



CONFERENCE on EMTRENDS
*Emerging Trends in Nutrition for Health and
Scope for Innovations-Way Forward*

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Compendium of
Abstracts & CVs



International Life Sciences Institute India

Abstracts and CVs

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Opening Session

**Presentations by Awardees for ILSI India Young Scientist Award for
Outstanding Contributions for Improving Public Health**

Abstracts & CVs

BRIEF CV

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Prof. Gopinath is recipient of 2021 ILSI India Young Scientist Award for outstanding contribution in the area of Food Safety.

Prof. Gopinath is a Professor in the Department of Biosciences and Bioengineering at Indian Institute of Technology (IIT) Roorkee, India. He earned his Ph.D. in Biotechnology from the Indian Institute of Technology Guwahati, India. He did his Post-Doctoral Research at the University of Rochester Medical Center, New York, USA.

His research group in the nanobiotechnology laboratory at IIT Roorkee is working on developing various nanomaterials for Biomedical applications. At present, he has more than 137 research publications in the area of nanobiotechnology in high-impact factor journals. He has filed 13 patents and done one technology transfer. He has also published eight books and 15 book chapters. He has been a reviewer and editorial board member for many international journals. He has received numerous prestigious awards for his scientific contributions in the area of biomedical nanotechnology.

Biopolymer Based Edible Coating for Enhancing the Shelf Life of Horticulture Products

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ABSTRACT

As per the report of the United Nations, half of the fruits and vegetables are lost annually. Industries are trying to reduce the postharvest loss by using coatings. Wax coating is the most preferred way to preserve fruits and veggies. Sometimes wax is mixed with some chemical compounds that are known to be carcinogenic. Recently many edible films have been developed using natural polymers to enhance the shelf life of food. The edible films act as a barrier between the food and the external environment to prevent the direct interaction of food with atmospheric gases and microbes, which reduce the rate of respiration, keeping the food fresh for an extended period. But, the cost of edible biofilms is high and restricted at the industrial level; the local fruits and vegetable vendors are not able to buy such costly biofilms. We have developed the solution for dip-coating and nanofiber coating using a blend of silk fibroin, PVA, honey and curcumin, which is a cost-effective method for fruits and vegetable vendors. The material used for coating is FDA approved. The techniques utilized for synthesizing the biofilm are electrospinning and dip-coating. Coating found to increase the shelf-life of fruits and vegetables.

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BRIEF CV

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Dr. Bhabatosh Das is recipient of 2021 ILSI India Young Scientist Award for outstanding contribution in the area of Gut Microbiome and Human Health.

Dr. Bhabatosh Das has done M.Sc. Zoology from Visva- Bharati University, Shantiniketan; M. Tech. in Biotechnology and Biochemical Engineering from IIT Kharagpur; Ph.D. from Jadavpur University, Kolkata; and Post- Doctorate in Microbiology from Institute of Integrative Biology of the Cell (I2BC), France. Currently he is working as Associate Professor at Molecular Genetics Laboratory at Centre for Human Microbial Ecology, THSTI, India. He has worked as visiting faculty at many institutes including Manipal Academy of Higher Education, Manipal, National Institute of Pharmaceutical Research, Guwahati and Regional Centre for Biotechnology, NCR Biotech Science Cluster, Faridabad. He also worked as a guest lecturer at All India Institute of Medical Sciences (AIIMS) at New Delhi.

Dr. Das is recipient of two international fellowships i.e. Japan Society for the Promotion of Science from Government of Japan, and Centre National de la Recherche Scientifique from Government of France), 2008 and three national fellowships (IIT (2001), ICMR (2003), CSIR (2006). He has published 59 research articles in prestigious journals including The BMJ, PNAS USA, PLoS Pathogens, Mol. Microbiol. and J. Bacteriol. He has written 1 Book and 24 book chapters in books. He is a life member of American Society of Microbiology. He is Editorial Board Member of Microbial Ecology Journal by Springer Group, Gut Microbiome by Cambridge University Press and Guest Associate Editor of Frontiers in Microbiology and Frontiers in Genetics by Nature group.

Dr. Das is also a member of WHO Expert Group. His research articles have received more than 1520 citations.

