parts has many medicinal properties. Mango possess anti-diabetic, anti-oxidant, anti-viral and anti-inflammatory properties. Mango leaves contain phenolic constituents like caffeic acid, polyphenols like mangiferin and gallic acid, flavonoids and volatile compounds. Therapeutic diet play a role in the management of diabetes, by reducing the postprandial hyperglycemia resulting in good glycemic control. The objectives of the study is development and standardization of mango leaves incorporated health mix and analyze the nutrient content, and determine the glycemic index. The ingredients select ed for health mix were wheat, barley, foxtail millet, green gram dal, roasted Bengal gram dal, groundnut and almonds. The ingredients were cleaned, roasted and milled to prepare mix. Five variations of health mix was prepared and it was made as porridge and evaluated. Fresh mango leaves was washed dried and powdered. This powder was incorporated into the health mix at 10, 20 and 30 percent level. Porridge was prepared with three variations and it was evaluated for its acceptability. Health mix incorporated with mango leaves powder at 10 and 20 percent was highly acceptable while 30 percent incorporation had a bitter taste and not acceptable. Nutrient analysis was carried out for the standard and the acceptable health mix. Glycemic index of the health mix and mango leaf incorporated health mix was determined. Standard health mix had 95 and mango leaves mix had 85 as glycemic index.

FSP-P-24
DEVELOPMENT AND QUALITY EVALUATION OF SNACKS INCORPORATED WITH FLAXSEEDS (Linum usitatissimum).

Background- People are becoming more health conscious and demanding the food having high nutritional value. Flaxseed is a functional food that provides health benefits for being high amount of α-linolenic acid (ALA), protein, dietary fiber, lignan, specifically Secoisolariciresinol diglucoside (SDG). Flaxseed products will serve as a good nutritious snacks in diet that promote potential benefits in situations like cardiovascular risk, certain types of cancers and other metabolic disorders. Hence, the present study entitled α-linolenic development and Quality Evaluation of Snacks incorporated with flaxseed. α-linolenic was carried out. Material and Methods-Churros and Pasta with three variations were formulated by incorporating flaxseed. Organoleptic evaluation and Consumer acceptability was done based on 5 point scale. The crude fiber composition of developed products was assessed using ASTA method and overall acceptability were evaluated and scores were analyzed statistically by mean standard deviation. To analyze the shelf life and nutritive value of formulated products. Result- A1 variation (20-80) and B2 variation (15-45) has got more consumer acceptability than the other two variations in terms of sensory attributes. The developed churros and pasta was found to be healthy and the crude fiber composition of developed products A3 and B3 has got more fiber content. Storage period of products during which the food retains an acceptable quality from a safety and organoleptic point of view depends on various factors. The nutritive value of developed products was also increased. Conclusion- Flaxseed in its flour can be incorporated in various recipes and can be developed in the forms of bakery and other products. Flaxseed flours can be successfully incorporated with flour to enhance the sensory and nutritional properties of the products. The product development proved that an addition level of flaxseed flour in baked products was well accepted by the tasters obtaining similar sensory acceptance to the standard product.

FSP-P-25
DEVELOPMENT OF ANTI OXIDANT RICH GUAVA LEAVES BEVERAGE POWDER

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DEVELOPMENT OF ANTI OXIDANT RICH GUAVA LEAVES BEVERAGE POWDER Rekha S.S, Dr. Usha Devi, Dr. Vejetha B.V.

ABSTRACT Objective- To develop and standardize a value added antioxidant rich guava leaves beverage powder α-quel™ was the primary objective of the project. The utilization of guava leaves as a base for the development of a value added antioxidant rich beverage powder was under taken in this project. Methodology- the study was done in smt. VHD research center. Initially many trials have been done for preparation of beverage powder with different ingredients and its proportions. Finally four variations of flavored guava leaves beverage powder were prepared and standardized. A panel list of 30 numbers evaluated the guava leaves beverage. 9 point hedonic rating scale was used for the sensory evaluation. Results- Ginger flavored guava leaves beverage variation was very well accepted among 4 variations, Ginger not only improved the flavor it also enhanced nutritional benefits. The costing of the product was also done and was found to be economical. The product also been subjected to analysis, in which the result found to be high in antioxidant (quercetin). Conclusion- This antioxidant quercetin investigation was resulted in the development of an economical value added antioxidant rich guava leaf beverage known for its therapeutic property for anti diabetes, anticancer, cold, cough and it is also beneficial for weight management. And it is also useful for promoting good health and immunity. Key words- antioxidant rich, beverage, economical, therapeutic property.
FSN-P-26
DEVELOPMENT OF MULTI NUTRIENT NOODLES
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DEVELOPMENT OF MULTI NUTRIENT NOODLES Lavanya M, Dr.Usha Devi, Dr. Neeta Pattan.

INTRODUCTION A product multi nutrient noodle was developed with the natural ingredients. Increase rate in the rate consumption of commercially processed food like noodles. The main purpose is that to provide all the essential nutrients like energy, protein, essential fatty acids, calcium, and vitamin-A to the preschoolers through one food. And main focus is to provide a health noodles with no refined starch, no trans fat and no added colour, flavours and no chemical preservatives. ABSTRACT Noodles were prepared. Ingredients used were wheat flour, malted wheat flour, black gram dhal, sesame seeds and dehydrated carrot. Black gram dhal incorporated to increase the protein quality. Noodles in this study are a good source of nutrition which plays an important role in maintaining health. It is a good source of protein, calcium, fiber, vitamin A, the innovative multi nutrient noodles provides most of the essential nutrients especially for the preschoolers. Various trails were made; noodles had been given for sensory evaluation to semi trained panelist. Objective- Commercially available noodles are made with Maida which is not good for health. In particular, school going children and adolescents are fond of consuming noodles Consumers are prone to buy them as they are readily available in the market. Methodology- The study was done in smt.VHD research center. Initially many trials have been done for preparation of multi nutrient noodles with different ingredients and its proportions. Finally three variations of multi nutrient noodles were prepared and standardized. A panel list of 30 numbers evaluated the multi nutrient noodles. 9 point hedonic rating scale was used for the sensory evaluation. Conclusion- All the Developed Multi Nutrient Noodles variations were subjected to sensory evaluation and variation 3 was most accepted by semi trained panel members. The standardized Multi Nutrient Noodles in this study is a good source of nutrition which plays important role I maintaining health. It is a good source protein, calcium, fiber, Vitamin A and also good source of anti oxidants. The innovative Multi Nutrient Noodles provides most of the essential nutrients especially for preschoolers. It is free from all the artificial flavors, chemical preservative and coloring agents. Key words- malted wheat flour, protein quality, vitamin A, calcium rich.

FSN-P-27
DEVELOPMENT OF CHONDROITIN SULFATE ENRICH POULTRY SHANK SOUP
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India ranks in 4th globally in the poultry production with an annual production of 122.5 million MT. Poultry meat and its products are more popular in all age group peoples. Poultry wastage includes feathers, shanks, skin, head, different organs, etc. Shanks contributes about 4% of total body weight, which is approximately 65854 tonnes. These shanks are a rich source of Chondroitin sulfate. The chondroitin sulfate plays biologically important roles in a human body, such as protection of connective tissues and management of osteoarthritis. Therefore present study focused on the extraction of chondroitin sulfate and utilization in value-added product i.e. soup. The stock was prepared by boiling the shanks in potable water. The stock was added with the spices and additives. The prepared soup was analyzed for proximate composition, chondroitin sulfate and sensory analysis. The results of the proximate composition showed that the prepared soup was rich in protein (43.25%) and fat (22.18%). Results also revealed that the prepared soup was a good source of chondroitin sulfate (1.20%). The soup prepared with 10% corn flour had the highest score for overall acceptability as well as for all sensory parameters. This will open up an additional avenue for poultry processor as a new income source.

FSN-P-28
VALUE ADDED PRODUCTS FROM PLANTAIN FLOWER AND ITS POPULARIZATION AMONG HOUSEWIVES
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BACKGROUND Plantain flower is a valuable source of potassium, vitamin A, vitamin C, vitamin E, minerals, fatty acids, flavonoids, saponins and glycosides. It is a good antioxidant source. The phytochemicals found in plantain flower helps to lower LDL, boost immunity, inhibit growth of cancer cells, reduce blood sugar and increase haemoglobin. METHODOLOGY Objectives of the study were to formulate plantain flower based recipes, analyse the nutrient content, to assess the acceptability of products and to popularize among housewives. Twenty recipes were developed using plantain flower. Score card was formulated to assess organoleptic qualities of the products. Sensory evaluation was carried out with the help of 10 panel members. Cost of the products was calculated to find out the affordability. Scores obtained were analysed statistically using ANOVA to select the best products. Best products selected were analysed for fibre and vitamin A content. Nutrition education was given for the housewives regarding the importance of vitamin A and fibre. RESULTS Five best products selected were Plantain Flower Sandwich, Plantain Flower Thoran, Plantain Flower Cutlet, Plantain Flower Chutney and Plantain Flower Sautéed. The fibre content varied from 2.90 â€“ 3.9 g/100 g.
where Plantain Flower Thoran scored highest (3.9 g/100 g). The vitamin A content varied from 25.08 â€“ 58.78 IU. Plantain Flower Cutlet had highest vitamin A content (58.78 IU). The cost of the products ranged from Rs. 2.20 â€“ Rs. 5.30/ 100g. CONCLUSION The developed products were nutritionally adequate. Plantain flower being a locally available ingredient, it was acceptable and economical from the consumerâ€™s point of view.

**FSN-P-29**

**DEVELOPMENT OF VALUE ADDED PRODUCTS FROM RIPE PAPAYA AND ITS POPULARIZATION AMONG MOTHERS OF PRE SCHOOL CHILDREN**

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**Background** Richness of papaya fruit in different vitamins, minerals, antioxidants and fibre makes it a highly nutritious fruit. It has a wide range of pharmacological effect. It is locally available in all seasons and has low cost. Development and popularization of its products may helpful to the society for its effective usage. Methodology The study was carried out with the objective of developing ripe papaya based products and popularizing them among mothers of school children. Twenty products (jam, jelly, gulab jamun, custard, pudding, ice-cream, cream souffle, cake, halwa, ladoo, sweet ball, payasam, kheer, kesari, ada, kumbilappam, kozhukatta, lazi, shake, juice) were developed using papaya as the major ingredient. A scorecard was developed for the organoleptic evaluation of the products. Sensory evaluation was carried out with the help of 10 panel members. Costs of the products were also calculated to find out the affordability. Popularization and nutrition education were done among mothers. Using ANOVA, five best products were selected. Vitamin A and vitamin C content of the selected products were analyzed. Results All the developed products have got high score for organoleptic qualities. The mean score for appearance, colour, texture, flavor and taste were 4.6, 4.7, 4.5, 4.6, 4.8 respectively. The cost of the products ranged from Rs 2.84/100gm to Rs 8.36 /100gm. The best products selected were halwa, payasam, shake, kumbilappam and jam. The Vitamin A content of the selected products varied from 412mcg/100gm (shake) to 289mcg/100gm (halwa) and Vitamin C content varied from 39mg/100gm (shake) to 21mg/100gm (payasam). Conclusion The developed products were economical and acceptable to the subjects. Nutrient analysis revealed that all the selected products have got high Vitamin A and good vitamin C content. Response of the participants included in nutrition education revealed that their knowledge improved after education and it was a success.

**FSN-P-30**

**SCREENING AND CHARACTERIZATION OF Ï€-PGA (GAMMA POLY-Glutamic Acid) PRODUCERS FROM MICROFLORA OF TRADITIONAL FERMENTED FOODS**

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**Background** Poly(Î³-glutamic acid) or Ï€-PGA is a water soluble, anionic, biodegradable and non-toxic homo-polyamino acid. Ï€-PGA and its derivatives are therefore interesting for a broad range of industrial fields, such as food, cosmetics, medicine and water treatments. The gamma glutamyl linkage between the â€-amino and Ï€-carboxyl chains makes it a poly amino acid that cannot be degraded easily by naturally occurring proteases. Functional properties of microorganisms in fermented foods include probiotics properties, antimicrobial properties, antioxidant, peptide production, fibronolytic activity, poly-glutamic acid, degradation of anti-nutritive compound, which may be important criteria for selection of starter culture(s) to be used in the manufacture of functional foods. Materials and methods- PGA producing bacteria were screened on a nutrient medium containing methylene blue dye. Further PGA was purified and quantified by UV-vis spectroscopy. The strains producing high quantity were selected and further taken for analytical analysis like FT-IR, NMR spectra, thermal analysis, amino acid composition and molecular weight determination. Results- The purified PGA was subjected to FT-IR measurements. The results showed the presence of a carbonyl group; two amide stretches, N-H bending and C=O symmetric stretching band. 1H and 13C NMR showed the chemical shifts for the â€-CH proton, Ï€-CH2 proton and Ï€-CH2 proton. Then, TGA (thermogravimetric analysis) was performed to determine the thermal decomposition temperature, Td which represents the thermal stability of Ï€-PGA. Ï€-PGA exhibited high-resistance to thermal degradation. The chromatogram of amino acid analysis showed a position corresponding to D-glutamic acid with the same retention time, there was no peak corresponding to the L-glutamic acid. This indicates that the polymer consisted of D-glutamic acid residues. Conclusion- Screening of Ï€-PGA producing bacteria from food sources and physicochemical properties of the Ï€-PGA were characterized in this study. The results suggest a practically important method for the production of PGA from natural food sources rather than producing it chemically. This will help the incorporation of PGA in foods and production of protected probiotics even at freezing environment as it has a cryoprotectant activity and will help in the formation of hydrogels as well.
FSN-P-31

INFLUENCE OF PROTEOLYTIC ENZYMES ON FUNCTIONAL AND BIOACTIVE PROPERTIES OF RIBBON FISH (LEPTURACANTHUS SAVALA) PROTEIN HYDROLYSATE

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Objective- Effect of proteases on protein yield, its bioactive and functional properties of protein hydrolysates from ribbon fish viscera is studied. Methods and procedures- ACE-1 inhibitory, antioxidant activity and functional properties of protein hydrolysates extracted from the muscle of ribbon fish (MPH) and its viscera (VPH) were hydrolyzed using proteolytic enzymes (papain, alcalase and flavourzyme) separately (1- 5h). Results- All the enzymes increase the protein yield from 1- 4h (30-35%), with a non-significant increase from 4-5h (2-3%). MPH and VPH extracted from alcalase showed higher ACE-1 inhibitory activity (IC50 0.87 mg/mL) than flavourzyme (IC50 1.66 mg/mL) and papain (IC50 1.31 mg/mL). Captopril was used as standard (IC50 0.0040 mg/mL). Similarly, extract showed higher levels of DPPH radical scavenging and metal-chelating activity alcalase (IC50 2.5 and 0.50 mg/mL) than papain (IC50 7.5 and 1 mg/mL) and flavourzyme (IC50 10 and 2.5 mg/mL). All the hydrolysates extracted from three different enzymes showed >75% solubility (20 mg/mL) at different pH ranging from 2-12. At pH 7, MPH and VPH produced by flavourzyme increased the emulsifying stability activity index (87.5 and 85.0%), emulsifying stability index (77.0 and 72.0%), foaming capacity (84 and 81%) and stability (78.2 and 75.2%) in both MPH and VPH than papain and alcalase. Conclusion- Alcalase extracted good bioactive properties, whereas flavourzyme extract exhibited better functional properties in both MPH and VPH. The science-based knowledge on the selection of the enzyme for the preparation of protein hydrolysates influencing the functional properties, becomes important for food application with nutraceutical value. Moreover, utilization of fish waste through enzyme technology is an industrial opportunity, as it is not only a potentially generator of revenue, but can also lessen the disposal issues.

FSN-P-32

STUDY ON THE EFFECT OF BLACK RICE FLOUR INCORPORATION ON FUNCTIONAL PROPERTIES OF INDIAN FLAT BREAD(ROTI)

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ABSTRACT There is a strong tendency for one or more ‘ traditional ’ foods to exist in most places, but the composition of this varies widely from place to place, and has varied over time, so that globally a very wide range of preparation and ingredients are now associated with breakfast. Black Rice is a whole grain, super nutritious types of rice that is high in fiber, anthocyanin, antioxidant, vitamins B and E, iron ,thiamine, magnesium, niacin, phosphorous and Black Rice known for some good health benefits to the human life . In the present study an attempt was made by incorporating Black rice flour in Indian flat bread (Roti) viz, Akki roti, Jowar roti, Ragi roti, Bajra roti at different concentrations (25%,50%,75% and 100%). The functional properties (bulk density, water absorption, fat absorption, emulsion capacity and foam capacity) were analysed in dehydrated powder of the final products . The product prepared were subjected to sensory evaluation for color, appearance, taste, texture, flavour and overall acceptability. Incorporation of Black rice flour resulted in increasing the functional properties of the product. The products were better accepted than standard. Black rice flour has a potential to be used as functional food ingredient due to its very low fat, salt, sugar, gluten, cholesterol and high protein . There are limited studies reported on the food product development and functional properties. Hence, more products can be developed by incorporating Black Rice for health benefits.

FSN-P-33

CAROTENOID COMPOSITION OF LOCALLY FOUND SEAWEEDS IN DAKSHINA KANNADA

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Background- Consumption of dietary carotenoids like lutein, zeaxanthin, and ß-carotene is beneficial in preventing AMD, cataract, CVD and cancer. Although marigold flowers are used as a conventional source of lutein, bio-availability of the consumed lutein is always a question of concern since the flowers hold lutein as esters which are not readily absorbed upon consumption. Seaweeds are marine macroalgae that contain abundant photosynthetic pigments and considering their availability along with the low cost of processing, seaweeds may perhaps be a potent source of natural carotenoids. In this study, lutein, zeaxanthin and ß-carotene content of
macro-algae commonly found in Dakshina Kannada district, Karnataka has been determined by HPLC. Materials and methods- Green, red and brown seaweeds (n=15) were collected from the coastal belt of Mangaluru. Carotenoids were extracted by ice-cold acetone extraction, separated on C-18 column and analyzed by HPLC equipped with PDA detector. Results- Among the seaweeds collected, xanthophyll carotenoids were found to be major pigments in the order lutein>zeaxanthin>ß-carotene. Carotenoid levels were found to be higher in green algae followed by red and brown algae. In comparison to marigold flowers, 1.54 fold higher lutein level was estimated in Cladophora spp. The lutein and zeaxanthin level (µg/g) was the highest in Cladophora spp. (248.87 and 50.2) whereas ß-carotene level (µg/g) was highest for Ulva prolifera (10.83). However, ß-carotene was detected only in green and red algae. Conclusion- Algal biomass production is an inexpensive practice to procure many valuable compounds like vitamins and carotenoids. These findings might pave the way to utilize natural bio-resources for aiding production and preparation of nutraceuticals to help mankind live a disease-free life.

FSN-P-34

BANANA GRIT FROM UNRIPE Â‘NENDRANÂ€™ BANANA AND CHARACTERIZATION OF ITS STARCH FRACTIONS

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Background- Banana is a popular tropical plant coming under the genus Musa of Musaceae family. Banana is a potential source of several bioactive compounds such as carotenoids, phenolics, biogenic amines and it is one of the resistant starch (RS) abundant commodity. RS is termed as bioactive carbohydrate due to its tremendous biological potentials. â€“Nendranâ€™ is a popular cultivated variety of Musa Â— paradisica L. in Kerala. Though the unripe banana is rich in many minerals and functional nutrients, it is underutilized. Considering these facts there is a huge scope for developing value added products from unripe â€“Nendranâ€™ for health benefits. The objective of the present study was to develop novel food product from unripe â€“Nendranâ€™, with focus on its shelf life studies and estimation of starch fractions. Materials and methods- Fresh unripe â€“Nendranâ€™ was purchased from farmers and the pulp and peel were separated. The pulp was subjected to pretreatment, subsequent drying and final grinding to produce â€“banana gritsâ€™. The physicochemical properties of the product were determined and the shelf life stability of product was evaluated for seven months. An in vitro digestion protocol which mimics the human digestion was followed in order to determine the starch fractions in grit. Result- A novel food product, banana grits was developed from unripe â€“Nendranâ€™. The proximate analysis showed that the banana grits have low moisture content (2.83Â±0.05%) and high carbohydrate content (91.31Â±0.18%). Shelf life studies showed that the product was shelf stable up to seven months. The in vitro digestion assay showed that the grit comprises of 84.74Â±6.74 % starch, out of which 50.63Â±7.60% was bioactive carbohydrate fraction. Conclusion- A novel, highly shelf stable and preservative free banana grits was developed from â€“Nendranâ€™ banana. Presence of high RS portion indicates immense biological potential of grit.

FSN-P-35

BIOACTIVE PEPTIDES FROM FOOD PROTEINS USING TRYSIN

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Background- Hypertension is a disorder referring to a constant rise in arterial blood pressure which is the major risk factors for Cardio-Vascular Diseases. Synthetic drugs for hypertension are known to cause a lot of side effects. The rising prevalence of hypertension needs immediate attention ensuring minimum side effects. Therefore, bioactive peptides from food source have proven to have beneficial properties. Extraction and purification of such bioactive peptides for a better antioxidant and ACE-I inhibition will ensure antihypertensive effects with minimum side effects. Materials and Methods- In this study, protein-rich plant (8) and animal sources (7) were screened for potential antioxidant and antihypertensive peptides. Trypsin was used as a proteolytic enzyme for the extraction of peptides. Proximate analysis, antioxidant and ACE-I inhibitory activity was analysed in comparison with captopril (synthetic drug) as standard. Results- Out of 8 plant sources selected for extraction, masoor dal protein hydrolysates showed the highest protein yield of 79.6%. Whereas, chicken protein hydrolysates showed a maximum of 65.03% of protein out of 7 animal sources selected. The free radical scavenging activity was found highest in chickpea protein hydrolysates (93.78%) and least was seen in green gram dhal protein hydrolysates (81.34%). ACE-I inhibitory assay was showed highest in kidney pea protein hydrolysates (92.45%) were as cashew protein hydrolysates showed the least ACE-I inhibitory activity (40.5%). Conclusion- These results suggest that the protein hydrolysates from vegetarian sources showed better antioxidant and ACE-I inhibitory activity. Therefore, protein hydrolysates extracted from food sources can be an alternative to synthetic drugs in the form of nutraceuticals.
ORGANOLEPTIC EVALUATION OF SOY TEXTURED VEGETABLE PROTEIN BASED PRODUCTS AND ITS POPULARIZATION

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The wonder bean or miracle bean of nature- Soy is a wonderful gift with excellent protein quality and minimum saturated fat. Soy nuggets also known as â€”Texturised Vegetable Proteinâ€™ is made from the defatted soybean meal and consists of approximately 50 per cent protein. The phytoestrogen soy isoflavones include genisteen and daidzein. It is a natural alternate for hormone replacement therapy for treating women who are in menopause, to ward off osteoporosis, can reduce the risk of cancer, has cholesterol lowering effect etc. Materials and methods- Twenty soy chunks based recipes were formulated and the organoleptic evaluation was carried out by a panel of ten women between the age group of 45-55 years. The major quality attributes were appearance, taste, texture, flavour and colour. Seven products were found to be the best on the basis of ANOVA. The selected recipes were subjected to analysis for protein and vitamin A. Results- Soy balls scored highest for appearance, flavour and taste while soy pulao scored highest for colour and texture. Analysis of vitamin A and protein revealed that soy scrambled and soy pakoda scored the maximum nutrient contents respectively. Cost analysis of the products showed that chilli soya chunks which costs only Rs.3.80 was the cheapest product. The popularisation done among post menopausal women showed a significant difference between the pre and post tests.