Human Microbiome in Health and Disease

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ABSTRACT

Microorganisms, the unicellular microscopic living entities, display incredible diversity and live in all the environmentally exposed surfaces including human body. Based on the nucleotide sequences of rRNA gene and unique enzymatic functions, the microbes living in the human body are classified into three domains: Bacteria, Archaea and Eukarya. Members from all three domains are isolated from the skin, mucous membranes, gastrointestinal tracts, and reproductive tracts. Thousands of novel functional potentials and functional activities that directly or indirectly modulate our physiology have been decoded. We observed that the compositional and/or functional dysbiosis in the gut microbiome is associated with numerous health disorders like inflammatory bowel disease (IBD), malnutrition, metabolic disorders, asthma and neurodegenerative diseases. Our findings of gut microbiome study of healthy Indians help clinicians to identify rural population from the state of Haryana and Jammu and Kashmir as 'healthy guts' and ideal donors for 'Fecal microbiota transplantation (FMT)', a procedure that helps patients of Clostridium difficile infection or inflammatory bowel disease (IBD) to regain a healthy gut.

BRIEF CV

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Dr. Pradip Behare is recipient of 2021 ILSI India Young Scientist Award for outstanding contribution in the area of Functional Foods.

Dr. Pradip Behare has done B. Tech in Dairy Technology from Dr. Punjabrao Krishi Vidyapeeth (PDKV) Akola, Maharashtra; M.Sc. in Dairy Microbiology from SMC College of Dairy Science, Anand Agricultural University (AAU), Anand, Gujarat; and Ph.D. in Dairy Microbiology from ICAR- National Dairy Research Institute (NDRI), Karnal, Haryana. Currently he is working as Senior Scientist Dairy Microbiology Division at ICAR- National Dairy Research Institute (NDRI), Haryana.

Dr. Behare is recipient of IDP/ NAHEP (World Bank -ICAR) fellowship. He has also received several distinguished award such as DST Young Scientist award 2013, Best Teacher award (undergraduate teaching) 2015 at ICAR-NDRI, Karnal, NAAS Associate 2018, NADSi Associate 2018, Young Scientist Award 2018 (Dairy Microbiology) by Society for Up-liftment of Rural Economy. He has guided more than 12 M. Tech. and Ph.D. dissertations. He has published above 40 Research and Review Articles in prestigious international and national journals. His correspondence to Nature Reviews Gastroenterology & Hepatology having impact factor of 46.802 is one of the highly acknowledged contribution from ICAR-NDRI. He has written 3 Books, 20 book chapters and 6 Compendium or manuals. He has published more than 39 popular articles or papers in proceedings/ symposium/ conferences. He has developed and commercialized 9 technologies and has 2 patents on his name.

Improving Public Health – Food Safety, Nutrition & Wellbeing

Dr. Pradip Behare

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ABSTRACT

Dr. Pradip Behare has been particularly engaged in basic and strategic research of developing functional dairy foods for health applications. His basic research includes characterization of techno-functional lactic acid and probiotic bacterial cultures from various geographical niches. He has deciphered whole genome of six industrially important organisms comprising species of *Lactobacillus*, *Fructobacillus* and *Leuconostoc* while submitted fifteen partial genome sequences to NCBI for end users. He has also identified bile and acid responsive key proteins in indigenous probiotic lactic cultures by proteomic techniques which gave insight on gut adaptability of these strains. Use of native lactic acid probiotic strains and/or their biomolecules like exopolysaccharides, vitamin B₁₂, bioactive peptides and PLA, in indigenous dairy products showed reduction of cholesterol, vitamin B₁₂ deficiency and immunomodulation in animal studies.

In the area of strategic research Dr. Behare addressed industrially relevant problem of making low-fat healthy fermented dairy products that are free from the additives, economical and can be bought by all strata of consumers. He has developed and commercialized health promoting technologies/processes on Indian fermented dairy products such as Low-Fat, Dahi, Low-Fat Lassi, Misti Dahi, Sour Dahi and Greek-style Yoghurt to stakeholders. The process for producing probiotic DVS has been adopted by one of the India's first DVS powder selling company. Technologies on vitamin B₁₂ bio-enriched Soy Yoghurt, process for preparation of probiotic cell biomass Direct-Vat-Set (DVS) and indigenous probiotic strains for cholesterol reduction and immunomodulation are in the final stage of technology transfer. Other technologies on iron-fortified whey and zinc-enriched dahi having more bioavailable micronutrients are in the process of development. He has been granted with patent on low-fat Chakka and Shrikhand by using exopolysaccharides producing lactic cultures (Application No. 201811033236) whereas another patent on "AMCF formulation for enhancing shelf-life of Paneer" is filed to IPO (Application No. 202111007461).