VALUE ADDITION TO LINSEED; LADDU A TRADITIONAL SNACK

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Linseed laddu is a healthy traditional snack suitable for consumption by all the age groups. Linseed is a rich source of essential fatty acids, omega-6 essential fatty acids, lignans, vitamins and minerals. It is good source of lignans and phenolic compounds responsible for anticancer and anti-oxidative properties. Owing to the functional properties of linseed, it was utilised in preparation of laddus with an objective to Standardise the protocol for preparation of linseed incorporated laddu. Groundnut flour was replaced with linseed flour at 10, 20,30 percent for the utilisation of linseed in laddu and sensory evaluation was done by semi trained panel members of FSN department in UAS, Dharward by using nine- point hedonic scale. Laddu with different levels of linseed flour were evaluated for descriptive characteristics and nutritive value was computed. One way ANOVA was used for statistical analysis. The overall acceptability scores of the 100 per cent groundnut laddus (control) was highest with gradual decrease in scores with increase in linseed addition from 10 to 30 per cent (7.96 to 7.40) with highly significant differences between the means (p< 0.01). Sensory characteristics showed that the control (groundnut) laddu were attractive in colour, soft and firm in texture with good taste, which turned to dull colour, grainy appearance, firm and crunchy texture, good taste, strong linseed flavour with moderate acceptability with the incorporation of 30 per cent linseed in laddu. Replacement of groundnut with linseed at 10 to 30 percent was found to be acceptable with overall acceptability scores more than 7. Acceptability scores of laddu with 10 per cent was on par with the control. Addition of linseed in laddu significantly increased the sensory scores of flavour and texture besides improved the nutrients such as omega 3 fatty acid, dietary fibre, minerals, phytoestrogens and bioactive compounds.

DEVELOPMENT AND EVALUATION OF NOODLES INCORPORATED WITH BUCKWHEAT FLOUR

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Introduction- Buckwheat (Fagopyrum esculentum), a pseudo cereal is an under-utilized crop, gluten free and contains numerous essential nutrients. Buckwheat is best suited for people suffering from celiac disease. Today, fast food and drinks are very attractive to public. One of the popular fast food is noodles. Noodles can be made healthier by incorporation of buckwheat flour. Objectives- 1. To optimize buckwheat noodles 2. To estimate nutritive value and evaluate sensory attributes of buckwheat noodles Material and method- Noodles with two different proportions of refined wheat flour- buckwheat flour viz., 70- 30 & 50- 50 and noodles with 100 per cent refined wheat flour (control) was extruded using single screw extruder. A total of 100 g noodles was cooked in 500ml of boiling water for specific period. Boiled noodles was drained using colander, shallow fried in pre-standardized method using oil, mustard, onion, beans, carrot, green chilli, cabbage, capsicum, peas and salt. Noodles were then evaluated by fifteen trained panellists for sensory attributes. Results- Among the noodles prepared from different proportions, refined wheat flour- buckwheat flour in 70-30 proportion...
was found to be highly acceptable with acceptable sensory scores for colour (8.33), appearance (8.38), flavour (8.22), taste (8.21), texture (8.38) and overall acceptability (8.22). The noodles had good protein (14.9 g), fat (6.3 g), crude fibre (1.8 g), carbohydrates (73.5 g), energy (412 Kcal), calcium (42.9 mg), potassium (262.2 mg), zinc (1.9 mg) and iron (3.9 mg) per 100 g. Conclusion- Noodles prepared using 70 per cent refined wheat flour and 30 per cent buckwheat flour had high overall acceptability and nutritional profile. Increase in buckwheat flour concentration though increased the fibre content but also increased softness of the noodles than control sample. Refined wheat flour can be replaced with buckwheat flour in noodles preparation for enrichment of nutrients and health benefits.

FSN-P-39

COCONUT NEERA SYRUP €“ PROCESS OPTIMIZATION AND QUALITY EVALUATION

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Background- Coconut palm neera is rich in sugar along with some amount of other nutrients. The objective of the study was to develop a cost effective process to develop coconut syrup and establish quality parameters to avoid entry of spurious products to the market. Materials & Methods- Coconut syrup was prepared by open pan evaporation with citric acid and sodium benzoate. Proximate composition of coconut syrup was determined using standard methods. Sugar content was analysed by HPLC method. Result Fresh neera has a pH of 6, with citric acid addition pH was lowered between 4 to 5. pH of neera affected the consistency of syrup and its acceptability in a sensory angle. Neera being a rich matrix of sucrose gets converted to glucose and fructose when treated with citric acid and when these molecules coexist the viscosity of the final product changes. Neera syrup without citric acid inversion is rich in sucrose and is free flowing but has poor sensory acceptance. Consistency and mouth feel improved with the treatment of citric acid, product also had a pleasant fruity flavour and hence the above product received a higher score in sensory studies. Our HPLC studies showed the conversion of sucrose to glucose and fructose by acid inversion. Moisture content of coconut syrup was 23.4% and ash content was 0.96%. Conclusion- A cost effective process has been developed for neera syrup development. HPLC quantification of the sugars can help in fixing the range of sucrose, glucose and fructose in the product. We are also exploring the reason for the development of fruity flavour in the citric acid treated syrup, the molecule/s so identified can possibly be considered as marker compounds to confirm the source of raw material used for syrup preparation.

FSN-P-40

DEVELOPMENT OF CALCIUM AND IRON-RICH PIZZA PARATHA

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Background- "Eat healthy and live healthy" is one of the essential requirements for long life. Unfortunately, in modern days, bakery products and junk foods are becoming one of the essential food items in the human diet due to ready-made availability. Hence scope to improve these products nutritionally is very important to increase consumer acceptability as a healthier choice. The overall purpose of this investigation was to develop portable, nutritious, calcium and iron-rich Pizza Paratha. Methods- This product was made from whole wheat flour, grated cheese, chopped capsicum, chopped cabbage, chopped carrots, coriander leaves, pizza sauce, and pav bhaji masala. Sensory quality of the final product was assessed by 25 semi-trained panel members using the 9-point hedonic scale. Nutritional properties of the product were calculated based on the nutritional value of Indian foods given by NIN using the raw ingredients used for making this product. Result- The nutritive value of the product for 100g using the raw ingredients was 27.5g of carbohydrate, 8.1g of protein, 6.6g of fat, 35.3g of calcium and 2.5g of iron. Based on the 9-point hedonic scale, the mean overall acceptability of the product was 8.4, texture 7.6, color 8.3, aroma 7.7, and taste 7.8. Conclusion- This product is nutritional, healthier and can be prepared easily at home. Hence, the product if made more attractive can be served as an alternative to adolescents and school-going children who tend to eat junk foods in the streets.
ORGANOLEPTIC AND NUTRITIONAL EVALUATION OF PROTEIN-RICH CHOCOLATE BITES USING OATS

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Background- Increasing dietary protein, mostly from a plant may benefit cardiovascular health by aiding in weight maintenance, improving the lipid/lipoprotein profile, and reducing blood pressure. Therefore, consuming protein-rich foods in a rational way might be effective to reduce chronic disease. Hence, this study aimed to develop a protein-rich chocolate bite using oats as a convenient snack. Method- Protein-rich chocolate bite was prepared by using ingredients viz. oats, butter, eggs, and dark chocolate. Developed product was assessed for sensory qualities using 9 points hedonic scale by 30 semi-trained panel members. Nutritional value of the product was also calculated from the raw ingredients nutritional content by using the nutritional value of Indian foods given by National Institute of Nutrition (NIN). Result- Sensory evaluation score revealed that 82.5 % of the panelists liked the product. On the contrary, the taste of the product was disliked by 21.3% panelists. Nutritive analysis of this product revealed that it was rich in protein (14.83g/100g), carbohydrate (79.61g/100g), calcium (45.98mg/100g) and phosphorous (82.30mg/100g). Conclusion- This product can be munched in between the meals as a snack bar. This food may satisfy the needs of the body for a variety of nutrients, but also to reduce hunger and not likely to cause fat deposition.

PREPARATION AND SENSORY EVALUATION OF CHOCOLATE BISCUIT CAKE

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Background- In recent years, bakery products are gaining popularity as an essential food item in human diet. Among them, biscuits are widely consumed that have relatively long shelf life and good eating qualities. School age children are often willing to eat a wider variety of foods including biscuits. Energy dense snacks are required for the school going children as they are physically very active. Hence, the overall purpose of this study was to prepare a cake using biscuits as a major ingredient. Method- Cake was prepared by the combination of two biscuits that is Oreo and Bourbon biscuits without using oven. The prepared cake was subjected to evaluation for sensory attributes like taste, color, texture, and appearance by 30 semi-trained panelists. The energy content of the cake was computed from the raw ingredients used in making the product. Result â€“ About 75% of the panelist (n=30) liked the taste of the cake made of biscuits while only 29.5% panelists disliked the aroma of the cake. Among the other sensory attributes, the color, texture and appearance were acceptable by majority of the panelists. The cake was found energy dense with the calorie content of 549.9 kcal/100g. Conclusion- This energy dense chocolate biscuit cake can be a very good snack for school age children and as being comparatively cheap; it can be easily available to poor people along with nutrition to overcome malnutrition.

DEVELOPMENT AND SENSORY EVALUATION OF IRON-RICH BURFI USING DATES

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Background- In India, iron deficiency is a common problem due to various factors. The present study was planned to develop a convenient snack food rich in iron for vulnerable groups of iron deficiency anemia. In terms of dietary iron, dates are easily accepted due to their acceptability in all age groups and for longer shelf life. Hence the study was aimed to develop an iron-rich dates burfi. Methods- The present study involved the development of dates burfi using different combinations of foods viz. dates, dry fruits (almonds and pistachio), cardamom powder, poppy seeds, little millet, and ghee. The formulated product was evaluated for sensory attributes by 30 semi-trained panel members using the 9 points hedonic scale. Nutritional properties of the dates burfi were calculated based on the nutritional value of the raw ingredients. Result- The energy content of the burfi was estimated 241.97 kcal/100 g of weight. The nutritive value of the product per 100 gm of weight was estimated as carbohydrate 28.016g, protein 3.152g, Fat 11.22g, crude fiber 3.27g, and iron 1.73g. Based on the 9 points hedonic scale rating method the average overall acceptability of the product
was 8.5, texture 8.5, appearance 8.8, color 8.5, aroma 8.2, and taste 8.4. Conclusion- In this study, an attempt has been made to formulate a burfi product from dates that will be of higher in iron and other nutrients.

**FSN-P-44**

**PREPARATION, SENSORY EVALUATION AND NUTRITIONAL VALUE OF CARROT BURFI**

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**Background**- Carrot is one of the important nutritious roots vegetable. In recent years, the consumption of carrot and its related products has increased steadily due to the recognition of antioxidant and anticancer activities of ß-carotene in carrot, which is also a precursor of Vitamin A. Considering the rich nutritional content and health benefits of carrot, this study aimed to prepare carrot burfi and to determine the sensory qualities and nutritional value. Method- Raw ingredients such as -carrot, coconut, milk and condensed milk along with nuts for garnishing were used to prepare this product. Sensory acceptability was done by 30 panelists using the 9-point Hedonic scale for sensory evaluation. In addition, the nutritive value of the burfi was estimated based on the raw ingredients used to prepare the food. Result- Sensory evaluation indicates that the carrot burfi was found acceptable (8.6). Other than the acceptability, the average sensory scores of different sensory parameters indicated as 8.6 for appearance, 7.85 for texture, 8.5 each for aroma and taste and 8.7 for colour. Result of nutrient analysis estimated that the energy (129.7 kcal/100g), calcium (316.08mg/100g), phosphorous (203.18mg/100g) and vitamin A content (504.5µg/100g) of the burfi were high whereas the product is low in fat (10.29g/100g). Conclusion- In this study have been made to formulate a burfi product from carrot that will be of higher nutritive value and easily affordable.

**FSN-P-45**

**PREPARATION OF KHEER USING MILLET AND EVALUATING THE SENSORY ATTRIBUTES**

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**Background**- India is the worldâ€™s largest producer, harvesting about 11 million tonnes/year which is nearly 40% of the worldâ€™s output. This grain is an example of a staple food for people of lower socioeconomic status. Nutritionally, millet is equivalent to other cereal grains, and has health promoting effects. This study was aimed to produce millet kheer Method- For the preparation of the kheer, raw foxtail millet and raw rice were collected from the local available market. Dry roasted separately and then cooled. Blended with the milk in the blender with sugar and boiled it till it is cooked and garnished with dry fruits and cardamoms. The formulated product was evaluated for sensory attributes by 30 semi-trained panel members using the 9-point hedonic scale Result- Results of the sensory evaluation revealed that the kheer was acceptable. The overall sensory score of the kheer was 8.35. The energy content of the kheer was estimated about 452 kcal/100g. Moreover, per 100g of the kheer contained dietary fibre 2.08 g, protein 3.99g, and fat 5.33g. Conclusion- The kheer made from foxtail millet is nutritious and readily available in both rural and urban areas.

**FSN-P-46**

**IDENTIFICATION OF THE COMPONENTS RESPONSIBLE FOR THE BITTER AFTERTASTE OF CURCUMA LONGA USING BIOINFORMATICS TOOLS.**

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**Background** Turmeric is a golden spice derived from the rhizome of the Curcuma longa plant, belongs to the Zingiberaceae family. Since ancient times, turmeric has been used as the principal ingredient of dishes originating from Bangladesh and India for its color, flavor, and taste. It is also used in social and religious ceremonies in Ayurveda and folk medicines. In Ayurveda, turmeric is known as â€˜haridraâ€™, â€˜nishaâ€™ etc., and the â€˜rasaâ€™ i.e., taste is â€˜tiktâ€™ and â€˜katuâ€™ which means pungent and bitter. On consumption of this spice, one can sense the bitter taste which is because of certain components present in the Curcuma longa. This study is to identify the components responsible for bitter after taste. Materials and Methods The bioactive components of the Curcuma longa was obtained from IMPPAT and Dr. Dukes phytochemical and ethno botanical database and the oral bitter receptor T2R39 (2GFZ) was obtained from the protein data bank. Autodock vina 1.1.2, was used to dock the molecules and visualized using,
LIGPLOT 1.4.5 and discovery studio visualizer. Results Among selected bioactive components, some components (e.g., Letestuianin_A) have more affinity towards the receptors and the some have less affinity, which binds through weak Vander Waals forces (e.g., ARABINOSE) and the rest are intermediate. Conclusion Curcuma longa is one of the spices used since ages, it imparts bitter taste on consumption which can be sensed when the active molecules present in the turmeric binds with the bitter receptor present on the tongue. The bond between the receptor and the molecules which resulted from the weak Vander Waals forces is transient. Hence, the bitter sensation will not stay for longer. Though the sensation is ephemeral, some components that have more affinity towards receptor do have tendency to stay for long and imparts the bitter taste. Thus, turmeric gives bitter aftertaste.

FSN-P-47

SENSORY EVALUATION AND NUTRITIVE VALUE OF PEDA USING MILK

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Sensory evaluation by 30 semi-trained panelists using the 9-point hedonic scale. Nutritional value of the product was calculated from the nutritive values of the raw ingredients used to prepare the product. Result- The nutritive value of the product per 100g weight was estimated as 4.18g of fat, 171.31g of carbohydrate, 14.38g of protein, 21.55g of fat, 536.42g of calcium and 0.67g of iron. In case of sensory evaluation of the peda, based on the 9-point hedonic scale, the mean overall acceptability of the product was 8.5 for texture, 8.75 for color, 8.5 for aroma, and 8.5 for taste. Conclusion- The developed product was nutritionally good, protein and calcium-rich and can be easily prepared at the household level.

FSN-P-48

PREPARATION AND SENSORY EVALUATION OF PEANUT BUTTER CHOCOLATE GRANOLA BARS

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This product was made from peanut butter, coconut oil, honey, cocoa powder, oats, choco flakes, peanuts, and sesame. Sensory quality of the pedal was assessed by 30 semi-trained panel members using the 9-point hedonic scale. Nutritional properties of the product were calculated based on the raw ingredient's nutritive values. Result- The nutritive value of the product per 100g of weight was 16.02g of carbohydrate, 171.31g of protein, 21.55g of protein, 104.18g of fat, 156.6 g of calcium, and 2.5 g of iron. Based on the 9-point hedonic scale, the mean overall acceptability of the product was 8.31 for texture, 8.22 for color, 8.0 for aroma, and 8.3 for taste. Conclusion- This product is nutritionally healthier and can be prepared easily at home.

FSN-P-49

DEVELOPMENT OF VALUE ADDED LADDU USING BETEL LEAVES

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The fresh leaves of betel vine are popularly known as Paan in India, which are consumed by about 15-20 million people in the country. The Betel leaf is a very perishable commodity and therefore, always subject to wastage by quick spoilage due to dehydration, fungal infection, dechlorophyllation etc. Therefore processing the leaves as a food ingredient helps to extend the use of the leaf. The purpose of this investigation was to develop a laddu using betel leaves. Method- Product was made using betel leaf, deccicated coconut powder, ghee, gulcan, fennel seeds, cardamom, and sugar crystal balls. The sensory qualities were tested using sensory evaluation by 30 semi-trained panelists, and the nutritional values of the laddu were estimated based on raw ingredients. Result- The calculated nutritive value of the laddu using betel leaf was found high in protein (20.95g), carbohydrate (53.37g), calcium
(306 mg), iron (12.47mg), sodium (3.32mg), and potassium (26.45mg). Sensory evaluation indicated that 80.5% of the panelists
(n=30) found the laddu acceptable. The colour and odour of the product was liked by 84.5% of the panelists and taste scored the
highest acceptability (86%) among all the sensory attributes. Conclusion- The betel leaf laddu can provide a nutritious, appealing and
inexpensive food source based on locally available betel leaves in areas of the world where it can be easily grown.

FSN-P-50
DEVELOPMENT, SENSORY EVALUATION AND NUTRITIONAL EVALUATION OF PAUSHTIK COOKIES
BASED ON BLENDS OF SOY FLOUR AND PEARL MILLTETS (BAJRA)

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BACKGROUND In today’s globalized world, people are more aware about the healthy nutrition. Making Indian fit is major call of
today. Urban fast life, where people hardly get time to go for healthy food, always ends with instant readily available food having
least nutrient and creates lot of side effects. Deficient with nutrient value with time got reflected as falling in trap of life style related
diseases. Functional foods play major role in our day to day life that offers several health benefits. Some major health foods these days
are soy, bajra, ragi etc. that have immense health benefits. These appear to be very good sources of fiber, protein, antioxidants etc.,
proving to be very beneficial for health. Healthy snacks prepared using healthy ingredient with taste will certainly replace junk food.
Soy contains several other important components like iso-flavonoids that have been reported to possess numerous physiological
properties, such as anti-tumor, anti-menopausal, osteoporosis and anti-ageing. It has enormous health benefits that it is being
recommended to the patients of celiac disease, constipation and several non- communicable diseases. Due to its potential health
benefits it has now gained popularity, nutritionists and dieticians recommends it for the better health options. This research aims to
utilize the potential health benefits of both bajra and soy and develop cookies with different variants. METHODOLOGY- This
involves the tools and techniques in which recipe is standardized that is an important tool for consistent quality products that involves
usually the same result every time and for elimination of guess work. Three different samples were taken to make cookies and then
sensory evaluation was done by hedonic test. This involves panellist, who were asked to rate the product according to their choice.
The categories to be measured were appearance, texture, taste, flavour and overall acceptability. Now, nutritive evaluation was done for
all three samples that vary in ingredients and were evaluated by AOAC laboratory method. Lastly, statistical analysis was done by
calculating mean, average and finally comparing overall data. On basis of information obtained from score card for questionnaire and
sensory evaluation, analysis was done. The mean deviation values were calculated and derived as 7.17Â±1.28, 7.15Â±1.19 and this
7.16Â±1.22 for sample 1, sample 2 and sample 3 respectively. RESULT- Cookies were prepared with blends of bajra flour and soy
flour. The various samples prepared were sample 1, sample 2 and Sample 3 in different ratios (wheat, soy, bajra flour). sensory
evaluation studies using nine point hedonic scale showed that cookies of sample 3 were highly acceptable as scored, whereas cookies
of sample 1(wheat flour) were least acceptable according to the score. On the other hand, all sample 2(wheat flour-50gm,soy flour-
25g, bajra flour- 25g) was liked moderately. Most acceptable cookies were further analyzed for nutrient and se

FSN-P-51
ASSESSMENT OF KNOWLEDGE ON FOOD POISONING OF SELECTED FOOD SAFETY OFFICERS OF KERALA

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Food poisoning is the result of consuming contaminated food and drink. The Food Safety and Standards Authority of India has been
established with responsibility to protect the consumer by ensuring compliance with food safety laws and regulations. According to
FSSAI, it is the duty of a food safety officer to remind producers and processors of their responsibility to produce safe foods. In the
light of the new food safety regulations there is certainly a need to reorient the food inspectors and help them see beyond mere food
adulteration. This study aims to find out the level of knowledge on food poisoning of Food Safety Officers. The sample consists of 25
FSOs of Kerala State Government. The data was collected using a questionnaire . Most of the respondent’s age group(52%) was in
30-39 years, and 64 % were women. 48% were Post graduates and in that 50% specialized in Food Science. Only 20% respondents
were answered all the questions correctly. Most of the respondents were not much aware about the basic food poisoning aspects.
Around 28% lacked the knowledge regarding incubation period of food poisoning and correct ways to prevent food poisoning. Lack of
thorouogh knowledge in concerned aspects, they will fail to implement the rules and regulations in to the practical side. So the
government should make sure that it should be followed according to the Act by the FSOs. For that, it should be necessary to develop
a training manual which contains all the important aspects in food safety including food poisoning, food micro biology, storage
temperatures etc. In conclusion, it is observed that frequent training of the FSOs with effective training manual is very important in
ensuring a country’s food safety..
FSN-P-52

STUDY ON FRUIT BY-PRODUCTS AS A HEALTHIER ALTERNATIVE TO SUGAR IN COOKIES

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BACKGROUND Sugars are mono-saccharides and di-saccharides of the carbohydrate group and a vital ingredient of bakery industry. However, the usage of refined sugar in manufacturing is a current issue of concern because of its role in diabetes, obesity and cardiovascular diseases. Sugars present naturally in fruits exist in combination with fibers, minerals, antioxidants and are beneficial to our health. The Eat Right Movement initiated by FSSAI strives to curb the daily intake of sugar, fat and sodium in consumers. In this study we have attempted to substitute refined sugar in cookie dough at different ratios with a blend of pineapple core and watermelon rind which are usually discarded during processing. The utilization of fruit by-products for enrichment of foods is gaining significance as a measure to attain sustainability. MATERIALS AND METHODS The watermelon rind and pineapple core were dried and ground to powders. Equal proportions of both the powders were combined to form the Fruit Powder (FP). The sugar in cookie dough was substituted with different dosages (0%; 30%; 50%; 70% and 100%) of FP. The nutritional composition, physical characteristics and organoleptic quality of cookies were analyzed using standard AOAC, IS and FAO procedures. RESULT The protein and dietary fiber values for cookies improved with increase in percentage of FP. A 78.33% increase in dietary fibre and 31% increase in protein was noted for cookies with 100% substitution. There was a considerable decrease in sugar content. The sensory attributes of all the cookies were good but the texture became soft and crumbly with increase in proportion of fruit powder. CONCLUSION The cookies with 50% sugar replacement exhibited improved nutritional and acceptable organoleptic properties. These cookies serves as a healthier snacking alternative for all age groups except infants. This approach ensures reduced intake of free sugars and encourages food sustainability.

FSN-P-53

NUTRITIONAL AND FUNCTIONAL PROPERTIES OF MILLETS UDHAYA

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Millets are ancient super grains, the reservoirs of nutrition for a better health. Millets (sorghum, pearl millet, finger millet, foxtail millet, little millet, proso millet, barnyard millet and kodo millet) are hardly and grow well in dry zones as rain-fed crops, under marginal conditions of soil fertility, moisture and are stable yielders. Millet grains are superior to major cereals with respect to protein, energy, vitamins and minerals and also they are a rich source of dietary fiber, phytochemicals and micronutrients. The edible component of millet kernel is the rich source of phytochemicals and polyphenols. Millets contribute to antioxidant activity with polyphenols and tannins present in it having important role in aging and metabolic diseases. Consumption of millets reduces risk of heart disease, protects from diabetes, improves digestive system, lowers the risk of cancer, detoxifies the body, increases immunity in respiratory health, increases energy levels and improves muscular and neural systems and are protective against several degenerative diseases such as metabolic syndrome and Parkinsonâ€™s disease. Millets have returned as a viable option to live healthy life without consuming loads of anti â€“ diabetic and anti- hypertension medicines that are not only very expensive but also have serious side effects in the long run. All millet varieties show high antioxidant activity. Millet is gluten free and non-allergenic. The important nutrients present in millets include resistant starch, oligosaccharides, lipids, antioxidants such as phenolic acids, avenanthramides, flavonoids, lignans and phytosterols which are believed to be responsible for many health benefits. The low glycemic index in millet keeps the blood sugar level at a constant ratio. Millets increase insulin sensitivity for people suffering with diabetes and also helps to control the sugar levels for type 2 diabetes. The antioxidants present in millets fights free radicals present in the body which slows down the ageing process.