Use of these technologies/processes in various products either improve quality, health or increases 5-7% yield, which is most significant aspects of research done over the past few years. Dr. Behare has published significant numbers of research papers in internationally acclaimed journals with good citation indexes. His research outcome leads to enhanced scientific knowledge, developed and commercialized health promoting dairy food technologies, promoted entrepreneurs for manufacture of value added products and created employment opportunities for the younger population. His work carried out on mannitol producing *Fructobacillus* cultures have been appreciated at Teagasc Food Research Centre, Moorepark, Cork, Ireland. Dr. Behare's contributions has been recognized by best academies and societies of India such as National Academy of Agricultural Sciences (NAAS), National Academy of Dairy Sciences India (NADSi), Society for Upliftment of Rural Economy (SURE) and Academic council ICAR-NDRI, Karnal.

Session One
Nutrient Intake Across Lifespan:
What Evidence Based Research Says

Abstracts & CVs

BRIEF CV

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Dr. Seema Puri, PhD has over 35 years of teaching and research experience with interest in infant and young child nutrition, childhood obesity and NCDs, bone health and geriatric nutrition.

She has guided the research of over 55 postgraduate and 17 doctoral students. She has undertaken several research projects funded by World Bank, UNICEF, WHO, University of Sydney, DST, ICMR and others. She has presented her work at several international conferences and has been an invited speaker at innumerable National and International meetings.

She has been awarded several fellowships including the Australian Awards Fellowship, CCGHR fellowship, to undertake specialized trainings abroad. She has been conferred the Distinguished Services Award by the Geriatric Society of India in 2010 and for her significant contribution to Nutrition and Dietetics in 2014. Recently she was felicitated with the Rajamal P Devadas Award 2020 by Nutrition Society of India for her outstanding contribution to applied nutrition. She also is a recipient of the Nutrition Leadership Excellence Award by NIFTEM and Ministry of Food Processing in 2022.

She has published extensively with over 110 publications and nearly 2900 citations. Publications to her credit include a popular "Textbook of Nutrition and Dietetics", an edited book on "Diet and Ageing" and on "Children in India: Opportunities and Challenges".

Dr Seema Puri has been a short term consultant for UNICEF, WHO (SEARO), WHO (EMRO), FAO and UN World Food Programme. She has been on several important national and international committees, project review groups and task forces including those at FSSAI, Ministry of Health, DST, ICMR and Government of Delhi. Presently, at FSSAI, she is member of the Scientific Panel on Labelling and Claims/Advertisements, and Scientific Panel on Functional Foods, Nutraceuticals, Dietetic and other similar products. She has been involved in the planning of the Midday Meal Scheme and ICDS supplementary feeding programme of the Delhi Government.

She is a member of several other academic bodies including the South Asian Infant Feeding Research Network (SAIFRN), Home Science Association of India and Indian Academy of Geriatrics. She was the National Vice President of Indian Dietetic Association, Executive Council member of Nutrition Society of India and India's Representative on the Asian Federation of Dietetic Associations. She is also the India representative on the International Federation of Home Economics.

Factors Affecting Brain Health and Development: A Lifecycle Approach

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ABSTRACT

Nutrients and growth factors regulate brain development during fetal and early postnatal life; failure to provide adequate macronutrients or key micronutrients at critical periods has a lifelong impact. Besides genetic influences, cognitive development of infants, children until adolescence requires neural enrichment in their environment. Early influences like poverty, food insecurity and dietary deficiencies, poor feeding practices, recurrent and chronic infections, and low levels of infant-caregiver stimulation prevent children from reaching their full potential for brain growth and development. Young adulthood and middle age are crucial periods for determining brain health in old age. Multiple factors affect cognitive health, e.g. age-related changes, injuries, mood disorders, substance abuse, and diseases. While some cannot be changed, many lifestyle factors are potentially modifiable: diet, physical activity, cognitive, social engagement, smoking and alcohol consumption which may stabilize or improve declining cognitive function. High protein and low-fat diets, some B-group vitamins and iron, many polyphenols are protective against cognitive decline. Mediterranean, Nordic and DASH diets are linked to a lower risk of cognitive decline and dementia. The relationship between gut microbiome and brain function has reinforced the beneficial effects of dietary fibers and probiotics. The importance of cardio-metabolic risk factors like obesity and hypertension, faulty diets, smoking and physical inactivity that develop in middle age suggest that preventive approaches are required for 40-50 year olds, before they develop dementia. Strategies to promote brain health throughout the lifespan should target individuals at each phase of life to adopt a healthy lifestyle (diet and physical activity), be engaged in cognitively stimulating activities and be socially active. The commonality of dementia risk with cardiovascular and diabetes risk suggests that dementia be added to present non-communicable disease management and broader public health programs.

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Dr. Bani Tamber Aeri completed her Ph.D. in Food and Nutrition, from, Delhi University. She has been working in the Department of Food and Nutrition, Institute of Home Economics, Delhi University since 2004. She has been guiding students on M.Sc. Dissertation and Ph.D. Research. She has several publications in national and international journals/articles/conference proceedings/ periodicals and chapters in books. Her areas of interest include management of non-communicable diseases, maternal nutrition and role of diet in mental well-being. She has guided researches on management of NCD's health through wholesome nutrition and was Principal Investigator on a project on assessing cardio metabolic risk of working adults in Delhi. She is associated with a number of national and international academic institutions and professional bodies. She has been actively involved in training of ICDC functionaries, disseminating nutrition messages on several forum including Doordarshan, Vigyan Prasaar and NetProFan and FSSAI related activities and developing course on food and nutrition for educational institutes like NCERT.

She received the ILSI International Scholar Travel Award in 2015.

Depression and Anxiety- Association with Nutrient Intake Across the Lifespan - A Systematic Review of Studies

Dr. Bani Tamber Aeri

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ABSTRACT

The current systematic review was conducted to understand the relationship and interaction between nutrition and mental health across the lifespan. The search adhered to PRISMA guidelines. Around 851 relevant articles published between January 2000 till 15th September 2021 were identified by systematic online search from 6 electronic databases (PubMed, PsycInfo, Science Direct, MEDLINE, Scopus and Google Scholar). Thirty one studies that assessed the intake of wholesome diets, dietary components and used standardized measures of dietary assessments as well as aspects of mental health were finally included as per the inclusion criteria. The American Dietetic Association Quality Criteria Checklist for Primary Research (2016) and the European Micronutrient Recommendations Aligned Network of Excellence scoring system was used to assess the quality of articles in a 2 step process. The heterogeneity between study definitions of dietary and internalizing symptomatology variables precluded formal meta-analysis. A narrative synthesis of the findings from the included studies was performed, The results of the review suggest that healthy eating pattern, including green leafy vegetables and fresh fruits, polyunsaturated fatty acids, like alpha-linoleic acid and minerals like magnesium positively impact mental health across the life span, starting from the prenatal period where it has implications not only for the mental health of the mother but also for mental development and cognition of her offspring. Further, childhood meal patterns (especially high reliance on nutrient poor and HFSS foods) have an impact on the future health of the adolescents as mental health disorders start appearing around this age. While clearly, diet is not the only determinant of mental health, attention towards a balance dietary pattern has long term implications for well-being.

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Dr. Swati Jain is a qualified nutritionist, presently working as an Assistant Professor in Dept. of Food and Nutrition, Lady Irwin College, University of Delhi. Her research and curriculum development interests are diverse and extend into the areas of mechanism-based nutrition studies, intervention research focused on nutrition issues related to chronic disease risk reduction and self-management. Dr. Jain has been actively involved as a member and reviewer with international organisations like the Nutrition Society, UK and World Public Health Nutrition Association (WPHNA), UK. She has undertaken many roles like serving as an Early Career Secretary at WPHNA and as an Assistant Editor for World Nutrition Journal.

She has published in various International Journals of repute and has participated and presented in numerous conferences. She has also received research awards from Indian Council of Medical Research (ICMR) and Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India. Prior to this, she worked for her Ph.D. research at Defence Institute of Physiology and Allied Sciences, Delhi and during this tenure (2008-2013) she was awarded DRDO Fellowship. Her Ph.D. research work has been focused on Appetite regulation, specifically on a nutritional approach for sustenance during conditions of food shortage. Prior to this, she completed her Masters and Bachelors in Food and Nutrition, Lady Irwin College, University of Delhi.