FSN-P-54

STANDARDISATION AND SENSORY QUALITY ANALYSIS OF NUTRITIOUS PRODUCT FROM AN INDIGENOUS FRUIT (ANNONA MURICATA).

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â€œStandardisation and sensory quality analysis of nutritious product from an indigenous fruit (Annona muricata)â€ Athira Babu and Drishya M.S Department of Homescience, Government College for Women, Thiruvananthapuram The study entitled â€œStandardisation and sensory quality analysis of nutritious product from an indigenous fruit (anonna muricata)â€ was aimed to standardize nutritious products from Annona muricata and analyse its sensory quality. Annona muricate is a member of the...
Annona muricata is a fruit tree with a long history of traditional use. The fruit is used as natural medicine for arthritic pain, neuralgia arthritis, diarrhoea, dysentery, fever, malaria, parities, rheumatism, skin rashes and worms. The objectives of the study were to develop baked product (cake and cookie) from Soursop (Annona muricata), to standardize the two products developed from Soursop and to analyse the organoleptic quality of the developed product. In the study we selected fully matured firm soursop fruit and ripened at room temperature. Through pre-processing of sour sopp fruit, we separated the fruit pulp. Using the fruit pulp, we made three different variations of cookies and cakes V1(30 gm soursop), V2(40 gm soursop), V3(50 gm soursop). Sensory quality evaluation was done using hedonic rating scale by a panel of 9 judges. The cake and cookies were prepared according to the variations and the standardization procedure was done by considering the overall score of Hedonic rating scale of the three variations. It was found that, from the three variations of cookie V1, V2, V3, the second variation recorded the highest hedonic value of 7.2. Similarly, from three variations of cake V1, V2, V3, the third variation recorded the highest hedonic value of 6.4. while considering the results of hedonic rating of variations of cookie the second variation showed high preference and in cake the third variation showed high preference. The sour sopp (Annona muricata) is abundantly grown in Kerala. This fruit has not been tapped by the processing industry. Soursop is a type of fruit that is used in medicine and cooking. It is low in calories but high in fiber and vitamin C. It has impressive benefits on our health.

**FSN-P-55**  
**POTENTIAL WILD EDIBLE FRUITS OF SENAPATI DISTRICT OF MANIPUR, INDIA**

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**Background**- Fruits constitute a major part of daily food intakes playing important role as dietary supplements, maintaining healthy living and curing certain diseases since time immemorial. Manipur is the home to a diverse range of fruits but some of the fruits are still underutilized and unexplored. Material and Methods- The present study was undertaken to identify, explore and document the wild edible fruits with ethno-medicinal values used by different indigenous inhabitants of Senapati district of Manipur, India. Result- In the present investigation, a total of 11 wild edible fruits belonging to 9 families were enumerated viz., Averrhoa carambola, Elaeocarpus floribundus, Docynia indica, Rhus chinensis, Prunus nepalensis, Elaeagnus latifolia, Malus esculenta, Calamus meghalayensis, Dillenia indica, Baccaria raminflora and Passiflora edulis. These fruits found traditional application in treatment of gastrointestinal disorders, respiratory ailments, dermatological problems, fever, cuts and wounds, diabetes, jaundice, cardiovascular problems, nutritional disorders, antidote, bone diseases, cancer etc. Conclusion- Wild edible minor fruits play a significant role in rural areas as the people not only benefit from their nutrients but can also generate income. The wild fruits have a great socioeconomic significance because of their nutritional and therapeutic values. A scientific investigation on wild edible fruits is needed to assess the potentiality for its cultivation and utilization as a food source for an ever-increasing population.

**FSN-P-56**  
**ECO-FRIENDLY AND ECONOMICALLY VIABLE CUTLERY**

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Bio-based food packaging has a potential to foster Sustainable Development Goals (FAO, 2016). Food packaging is an essential part of the food industry as it protects from surrounding stress challenges often of detrimental nature. Eradicating and reduction in the use of plastic is a step towards better tomorrow since they are a big threat to the environment. Cellulose fiber is one of the most abundant natural materials present in plant based materials which is a renewable resource. More concrete the sustainable benefits, better is the packaging and environment. This alternative approach to make food packaging material which is fully bio-based and compostable is made from agricultural crop waste which is left behind harvest and industrial waste after the extraction of required products. Agricultural waste is mainly burned which adds burden to the global warming or disposed as waste which adds to landfills that may emit green house gas. Conversion into packaging material is a second life to the waste and reduces deforestation done for manufacturing paper and card board (FAO, 2016). To forging an eco conscious path towards sustainability and innovation, packaging material is made from annually renewable plant fibers. Since this is made from waste they are also cost effective in manufacturing. Agricultural waste like banana pseudo stem, straws of wheat and industrial waste like sugarcane bagasse is used as raw materials to develop various eco-friendly cutleries which is bio-degradable and when manufactured in large scale can be economically viable. These bio-based packaging materials is a way to recycle crop waste and industrial waste into economically viable package which meets the market demand of the upcoming plastic-free world.
NUTRACEUTICAL PROPERTIES OF ANNONA MURICATA (GRAVIOLA) AND ITS HEALTH BENEFITS

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Annona muricata is a member of the Annonaceae family and is a fruit tree with a long history of health benefits. A. muricata, also known as soursop, graviola and guanabana, is an evergreen plant, mostly distributed in tropical and subtropical regions of the world. A. muricata have been characterized as an antimicrobial, anti-inflammatory, anti-protozoan, antioxidant, and anti-cancer activity to treat diverse ailments such as fever, pain, respiratory and skin illness; internal and external parasites, bacterial infections, hypertension, inflammation, and cancer. More than 200 chemical compounds have been isolated from this plant, the most important being alkaloids, phenols and acetogenins. A. muricata produces these natural compounds in its leaf, stem, bark, fruits and seeds. Normally, a tumor cell needs energy to grow and reproduce. Acetogenins block ATP energy of the tumor cell over time, the tumor cell no longer has enough energy to sustain and finally dies. Normal cells, are not affected by acetogenins because it produce its own energy. Anti-inflammatory and analgesic activities of the fruits, shown to be induced through the suppression of inflammatory mediators and interactions with the opioidergic pathway. Anti-nociceptive and anti-inflammatory effects of A. muricata has substantiated by its consumption as pain killer. It kills free radicals and affirm the immune system healthy. hence, it can effectively perform its function such as warding off diseases. Key words - Annona muricata , acetogenin ,graviola , anti â€Ŗtumor ,anti-inflammatory

BIRTH OF POSTBIOTICS (EXOPOLYSACCHARIDES)- A WAY TO NUTRITION SECURITY

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Recent work on postbiotics i.e. probiotic derived metabolites are isolated and characterized by probiotic strains. The different form of postbiotics include bacteriocins, short chain fatty acids, peptidoglycans, exopolysaccharides and peptide molecules. Postbiotics are more stable than the probiotics allowing their application in a wide variety of functional food products. Probiotics, prebiotics and symbiotics are overcome by their birth of postbiotics. Incorporation of postbiotics in foods including daily dietaries may be a good alternative with high therapeutic value and increased shelf-life of food products. Exopolysaccharides are high molecular weight and biodegradable polymers. Exopolysaccharides are mainly derived from Lactobacillus rhamnosus R by cell disruption techniques like heat and enzymatic treatments, solvent extraction and sonication followed by post production steps such as additional extraction and centrifugation, dialysis, freeze-dried and column purification. Exopolysaccharides have positive effect on health such as antitumor effects, antilucre, antioxidant activities, immune-stimulatory activity and also lowers blood cholesterol. Exopolysaccharides derived from lactic acid bacteria play an crucial role in improving the rheology, texture, mouth feel of fermented food formulations in food industry. Further more; it finds its application in foods as thickeners, stabilizer, emulsifiers and gelling or water-binding agents. Bio-floccuants, bio-absorbents, agents of heavy metal removers, and drug delivery system are the new applications of exopolysaccharides.

PEDALIUM MUREX AND ITS ROLE IN HUMAN HEALTH

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ABSTRACT- 80% of the world population relies in traditional medicine .it shows the value of traditional plants and drugs. Pedalium murex Linn commonly known as large Caltrops and Gokhru (India) and locally known as yaanai nerinji mul in Tamil. it is a shrub found in the Southern part, Deccan region of India and in some parts of Ceylon. Different parts of the plant are used to treat various ailments like, cough, cold and as an antiseptic. It has benefited in complications like urinary track disorder as well as gastro intestinal tract disorders. Pharmacologically, the plant have been investigated for antulcerogenic, nephroprotective, hypolipidemic, aphrodisiac, antioxidant, antimicrobial and insecticidal activities. The plant is highly used to treat impotency in men the medicinal property of PEDALIUM MUREX is relatively considerable . It is also sweet, cooling, mucilaginous, and used to treat digestive, carminative, tonic, spasmodic affections, amenorrhoea, and vitiated conditions of pita, inflammation and general debility.it can be concluded that the plant were found to have a better profile with potential natural source for the treatment of various range of either acute or chronic disease.
FSN-P-60

NUTRITIONAL CHARACTERIZATION OF SEETHANI, A FORGOTTEN ETHNIC GRAIN

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Immature grains are known to have better nutritive quality than the mature grains. Seethani is an immature sorghum grain consumed in parts of North Karnataka and South Maharashtra. According to folks, eating seethani for a month will keep you healthy for a year. Therefore, the study was aimed to characterize seethani for its nutritional quality. Three varieties (M35-1, SMJ-1, KMJ-1) of seethani were ground to 175 μm particle size which were procured from K.V.K Bijapur and were stored at 40°C till further analysis. The flour was analyzed for proximate, dietary fibre content, minerals, sugars and starch content using standard protocols. M35-1 is chappati purpose variety, SMJ-1 is sweet variety and KMJ-1 is the popping variety. Seethani was found to be a good alternative of many other grains with high protein (9.22 to 12.45%), dietary fibre (10.01 to 12.06%), iron (4.40 to 8.11 mg) and zinc (1.85 to 2.76 mg). Being a sweet variety, SMJ-1 was found to have highest amount of total sugars (3.65%) with higher proportion of reducing sugars (2.63%). Since seethani is harvested at milky stage, a reduction of 33.08% to 55.46% in total starch was observed when compared with mature sorghum grain. The oligosaccharide content was found to be significantly higher than the sorghum grain. SMJ-1 was the best suited variety for seethani with better nutritional quality. This variety has an advantage of being sweet so it can be consumed either as fresh grain or as any of its product. Also, seethani can be a functional food like freekeh (immature wheat) or baby corn. Therefore, an effort can be made to popularize this niche product which can benefit farmer too.

FSN-P-61

PURIFICATION AND CHARACTERIZATION OF BACTERIOCIN PRODUCED BY BACTERIOCINOGENIC BACTERIAL ISOLATES FROM FERMENTED FOODS

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Background- More we have a look upon today’s life style; more we come across the need to preserve food items for maximum duration to be suitable for intake. In such a case, there is also fortunate possibility of secretion of some antimicrobial components by fermented food bacteria against the pathogens, leading to their growth inhibition. Some of such food borne pathogens includes S. enterica, P. aeruginosa, L. monocytogenes, Y. enterocolitica, E. coli etc. Thus, microorganisms from fermented foods can be used as a weapon to avoid food borne infections which dominate as a consistent cause for several diseases. Material and Methods- Bacteriocins which act against closely related bacteria and inhibit their growth and may be proteinaceous or non-proteinaceous. And, it has been consistently found that the activity by the unknown isolate is found only when it is induced by the selected pathogenic strain. It can be said in mechanistic approach way that presence of the test pathogen induces the production of bacteriocin against it. This ensures food spoilage safety which could be enhanced and modified according to our needs and demands. The study here proves the inhibitory action of unknown microorganisms from fermented foods against 5 standard pathogenic strains. Furthermore, MIC determination has been done by proceeding with solid as well as liquid culture assays. Next, to obtain the desired bioactive component, precipitation was done using Ammonium sulphate method; it was dialyzed, partially purified by column and then purified in large scale using specific chromatographic methods. Result- The results included characterized active component, optimization of its production and purification. It was proteinaceous peptide and it reduced the growth of test organism by about 30%. Conclusion- The study hence characterizes the active component and future aspects include its incorporation in food items to increase their shelf life and ensuring food safety.