Micronutrient Status of COVID-19 Hospitalized Patients - A Systematic Review

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ABSTRACT

Coronavirus Disease 2019 (Covid-19) pandemic has created a global health crisis. The present Systematic Review evaluated the impact of micronutrient status on the occurrence and prognosis of Covid-19. The review was done using PRISMA Statement. The main search engines used in the present research were PubMed, Google Scholar, ScienceDirect and Springer. The search explored all the relevant studies related to micronutrient status of hospitalized Covid-19 patients/critically ill Covid-19 patients, with or without co-morbidities. The micronutrients studied were Vitamins A, B, C, D and K and Minerals - Zinc and Selenium. All study designs such as, Retrospective, Cohort, Prospective and Case-Control were included papers published till February, 2021. A total of 6944 articles were identified from the databases (PubMed- 657; Google Scholar- 1504, ScienceDirect- 2840 and Springer- 194) and screened by four reviewers. A total of 42 were included for the review. The present systematic review showed lower micronutrient levels among Covid19 patients. Hypovitaminosis mainly Vitamin D and lower levels of minerals pose a great jolt on the body's immunity and other prognostic parameters such as mortality, longer hospital stay, ICU admissions, and higher CRP levels among Covid 19 patients.

BRIEF CV

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Dr. Anju Sinha is a Public health professional trained in Epidemiology, with overall 31 years of research experience. She is experienced in conducting large scale community based field trials funded by national and international agencies on Vitamin A, Zinc and Site preparation for Typhoid vaccine trials. She has worked as Surveillance Medical officer in the National Polio Surveillance Project of WHO for three years in Bihar, Jharkhand and U.P, areas that faced huge challenges in polio eradication In India.

Dr. Anju Sinha worked in Indian Council of Medical Research in the areas of Neonatal and Child Health, HIV prevention, and Evidence Based Child Health. At the Council she participated in a large Cluster Randomized Controlled trial on Home Based Management of Young Infants, designed and implemented RCT testing efficacy of probiotics in neonatal sepsis, RCT evaluating mode of delivery of Iron and/or iron and zinc supplement on Iron status markers and Potential markers of Iron Toxicity in children, W.H.O Global Survey Asia on Maternal and Perinatal Health. Her experience in the area of HIV includes conceptualization and coordination of an epidemiological study Estimating Disease Burden of Pediatric HIV in Belgaum, coordination of a multicentre qualitative study on Male Circumcision, and Pre-exposure Prophylaxis.

Dr. Anju is interested in micronutrient research, research on prevention of neonatal and childhood morbidity and mortality, methodological work, systematic reviews and meta-analyses and their use in policy briefing and finding new research priorities. She has developed the area of Evidence Based Medicine at the ICMR. She is trained in Evidence synthesis from the South Asian Cochrane Centre, CMC, Vellore and from the United Kingdom Cochrane Centre, Oxford. She coordinates a Centre for Advanced Research (CAR) on Evidence Based Child Health at PGIMER, Chandigarh supported by ICMR. She is a Cochrane author and received the prestigious **Kenneth Warren** and **Aubrey Sheiham Public Health and Primary Care Awards** from the Cochrane collaboration. A member of the Cochrane Child health Field, Cochrane Public Health Field and the Cochrane Rapid Reviews Methods Group, she is involved as a Peer Referee and trains Indian scientists in conduct of Systematic reviews at national institutions. She is also trained in Health Technology assessment and is member of the Technical Advisory Committee of the HTAIn at DHR. Dr. Anju was part of the core group that drafted the ICMR Strategic Plan & Agenda 2030; Transforming Health of Indian People through Responsive Research. She drafted the chapter on Pillar 4: Enable Evidence to Policy Translation. She has several publications in International and national journals including a book: Beginner's Guide for systematic reviews.

Currently Dr. Anju is leading a UKRI MRC funded multicentre trial on use of probiotics in prevention of neonatal sepsis. She Co-Chairs the Cochrane India Network and is the Director of the ICMR-Cochrane Affiliate Centre.

Efficacy of Nutraceuticals (Probiotics or Prebiotics or Synbiotics) in the Prevention or Treatment of Covid -19 - A Systematic Review and Meta - Analysis

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ABSTRACT

Background: Probiotics have gained the interest of clinicians for their applicability in the prevention and treatment of multiple ailments. Literature suggests the possible role of nutraceuticals in COVID-19. However, substantial uncertainty related to their safety and efficacy still exists.

Objectives: To assess the efficacy and safety of nutraceuticals in preventing or treating Covid-19.

Search Methods: We searched electronic databases (such as The Cochrane Central Register of Controlled Trials, MEDLINE, etc.), as well as registries for ongoing trials, websites, and e-libraries of development agencies. Additionally, we checked the reference lists of reviews and retrieved articles for additional studies.

Selection Criteria: After removing duplicates, two investigators independently screened all the articles retrieved from searches initially on the basis of titles and abstracts and then on the basis of full-texts. Disagreements were resolved by consensus.

Data Collection and Analysis: We extracted data, assessed the risk of bias (RoB) for all eligible studies, and assessed the overall certainty of evidence. We followed the recommendations specified in the Cochrane Handbook for Systematic Reviews of Interventions. We expressed the results as risk ratios with 95% confidence intervals for dichotomous outcomes.

Main Results: We identified 456 potential studies, and Only two studies were included for quantitative synthesis. One study was at a 'high' RoB, and two studies had 'some concerns' in the RoB. We did not find any study that assessed the effect of probiotics in preventing the number of cases of COVID-19 and reducing the severity of Covid-19 disease. The observed effect was small and uncertain for its efficacy in reducing mortality and days of hospitalization in COVID-19 patients. Also, there was no evidence of increased adverse effects with probiotic use.

Authors' Conclusions: Evidence in hand suggests that probiotics may make little or no difference in reducing mortality and days of hospitalization for people with COVID-19. Therefore, the use of probiotics for the treatment of COVID-19 is currently not evidence based. Methodologically robust RCTs must be undertaken in large samples of populations so that the evaluation of their therapeutic potential gives us quality evidence for their efficacy and safety in clinical practice.

BRIEF CV

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Professor H. N. Mishra has more than 35 years of professional experience in teaching and research in food technology, has many laurels and awards to his credit.

He has published 583 research papers including 209 in peer reviewed international journals and 306 in conference proceedings; 15 popular articles, 34 book chapters. He has written 4 books, 4 e-books, 7 lecture compendium & laboratory manuals, 4 technology manuals, and has 14 Indian patents to his credit. Besides, he is on the editorial boards of several reputed journals. He has supervised more than 275 student research projects including 10 Post-Doctoral and 50 Ph D research scholars.

Professor Mishra has handled several international and national sponsored research and industrial consultancy projects. Professor Mishra has worked in different capacities on various academic and administrative committees of IIT Kharagpur and many other institutions in the country. He is President of Association of Food Scientists & Technologists, India.

Transition from Fat to Fit by Use of Heart Healthy Vegetable Oil Powder

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ABSTRACT

Cardiovascular diseases (CVD) are the major non-communicable diseases causing maximum deaths worldwide. Edible oils play an important role in the causation, treatment, and prevention of CVD by regulating cholesterol levels. According to the American Heart Association (AHA), healthy cooking oil must satisfy the balance between monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA) ($MUFA/PUFA = 1$ to 1.5) and ω_6/ω_3 (1 to 4). Blending different edible vegetable oils give greater flexibility to satisfy nutritional requirements. The innovation involves three edible oils, *viz.* rice bran (RBO), flaxseed (FO), and peanut (PO), that were selected for blending at different concentrations. The oil blend (OB) had well-adjusted ratios of fatty acids, *i.e.*, $MUFA/PUFA = 1.1$ and $\omega_6/\omega_3 = 2.7$. PUFA-rich vegetable oil is prone to rancidity and reduced shelf-life under severe environmental conditions. The prime concern of lipid oxidation is resolved by microencapsulating oil blend in wall materials (maltodextrin, sodium caseinate, milk protein isolate) and converting it into vegetable oil powder. The preservation of vegetable oil blend is done through emulsification (O/W with lecithin) and conversion into oil powder using novel microwave drying process technology, making it shelf-stable without compromising the antioxidant potential and powder physical properties. Cholesterol and saturated fats being the potential risk factors, it needs to be replaced by non-dairy fat. The use of microencapsulated PUFA-rich oil powder in replacement of dairy fat/shortening in many bakery or confectionary products will suppress their adverse impact and have a healthy impact, particularly mitigating heart related diseases on the consumers.