FSN-P-62

DEVELOPMENT AND EVALUATION OF SENSORY PARAMETERS OF MILLET BASED INSTANT SOUP MIXES

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Background- Variety and taste are key trends in convenience food segment. Millet based convenience foods would not only provide convenience, variety but also nutrition at economic value. Materials and Methods- Study was conducted at Department of Foods and Nutrition, Professor Jayashankar Telangana State Agricultural University. Cleaned Kodo millet and green gram dhal were roasted and were made into flour individually. Vegetables were blanched and dried in tray drier for 12-24 hours at 50°C then were ground coarsely, spices were dried and made into fine powder. Soup mixes were prepared by mixing the ingredients in the following ratios.
Control soup mix- Corn starch- Green gram dhal- Dehydrated vegetables and spices - 60-20-20 Kodo millet Soup mix 1- Kodo Millet- Green gram dhal- Dehydrated vegetables and spices - 60-20-20 Kodo millet soup mix 2- Kodo Millet- Corn starch- Green gram dhal- Dehydrated vegetables and spices - 50-10-20-20. A reconstitution ratio of 1-20 and 1-25 was used to prepare soups. Soups were evaluated for sensory properties using 9 point hedonic scale by a semi trained panel of 21 members. Result- It was found that soups prepared with reconstitution ratio of 1-20 were found to be more acceptable compared to soups prepared with reconstitution ratio of 1-25. Statistically there was significant difference between the soups only with respect to consistency and overall acceptability (p<0.05). Overall acceptability was higher in Control soup (7.3) followed by soup containing 50% Kodo millet (7.1) and 60% Kodo millet (6.7). The mean consistency scores of the control, soup with 50 and 60% Kodo millet were 7.61, 7 and 6.62 respectively. Conclusion- Hence, Kodo millet can be used effectively in combination with other ingredients to develop instant soup mixes that are tasty, nutritious and convenient to cook

FSN-P-63
DEVELOPMENT OF COCONUT COOKIES FROM WHITE RAGI FLOUR & EVALUATING ITS NUTRITIONAL QUALITY

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Background- Cookies are popular baked or cooked product that is typically small, flat and sweet. It usually contains flour, sugar and some type of oil or fats in sweet cookies, for savory cookies salt and spices are used. Coconut flour is a good source of dietary fiber and can be added to bakery products. The bakery products such as cookies are mainly based on refined wheat flour (Maida) replacement of which with finger millet will enhance its the nutritional quality. Materials and Method- Coconut cookies were developed by partially replacing Maida with white and brown finger millet flour in different blend ratio. Seven variations of cookies were prepared. The cookies were evaluated for its sensory attributes. The coconut cookies evaluated on a 9 point hedonic scale and the best cookies were considered for further evaluation and were compared with the cookies made of 100% coconut flour. Result- There was better nutritional value present in the coconut cookies made out of 30% WRF incorporated compared to control and 30% BRF coconut cookies. Control coconut cookies had a better shelf-life when compared to WRF and BRF coconut cookies since 0th day to 16th day. Conclusion- The study was conducted to develop coconut cookies from RWF, WRF and BRF to evaluate and compare the sensorial properties, physical characteristics, nutritional composition and self-life of developed coconut cookie. 30% incorporation WRF had better protein content when compared to control and BRF coconut cookies. WRF and BRF coconut cookies had more fiber and calcium. Cookies developed incorporating white and brown ragi flour serve as healthy alternative

FSN-P-64
STANDARDIZATION AND DEVELOPMENT OF MORINGA INCORPORATED COOKIES FROM WHITE RAGI FLOUR

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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. Convenience and easy availability makes it a good vehicle for fortification. Hence in this study an attempt was made to develop cookies from white ragi flour (WRF) which is rich in protein. Further to enhance the iron content and other nutraceuticals, Moringa was also incorporated. MATERIAL AND METHOD- In the present study 3 g of coarse dried moringa powder is incorporated with different blend ratio of white and brown ragi (finger millet) flour and the cookies were developed from that. The cookies were evaluated for its sensory attributes and physical characteristics. The nutritional quality and the shelf life of the products were assessed as per the standard procedures. RESULT- The moringa cookies were evaluated on a 9 point hedonic scale for its sensory attributes. When compared to standard cookies with moringa powder, cookies from WRF (30%) was superior in terms of taste and flavor. Even the cookies from brown ragi flour (BRF) also tasted better. Nutritionally, cookies form ragi flours (both white and brown ragi) were superior with high fiber, less Carbohydrates and proteins on par with standard cookies. All other parameters were similar to that of standard cookies except tannins and phytic acid which were high in cookies from ragi flours. CONCLUSION- Thus from the study it was concluded that 30% incorporation of WRF and BRF in moringa cookies enhances the protein, fiber and minerals profile. Cookies from white ragi flour had better sensorial score compared to brown ragi and was on par with standard cookies. Considering the nutritional benefit of millets, it is recommended to incorporate 30% white ragi flour in bakery products especially cookies to make them healthy.
**FSN-P-65**

DEVELOPMENT OF BUTTER COOKIES FROM WHITE RAGI FLOUR AND EVALUATION OF ITS NUTRITIONAL QUALITY

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**Background**- Cookies hold a significant place in the baking industry due to variety in taste, texture, & aroma. Cookies are generally prepared out of refined wheat flour, fat, sugar. Refined wheat flour (Maida) is key ingredient for preparing cookies due to its gluten content. Gluten is not well tolerated and Maida lacks fiber and is rich in carbohydrate making it a high glycemic index food. In this study, cookies were prepared using ragi flour, to modify its nutritional content, enhance the calcium, iron and fibre content of the cookies. The main objective was to modify a standard Maida cookies (which was high in CHO & low in fibre) into the modified product i.e. healthy cookies in order to improve its fibre and mineral content. Material and method- Cookies from white ragi flour (WRF) and brown ragi flour (BRF) partially replacing Maida were developed and compared with standard Maida cookies. Except for partially replacing the Maida, all other ingredients and method of preparation remained the same. Maida was partially replaced in the ration of 90-10, 80-20, 70-30 60-40 and 50-50. Developed cookies were subjected to sensory evaluation from the trained panel scoring on 9-point hedonic scale. Selected variation was subjected to nutritional evaluation Result- 30% WRF & BRF incorporated cookies had sensory scores on par with controls. WRF incorporated cookies had more protein compared to BRF cookies. Iron and calcium content was also more in RF incorporated cookies Conclusion- Partially replacing Maida with ragi flours (both white and brown ragi flour) modified the nutritional profile of usual butter cookies and made comparatively healthy with more fiber, iron and calcium and decrease in CHO.

**FSN-P-66**

SHELF LIFE EXTENSION OF SARDINELLA LONGICEPS VALENCIENNES, 1847 USING THE COMBINED EFFECT OF LEAVES OF TAMARINDUS INDICA AND VACUUM PACKAGING

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The present study was aimed for standardization and development of value added product from Sardinella longiceps Valenciennes, 1847 using the leaves of Tamarindus indica and also to investigate the combined effect of vacuum packaging and the leaves along with other ingredients to improve the quality changes of Indian oil sardine (Sardinella longiceps) during storage at 3°C for 20 days. Tamarindus indica leaves was found to have strong antioxidant activity as determined by DPPH assay. A ready to cook product was developed viz., ‘Meen puliyila’ by marinating fish with paste of leaves, coconut, bird’s eye chilly and salt using standardised recipe. All the quality parameters of the developed product along with control (raw sardine) stored under vacuum at 3°C for 20 days were analysed during different storage periods. Fish treated with Tamarindus indica leaves showed significantly lower value for pH, peroxide value, free fattyacid, Total volatile base nitrogen(TVBN), trimethyl amine(TMA) and total volatile count (TVC) till the last day of storage when compared to control. Synergistic use of leaves and vacuum packaging has markedly controlled microbial proliferation and rancidity in the samples when compared to control. Sensory quality of the products studied showed acceptability till the end of storage period. Based on sensory evaluation, a shelf life of 16 days can be assured for Indian oil sardine stored under vacuum at 3°C whereas more than 20 days for fish in combination with vacuum and leaves. The study conclusively indicates that, development of value added fish products from Indian oil sardine could play an important role in improving the utilization of these fish in a more beneficial manner. These results support the possibility that leaves of Tamarindus indica can contribute to protective effects on human health in preventing free radical related diseases and to the current growing pharmaceutical and food industries.

**FSN-P-67**

STANDARDIZATION AND DEVELOPMENT OF LADDU MIX FROM QUALITY PROTEIN MAIZE

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**Background**- Laddu (originated from the Sanskrit word Lattika) is a sphere shaped sweet originating from the Indian subcontinent. Laddus are made of flour, fat (ghee/butter/oil), and sugar, with other ingredients which vary by recipe. They are often served at festive or religious functions. One of the very common laddu is prepared from besan (Bengal gram flour). Due to fast paced life, convenient
DEVELOPMENT AND EVALUATION OF QUALITY PROTEIN MAIZE HOLIGE MIX

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Background- Puranpoli or Holige is considered as a nutritionally rich and traditionally made only during auspicious occasions and during important Indian festivals. Traditionally Holige is prepared with Maida with fillings with either coconut and jaggery mix or with bengalgram flour and jaggery mix. In this study an attempt was made to prepare holige with quality protein maize (QPM) and barley in equal proportion and addition of coconut powder, cardamom and jaggery syrup. The main ingredients of puran poli are maize flour and barley flour, these unique combinations of cereals fulfil the nutritional requirement of essential amino acids like lysine and tryptophan as well as good nutritive values, and were rich in protein, fibres, fat ash and minerals like calcium and iron. Â Materials and methods- The holige mix were initially standardized by changing the proportions of ingredients in four different variations to know the best accepted ratio. The prepared holige evaluated for their sensory attributes by semi trained panel members using 9 point hedonic scale. The best accepted ration was further evaluated for its nutritional quality and storage stability. Results- Among all the variations, variation A (50; 50) secured higher scores in all the parameters. The protein content was increased in the holige from QPM. Further, the CHO content was reduced and thus energy content. The holige mix from QPM had better keeping quality Conclusion; A convenient food containing QPM was developed using the recipe of traditional sweet snack Holige. This mix reduces the processing time as well as preparation time. Further, compared to usual traditional holige this mix has better nutritional profile in terms of protein and micro nutrient

DEVELOPMENT AND EVALUATION OF ROTI MIX FROM QUALITY PROTEIN MAIZE

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Roti is one of the traditional breakfast products made with different flours. Maize and barley is used as main ingredients in roti mix but normal maize varieties are deficient in essential amino acids. Quality protein maize is an improved variety which contains higher amount of lysine and tryptophan. The quality protein mix roti was standardized using the ingredients such as maize flour, barley flour, soya flour, amaranthus powder and other ingredients. Biological value of quality protein maize is high compared to normal maize protein.Â Thus, this study an attempt was made to develop a convenient breakfast food (Roti Mix) from QPM which is healthy.Â Materials & methods-- Â Â Â Initially the roti mix were developed by changing the ratio of maize flour, barley flour and quality maize protein. Keeping all the other ingredients constant for all the 4 varieties. The roti mix were evaluated for its sensory attributes, nutritional quality and storage stability.Â The selected variety was subjected for proximate analysis and compared with usual roti from rice flour and maize flour alone. Result-- The experiment data indicated that the functional roti mix with the ratio of 50:50 of QPM and Barley was accepted among all the variations. When this was compared with the maize alone roti for sensory attributes, it was found that the functional roti mix had higher acceptance. The functional roti mix was nutritional superior to normal maize roti mix with increased protein, fibre & other micro nutrients estimated. This nutrient profile makes it a low GI food.Â Conclusion -- Considering the increased demand for convenience mixes and malnutrition still remains a widespread problem, quality protein maize based convenience mixes are developed. QPM contains 55% more tryptophan & 30% more than normal maize and hence serve a better breakfast food.