Session Two
Select Products and Health Effects

Abstracts & CVs

BRIEF CV

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Professor Jashbhai B. Prajapati is a Dairy Technology graduate from Gujarat Agricultural University and Ph.D. in Dairy Microbiology from National Dairy Research Institute, Karnal, India. He recently retired as the Principal and Dean of the Faculty of Dairy Science at AAU, Anand. He is Chairman of Indian Dairy Association, Gujarat State Chapter and Coordinator of SASNET-Fermented Foods. At present he is Chairperson of Dr Verghese Kurien Centre of Excellence at Institute of Rural Management, Anand.

Professor Prajapati is a renowned academician and scientist in the area of probiotics and fermented foods. He has handled number of research projects sponsored by ICAR, DBT, State Govt., EU, SIDA and has more than 500 publications, including two text books. He has guided 32 MTech and 9 PhD students. He has received 6 times best paper awards. He had Fellowship award from Erasmus Mundus (EU) as well as Indian National Science Academy. He is a Fellow of Indian Dairy Association as well as Fellow of National Academy of Dairy Science.

He is a recipient of Hari Ohm Ashram Award 2015 from Indian Council of Agricultural Research for his outstanding research contribution in probiotics. He is Associate Editor of International Journal of Fermented Foods, International Journal of Probiotic and Prebiotics and reviewer for many scientific journals and serving as an expert member for many other universities and institutions. He is Adjunct Professor at Bihar Animal Science University and also acting as an expert for Export Inspection Council of India. He is a member of scientific panel on milk and milk products of FSSAI; Member of Governing council of Gut microbiota and Probiotic Science Foundation India, Member in Indian National Committee of International Dairy Federation (IDF) and is associated with many other leading organizations.

Prof. Prajapati is a Member of Governing Council of ILSI India Knowledge Center on Gut Microbiome, Functional Foods, Immunity and Health – K-FFIG.

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ABSTRACT

Several food products prepared with the help of beneficial microbes can fit into the present day definition of Probiotics which have been consumed by mankind since ancient times. Beneficial microbes are the agents that produce many fermented foods and beverages, which are popular in different parts of the world. Indications about the use of products with healthy microbes are given in *Vedic* literature and are also depicted in ancient Egyptian and European treatises. However, systematic studies on Probiotics started after the publication of a book "Prolongation of life" by Eli Metchnikoff in 1907. During the last century, use of Probiotics as food and as pharma products got substantial rise. The Present Review intends to compile and analyze the literature pertaining to use of Probiotics as food products, especially for nutritional enrichment. The Review will focus on the key issues important to establishing the requirement to re-assure the efficacy and safety after strain development, process standardization, or product formulations, bioavailability of the live cells and biomolecules, effect of processing, etc. The Review also deals with modes of incorporation of probiotics in food products, food matrices and use of prebiotics for supporting probiotics as well as nutritional enrichment. Current literatures addressing the mechanisms of action for Probiotic function and the development of Novel Probiotic Foods with particular health claim and meeting the nutritional requirement through fermentation are greatly needed to better understand the product and its application.

BRIEF CV

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Dr. Kamala Krishnaswamy has done MBBS and MD from Osmania University and joined the National Institute of Nutrition (NIN), Indian Council of Medical Research (1964). She received special training in Clinical Pharmacology from Karolinska Institute, Stockholm on a WHO Fellowship. She was appointed Director of NIN (1997- 2002). She continued as Emeritus Medical Scientist till 2005.

Dr. Kamala Krishnaswamy has carried out a number of research studies in the fields of diet-cancer interactions, nutrient- drug interactions, environmental toxicology, non-communicable chronic diseases and vitamin-B – complex deficiencies. She is currently actively engaged in diabetes research. She has published over 260 original research articles in several national and international journals of repute and has edited books, chapters in books and has review articles. Under Dr. Krishnaswamy's chairmanship 'The Dietary Guidelines for Indians' was prepared in 1998 (80th year of NIN) and updated in 2011. She is a fellow of several **scientific academia** including IUNS and The World Academy of Sciences. She has been on Advisory Boards of several scientific committees of academic institutions and industry. She is Scientific Trustee of ILSI India Board of Trustees. She has several awards and honours to her credit

She is currently Senior advisor to Foods, Nutrition and Dietetics department of Madras Diabetes Research Foundation in Chennai. She had been a member of scientific advisory committee of National Institute of Nutrition and an expert committee member of Nutrient Requirements for Indians, Recommended Dietary Allowances and Estimated Average Requirements, of ICMR-NIN and also on the Advisory Committee of current Dietary Guidelines for Indians.