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**NPR-P-01**

DIETARY PATTERN AND ASSESSMENT OF NUTRITIONAL STATUS AMONG AUTISTIC SCHOOL GOING CHILDREN IN DELHI NCR

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**Background**- Autism is a neurological developmental disorder that impairs the ability to communicate and/or interact. Although there is insufficient evidence attributing causality of autism to foods, gluten and casein intolerance in autistic children have been reported. This study was undertaken to attempt to understand the diet and feeding pattern of autistic school going children and to assess their nutritional status through anthropometric and dietary data. Materials & Methods- 50 subjects aged ten to twelve were selected from two schools and one institution catering to autistic children in Delhi-NCR using purposive sampling techniques. Questionnaires were used to collect dietary and anthropometric data. WHO AnthroPlus Software was used to assess Body-Mass-Index-for-age scores and Diet Cal Software was used to analyze the nutritional adequacy of diets. Result- The subjects had specific preferences when it came to the utensils they used, the preferred place to have food when they were at home and the texture and consistency of cooked foods, according to their parents/primary caregivers. 46% of the subjects were vegetarian while 54% were non-vegetarian. Anthropometric measurements of the subjects revealed that an 8% of the subjects were overweight. Subjects found with gluten and lactose intolerance were 25% and 37% respectively. The subjects consumed diets fairly adequate in all the nutrients with higher than adequacy levels of calcium, folic acid and Vitamin C. The mean energy intake in a day of male subjects was found to be 1880 kilocalories and 1785 kilocalories among the female subjects. The energy intakes were lower than the recommended dietary allowances (RDA) while the protein and total fat content of these diets were well above the RDAs. Conclusion- Although autism has no cure till date, understanding the dietary behaviour of autistic children along with regular assessments of their nutritional status can help in reducing their food related problems.

**NPR-P-03**

ISSUES AND CONCERNS ASSOCIATED WITH ADVANCED AGEING AND HEALTH ACUMEN AMONG SELECTED SENIOR CITIZEN

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Ageing, the gradual but continuing process of natural change begins in early adulthood. Traditionally, age 65 and above is designated as the beginning of old age, based on history and not by biology. Ageing comes with many challenges such as diminished physical ability and associated age discrimination imparted by society. At the biological level, ageing results from the impact of a variety of cellular damage over time, leading to a gradual decrease in physical and mental capacity and a growing risk of disease; though these changes are only loosely associated with a person’s age in years. While some enjoy extremely good health and functioning, others of same age may be frail and withering. In the above context, this study on Ageing Associated Issues, Concerns and Perception of Health among Senior Citizen aimed to identify the complex and diverse aspects of issues considered to be aggravated / associated by advanced ageing. The subjects interviewed were 100 elderly belonging to Young-Old, Middle-Old and Old-Old categories from Ernakulam, Thrissur and Kottayam districts. Among all the age groups vision and hearing issues were prominent but issues pertaining to other sense organs were minimal. Lifestyle diseases were common among all the age ranges and issues pertaining to heart, BP, arthritis, insomnia were also present in varying degrees. The sharp increase in memory loss and immobility was also a matter of concern for some but prevalence of mineral and vitamin deficiencies were negligible. The subjects rated their health and except Old-old other two categories were satisfied with their present health conditions. The data was very much supportive of the title of study revealing that except in a few areas most of the physical and biological issues of the selected elderly increased with advancing age and an awareness creation among the elderly considered an urgent need.

**NPR-P-04**

COST ASSESSMENT ON TAKE HOME RATIONS

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Adequate nutrition (macro and micronutrient) is essential during pregnancy to ensure optimal fetal growth and healthy life cycle. Iron deficiency anemia (IDA), Iodine deficiency disorders (IDD) and Vitamin A deficiency (VAD) are the three major micronutrient deficiencies of Public Health magnitude of India. The present study has been focused on Government-run supplementation programs of micronutrients- Vitamin A, Iodine, Iron and Take Home Rations (THR); Iron in the form of Iron Folic Acid tablets, Iodine for Iodized salt, Vitamin A capsules and Premix packets provided under as a part of antenatal care services during pregnancy. The study consisted of two phases. In the phase I, primary data pertaining to supply and compliance of THR, IFA, Iodized salt during pregnancy and Vitamin A at postpartum was collected form 250 pregnant women, who were purposively selected form 18 AWCs covered under 2 UPHCs of East zone of Urban Vadodara, within time duration of 3 months. Consent form and pretested questionnaire was used for the same. In phase II, Cost Effectiveness of all the 4 programs was carried out by calculating Disability Adjusted Life Years (DALYs). For this, Descriptive Analytical study was carried out for duration of 3-6 months. Database of women falling in the reproductive age group from WHO, NFHS3, CES 2009 and DLHS 2012 India and World Bank 2012 was used. This phase was divided into 3 sub phases- 1. Impact assessment of the programs 2. Calculation for DALYs and 3. Calculating Cost Effectiveness.

**NEC-P-01**

**DIGITAL HEALTH APPLICATION á€“ CURRENT APPROACH FOR PERSONALIZED DIET CONSULTATION**

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**Background**
As the world grows more fitness-conscious with passing time, the demand for technological solutions to cater to this burgeoning demand is diversifying. Nutrition and diet apps constitute another era of personalized nutrition care with interventions for healthy eating, weight management and other diet consultation services in a scalable and cost-effective way. Mobile nutrition systems offer the means for measuring food intake and energy expenditure as well as they provide constant communication and interaction in the form of personalized information exchange between the interested party and a professional adviser. Materials and methods- The present study involves development of mobile application for effective and authorized diet consultation and nutrition updates. The methodology involves pilot study to gain peoples€™ choice and preferences on the Nutrition consultation app followed by creating database with nutritive values of different food items, common lifestyle diseases, inborn errors of metabolism etc. Result- The proposed mobile app would help the user to make use of on line counseling in personalized chat room with data recording facility. Clients€™ diets are planned & modified as per the nutritional assessments by experts, at clients€™ convenient setting, which serve as medical dietetic record. Conclusion- Digital health applications should be genuine as they need to provoke long term engagement of clientele in intervention programs. App developments encourage focusing features and characteristics valued by dietitians to guide their development of apps that support dietetic practice and enhance patient care. Keywords- Personalized nutrition, mobile nutrition system, mobile application, on-line consultations, Digital health applications.

**NEC-P-02**

**CONSUMER AWARENESS LEVEL ON FOOD LABELING**

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Food labels present a set of vital information to the consumers which influence their purchasing. The dependence of consumers to labels on food products, food safety standards and nutrition facts are becoming much important with increase in consumption of packaged foods. It is necessary to assess the effect of awareness of consumers on food labels and its impact on the purchase behaviour especially on convenience foods. A study was conducted with the objective to assess the consumer awareness level on food labeling among consumers of 20 á€“ 50 years in Thodupuzha municipality. A total of 50 respondents were selected randomly and data was collected using a structured questionnaire. In the study 51.1% of the respondents were males. About 45.2% were post graduate and 27.4% were graduates. Eighty nine percent of the samples have heard of food labels, but do not consider it a matter of serious concern while purchasing food items. Sixty two percent of the subjects believed that information provided on food labels are true. When considering the information check on labels, majority (92.9%) focus date of expiry and 81% for date of manufacture especially for highly perishable foods like milk, bread, chappathi etc. Most subjects ignored food label information due lack of time and their trust on retailers. Although 48.9% of the studied subjects checked the ingredients on food labels, only 13% of the subjects read the nutrition information and information on food additives. Only 20% of the subjects were aware of food regulatory agencies for food safety and their mandatory certification marks on food labels. Majority (57.1%) of the respondents opined that they were not aware of the need of being an informed and a responsible consumer. Most of them wished to improve their food purchase behaviour and 54.8% emphasized...
the need for regular consumer education programmes to improve quality of their food purchase behaviour. It is noteworthy that there is a negative correlation (-0.35) between the educational status and awareness on food labels. The statistical assessment also highlighted the importance of regular consumer education programmes for keeping consumers updated and smart in their food purchase behaviour.

NEC-P-03

INSTAGRAM â€“ A VISUAL FOOD DIARY FOR VIRTUAL RECORD OF FOOD INTAKE

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Background - Smartphone technology, given its widespread uptake and pervasiveness, has provided new opportunities for Nutrition Research including dietary management and intervention tools. The current spread of mobile phoneâ€™s embedded cameras offers new opportunities for recording food intake on Instagram â€“ a visually driven social media platform. Hence, the study was conducted to record and share the food eaten by Instagram, observe their Instagram photos and calculate the virtual food and nutrient intake. Materials and Methods - Thirty young women (18-21 years) from an educational institution using smart phones were requested to consistently record and share what they eat on Instagram. Food intake was calculated by visual perception and nutrient intake was compared with the RDA. Feedback was obtained on the acceptability and usability of smart phones for recording the food intake. Results - Participants reported that sharing food photos helped them be accountable towards their goals, honest about their dietary intake and encourage them to extend support to other users and having a visual account of what they eat each day, maintain their desired behaviors and to continue to be mindful about their health. The findings indicated that Instagram Visual Food Diary may not present the accurate nutrient intake or nutritive value of the foods but this method will definitely help in the weight loss management programme among young adults using smart phone technology. Conclusion - Thus it can be concluded that, accountability can be key to attain the health goals for the participants, and Instagram Visual Food Diary provides an easy portal to accomplish that. The shared food photos may be an effective portable tool to help recording diet when aiming at improved dietary intake and weight loss. The application of Visual Food Diary may lead to greater improvement in food choices and to achieve health goals.

Sports Nutrition

SPN-P-01

ASSESSMENT OF NUTRITIONAL STATUS AMONG THE AQUATIC SPORTSPERSONS

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Background - Nutrition plays an important role for attaining high level of achievement in sports. Aquatic sports are endurance sports which require good nutritional status, that influences the level of sports performance. Poor nutritional status of adolescent sportspersons can negatively impact their health and increase the chances of dismal performance. Method - A total of 54 (canoeists, kayakers and rowers) sportspersons aged (14-18 years) were selected by purposive sampling method from SAI Water Sports Centre, Alappuzha. The nutritional profile of the sportspersons were assessed by anthropometry, dietary methods and use of supplements following standard procedures and a questionnaire. Results - The results of the study based on BMI percentile of the sportspersons revealed that the values were within the normal range when compared with the standard. There was no significant difference between the anthropometric measurements of the canoeists, kayakers and rowers, except arm span (p<0.05) and upper arm girth (p<0.05). Skipping of lunch was observed in two third of the sportspersons. The frequency of skipping ranged between 3-5 days a week. The mean intake of all macronutrients were found to be below the recommended levels except for fat where a positive deviation of 50 percent from RDA was observed. The lowest negative deviation was noticed in the energy intake (-10.52) of the sportspersons and the highest with the protein (-47.36) intake. The intake of micronutrients fulfilled or even exceeded the recommended values except iron. Iron intake was deficit by 84%. Good hydration trend was observed among the selected sportspersons. 100% of the sportspersons had the habit of carbohydrate loading before the event. It is found that supplements have been used by the sportspersons which were mostly energy drinks and protein powder. Conclusion - A multi-nutrition intervention approaches could improve the nutrient intake and enhance physical efficacy of the aquatic sportspersons.
SPN-P-03
IMPACT OF NUTRITIONAL INTERVENTIONS ON NUTRITIONAL STATUS OF ATHLETES

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Nutrition plays an important role to achieve excellence in sports performance. The nutrient intake of a sports person should be satisfactory to accommodate the energy requirement for the sports activity in addition to the individual requirement with regards to their age and gender to ensure proper health for a balanced healthy life. Macronutrients provide energy to maintain physical activity. Micronutrients provide regulatory and protective nutrients for overall health and well being. Hydration has special importance in the diet regimen of sports persons to ensure optimal participation, training and recovery from the stress. Good nutrition for is important for athletes for maintenance of good health and improved physical performance. Nowadays there is increased incidence of non communicable diseases like Coronary Heart Disease, Hypertension, Diabetes Mellitus, Osteoporosis, and Obesity even in sports population. This situation can be changed by giving proper, adequate, specific quality and quantity of needed nutrition with adequate exercise to attain a diseases free prosperous life and the winning edge for athletes. Well balanced diets could be planned for sports persons using inexpensive indigenous foods. Calendars could be prepared for green leafy vegetables available all over the country to facilitate them. Sports persons and their trainers should be enlightened on nutrition KAP. Nutrition and practical yoga and yoga therapy programme change lifestyle, attitude, skills and improve health. Rules in food intake - Nadishuddhi and Pranayama. Knowledge of Pancha Bhutas, Shareera Dharmas-Ahara, Nidra, Bhaya, Maithunam, Natural rejuvenation. Yoga Diet- triguna-vegetarian- sadhva, thamo, rajo human body practices help to improve health. Knowledge on spiritual aspects â€“ realisation of God, immortality of Athma, mortality of the human body, Yoga Psychology- working of the human brain realisation of feeling and emotion , rationalizing and introspection help in augmenting sports performance. Key words- Hydration, Micronutrients, Osteoporosis, Hypertension, Knowledge Attitude Practices.

SPN-P-04
EFFECT OF PRE AND POST EXERCISE MEALS AND HYDRATION SCHEDULES ON THE PHYSICAL ACTIVITY LEVEL OF PUNJAB ATHLETES

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Background- The effect of pre and post exercise meals on physical activity level of 120 (16-25 years) elite athletes selected from 5 universities of Punjab and participating in 4 sports viz. hockey, athletics, badminton and lawn tennis was assessed. Methods- The nutritional status of athletes was assessed by anthropometric measurements and haemoglobin analysis using cyanmethemoglobin method followed by their pre and post exercise nutrient intake using pretested questionnaire and their physical activity level was recorded. Results- The anthropometric analysis of males revealed an average Body Mass Index (BMI) of 23.1 kg/m2 while the corresponding value among females was 20.5kg/m2. Pre exercise intake revealed that 61% of total athletes used to consume meal an hour before training and 41% preferred hydrating themselves 10 to 15 minutes prior. Post exercise results showed that 56% of the total athletes used to consume meal 30 minutes after, while 31% preferred hydrating themselves immediately after training. Total energy consumed during pre and post exercise meal in males was observed to be 336 and 369 Kcal respectively, while in females it was found to be only 185 and 289 Kcal respectively. The lifestyle analysis showed that 51.7% athletes had vigorously active lifestyle. The haemoglobin level of the athletes revealed a significant positive (p≤0.05) correlation with the time spent in sports while pre-exercise intake of nutrients (energy, protein, carbohydrates) was found to be positively but non-significantly correlated. Conclusion- The pre and post exercise meals have a positive effect on physical activity level of athletes and generated data will be useful to health professionals to prepare suitable diet for athletes. Keywords- Elite athletes, post exercise meals, pre exercise meals Category- Sports Nutrition

SPN-P-05
DEVELOPMENT AND EVALUATION OF NUTRACEUTICAL ENERGY RICH PREGAME SNACKS ON THE SPRINTS PERFORMANCE OF SELECTED ATHLETES

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Background- The effect of pre and post exercise meals on physical activity level of 120 (16-25 years) elite athletes selected from 5 universities of Punjab and participating in 4 sports viz. hockey, athletics, badminton and lawn tennis was assessed. Methods- The nutritional status of athletes was assessed by anthropometric measurements and haemoglobin analysis using cyanmethemoglobin method followed by their pre and post exercise nutrient intake using pretested questionnaire and their physical activity level was recorded. Results- The anthropometric analysis of males revealed an average Body Mass Index (BMI) of 23.1 kg/m2 while the corresponding value among females was 20.5kg/m2. Pre exercise intake revealed that 61% of total athletes used to consume meal an hour before training and 41% preferred hydrating themselves 10 to 15 minutes prior. Post exercise results showed that 56% of the total athletes used to consume meal 30 minutes after, while 31% preferred hydrating themselves immediately after training. Total energy consumed during pre and post exercise meal in males was observed to be 336 and 369 Kcal respectively, while in females it was found to be only 185 and 289 Kcal respectively. The lifestyle analysis showed that 51.7% athletes had vigorously active lifestyle. The haemoglobin level of the athletes revealed a significant positive (p≤0.05) correlation with the time spent in sports while pre-exercise intake of nutrients (energy, protein, carbohydrates) was found to be positively but non-significantly correlated. Conclusion- The pre and post exercise meals have a positive effect on physical activity level of athletes and generated data will be useful to health professionals to prepare suitable diet for athletes. Keywords- Elite athletes, post exercise meals, pre exercise meals Category- Sports Nutrition
Sports are necessary for human development and health, and championship and for a spirit of friendly competition. Performance of Indian athletes in the national and international sports competition needs to be improved. Proper Nutrition and specific training required for any athlete makes a transformable change in athletic performance. The objectives of the present study are to develop an instant energy food product using nutraceutical energy rich ingredients and evaluate the acceptability of nutrient and nutraceutical potential of developed product and study the impact of supplementation of the developed product among athletes on the sports performance. Nutrition and Physical activity should go hand in hand. Activity and performance require carbohydrate and fat to supply fuel, protein to build and maintain lean tissues, vitamins and minerals to support both energy metabolism and tissue building and water to distribute fuel to dissipate the resulting heat and water (Whitney and Rolles, 1996). Sweet potatoes are an excellent alternative since they are a great, natural fuel source for athletes. Sweet potato is also an excellent source of flavonoids, Phenolic compounds such as beta-carotene, and vitamin A. These compounds are powerful natural antioxidants (Remya Mohanraj et al). (R. G. Abirami and S. Kowsalya 2010) studied the Nutrient and Nutraceutical Potentials of Seaweed Biomass Ulva lactuca and Kappaphycus alvarezii the study concluded that seaweeds selected were found to possess high nutritional value and nutraceutical potentials. A Nutraceutical rich ready to eat energy rich products by the addition of Sweet potato, Sea weed and basal seed to the standardized recipes will be formulated and supplement to the experimental group for six months. During and after the supplementation period, the qualitative and quantitative tests were assessed to find out the impact of supplementation. From the reviews it is seen that the proposed pregame product may increase the performance of the athletes.

SPN-P-06
NUTRITIONAL KNOWLEDGE, ATTITUDE AND PRACTICE LEVEL OF SELECTED FEMALE COLLEGIATE SPORTS PERSONS OF KOTTAYAM DISTRICT

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Background: Optimum nutrient intake and good nutritional knowledge have been recognized as the key factors that play critical role in improving the athletic performance. The present study aims to assess the nutrition knowledge, attitude and practice among the selected female collegiate sports persons of Kottayam district. Material and Methods- 100 female collegiate sports persons, from three different private colleges in Kottayam District, Kerala, India were selected for the study. The subjects belonged to different sports disciplines included in the group 3 category of NIN classification of sports and games based on energy expenditure. Mean age of the samples were 19.28±1.27. Background information of the subjects were assessed using pre structured standardized interview schedule. Knowledge, Attitude and Practice (KAP) questionnaire constructed using bipolar likert scale, were also given to the subjects. Anthropometric indices such as height, weight, BMI and waist to hip ratio were assessed using standardized techniques. Biochemical values such as Haemoglobin, ferritin (for those subjects with low haemoglobin), Total Calcium, and RBC count and packed cell volume also estimated. The collected data were statistically analyzed. Results- KAP scores revealed that, 50 percent of the subjects had good nutrition knowledge, 73 percent had average nutritional attitude and 52 percent had average nutritional practice. Anthropometric analysis revealed- 20 percent- underweight BMI, 8 per cent -overweight BMI and 3 percent- obese BMI and 2 percent - WHR more than 0.85. Findings in biochemical estimation were- 21 per cent -mild anemia, 26 percent-low packed cell volume and 3 percent- low RBC count, 17 percent- high total calcium. 73 percent of anemic subjects have low ferritin values. Conclusion- Results of the study pointed out to need of regular and periodical nutrition interventions among college sports persons.

SPN-P-07
A STUDY ON THE NUTRITIONAL AWARENESS AND NUTRITIONAL PROBLEMS FACED BY SPORTS WOMEN IN THIRUVANANTHAPURAM DISTRICT

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A STUDY ON THE NUTRITIONAL AWARENESS AND NUTRITIONAL PROBLEMS FACED BY SPORTS WOMEN IN THIRUVANANTHAPURAM DISTRICT was conducted with the objective to assess the nutritional intake, nutritional problems, nutritional knowledge, anthropometric measurements and to impart nutritional awareness to the sports women. Current scenario exhibits a large number of cases of nutritional problems that adversely affect the nutritional intake of sports women. This study reveals the hidden nutritional problems associated with sports women and corrective measures can be taken. By imparting nutritional knowledge to the sports women, their performance will increase, allowing them to achieve their full potential. Thus this study will help our Kerala sports girls to get maximum medals at the National and International level. The sample consisted of 100 college going sports women in the age group 18-25 years old from Thiruvananthapuram district. SCOFF questionnaire and food frequency questionnaire, 24 hour recall method was used as a screening instrument for gathering necessary information. A well-structured questionnaire was used to assess the general information regarding their socio economic status, dietary habits, physical activity, health status, menstrual history and nutritional status. Majority of the sample resided in rural area and had a family income of <25000. It was found that 49% of the sports women skipped their meals especially breakfast. 35% of them reduce their weight prior to competition. 13% of them practise carbohydrate loading prior to competition. 84% of them wanted to weigh less than they are. 41% of them had an
issue with their body composition. Majority of the subject had stress. 43% were found to be at risk for developing eating disorders. Anthropometric measurements revealed 55% belonged to normal weight category, 23% were underweight and 12% were overweight and 10% were obese. Hence the study showed that majority of the sports women were in the category of developing nutritional problems.

**SPN-P-08**

"EFFECTIVENESS OF DIETARY INTERVENTION REGIME IN RELATION TO EXERCISE KINETICS AMONG YOUNG ELITE PROFESSIONAL SWIMMERS".

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**Background**- Training and recovery are the two important cornerstones of athletic success. Besides fueling physical performance, nutrition plays an important role in athlete’s overall well-being. Optimal nutrition tends to help athlete to recover faster, prevent injuries and stay focused. Adequate nutrition assists in the ability to train intensely, as well as in muscle recovery and metabolic adaptations to endurance exercise. Methodology- With this backdrop proposed investigation was performed to evaluate interrelationship between exercise physiology and dietary adequacy among swimming athletes of urban Mysore region. Investigation was conducted using standardized checklists with oral interview method by randomized sampling technique. Results- Significantly energy and protein inadequacy were noted among non-swimmers in comparison to professional swimmers. Respectively Vitamins and minerals inadequacies were observed among non elite swimmers than professional elite swimmers. Despite nutrient inadequacy was noted among both groups in comparison to RDA [recommended dietary allowances] 2010. Dietary adequacy of trained athletes has to be optimized to ensure maximum adaptation towards very intense and long-duration physical loads. Anthropometry has been positively related to stroke rate, stroke length and stroke velocity. Highly significant relationships were found between the 50 & 400mts freestyle sprint and the mean power of arms & legs. Flexibility is important for stroke form especially in the recovery and pull phase. Vo2 max [maximum volume of oxygen was consumed] is very closely related to a 400 m swimming performance. Particular attention should be focused on female athletes. Conclusion- Evidently Nutrition education intervention found to support competitive swimmer at risk of physical injury, psychological harm along with poor recovery, diminished health and ultimately altered performance. KEYWORDS- Swimming athletes, Dietary adequacy, Nutrition, Flexibility, Recovery, Nutrition intervention.
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Improving choices across our Portfolio in line with our commitment to the FSSAI ‘Eat Right Movement’

- **OFFER MORE**
  - Increase positive nutrition
- **POSITIVE NUTRITION**
  - like wholegrains, fruits and vegetables, dairy, protein and hydration

- **REDUCE**
  - **ADDED SUGARS**
  - 100 Calories or fewer from added sugars

- **REDUCE**
  - **SALT**
  - 1.3 milligrams of sodium

- **REDUCE**
  - **SATURATED FAT**
  - 1.1 grams of saturated fat

---

**Innovating for a Better Tomorrow**

**Our ‘Refreshed Portfolio’**

- Pepsi
- Tropicana
- Gatorade

**Positive Nutrition Offerin**

- Wholegrain Nutrition
- 100% Juices
- Sports Hydration
THE RECIPE FOR A GREAT START TO THE DAY WAS CREATED OVER A 100 YEARS AGO

Since 1906, Kellogg has invested decades of science and product development into health and nutrition and therefore is the world’s leading cereal company.

Kellogg's® Anaaj ka nashta A solid start for you
With Best Compliments:

Saffola
Dil se healthy
The smart choice for a healthy lifestyle.

The tasty way to stay fit.
A Handful of All Things Good!

Incorporating California walnuts into meals and snacks is a simple, tasty and convenient way to add important nutrients to your daily diet.

Better yet, walnuts are the only tree nut to provide a significant amount of plant-based omega-3 fatty acids (2.5g/25g) and contain other key nutrients like protein (4g/28g) and fiber (2g/28g) that makes you feel full and energized all day long.

For recipes, resources and more visit www.californiawalnuts.in