Dairy Food Consumption and Risk of Incidence of Type 2 Diabetes Mellitus - A Systematic Review and Meta- Analysis

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On behalf of Madras Diabetes Research Foundation, Chennai

ABSTRACT

Consumption of milk began as early as 9000 BCE. Per capita consumption of processed and fresh dairy products among Asians is anticipated to double from the current rate, by 2028. Asia is the world's leading dairy-consuming region (39% of global consumption), with India topping the list, consuming over 81 million metric tonnes of cow milk in 2020. Milk is the wholesome food as it provides the needed macro and the micronutrients at an affordable cost even in the developing economies. The effect of dairy foods in non-communicable diseases especially type 2 diabetes, remains unclear. While several longitudinal studies have shown that dairy foods are protective against T2D, few of the studies suggest that dairy could increase susceptibility to T2D. South Asia (and India) is one of the hotspots of the global diabetes epidemic. Interestingly, this region is also the highest consumer and producer of milk making it important to study the effect of dairy on incident type 2 diabetes. Hence, we performed a systematic review and meta- analysis of all the available prospective studies to evaluate the risk of incidence T2D linked to the nutrient dense dairy foods (excluding studies with high amounts of sugar containing ice creams and fat concentrated butter).

A total of 3,009 articles were gathered from PubMed, Scopus, Medline and Science Direct from January 2000 to March 2022, out of which 27 prospective cohort studies were selected for inclusion. Another 5 studies were included for out of hand search matching with the inclusion and exclusion criteria. We classified dairy products as 'total dairy' and 'total milk' and these were further stratified based on their fat content and fermentation. A subgroup analysis was also conducted based on western or Asian ethnicity. We demonstrate from this global systematic review and meta- analysis that dairy in general, and fermented dairy products (plain yogurt), in particular are protective against T2D both in Western and Asian populations. In future, mechanistic studies and population specific clinical trials are needed to confirm the role of dairy foods in diabetes prevention and management. We further need to translate the evidence into clinical practice and appropriate public health messages.

The protocol was registered on the International Prospective Register of Systematic Reviews, PROSPERO (CRD42021249202).

Note: The manuscript has been submitted to the 'Journal of Nutrition' and is under review.

BRIEF CV

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Dr. Pulkit Mathur has done B.Sc. (Hons.) Home Science and M.Sc. Food and Nutrition from Lady Irwin College, and is a gold medallist from University of Delhi. She did her Ph.D. from Faculty of Science, University of Delhi with the research work carried out at the ICMR-National Institute of Nutrition, Hyderabad. In 2005 she joined Lady Irwin College as Assistant Professor, Department of Food and Nutrition.

Dr. Mathur's areas of research interest are food safety and nutrition. She has guided research work on estimating dietary exposure to food additives and assessing the risk posed as also development of strategies to communicate healthy food choices to the general public. She has undertaken several research projects and was co- investigator for a project on spreading nutrition awareness and inculcating healthy food choices among students in Delhi schools. She has published 8 books and more than 85 articles/ chapters in national and international journals/ books/ conference proceedings and periodicals. She has received several awards including Certificate of Merit in recognition of contribution and continued work as a leader in strengthening of the food safety eco-system by the Food Safety and Standards Authority of India. She has guided more than 33 MSc and PhD Scholars. She is a life member of several professional bodies concerned with Food and Nutrition. She is currently National Executive Committee Member of the Nutrition Society of India, Member of the National Committee of the International Union of Nutritional Sciences, and a National Resource Person for the FoSTaC program of FSSAI and National Technical Trainer, Rashtriya Kishor Swasthya Karyakram, MoHFW.

Non Nutritive Sweeteners and their Role in Insulin Regulation and Related Metabolic Factors - A Systematic Review

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ABSTRACT

High consumption of sugar has been linked to an increased risk for obesity and associated metabolic disorders. As a replacement for sugars, Non-Nutritive Sweeteners (NNS) are widely being used in different food products with the assumption that these would lower calorie intake and help to manage weight and blood sugar levels better. However, observational studies and those using animal models have reported that chronic exposure to NNS leads to increased food consumption, weight gain, and insulin resistance. Hence, this study was designed with the objective of examining the use of non-nutritive sweeteners especially with respect to insulin regulation and related metabolic factors among human population, especially Indians.

In this systematic review, evidence was acquired from other systematic reviews or meta-analyses (2016-2021) using the PRISMA guidelines. Evidence reviewed does support role of NNS in weight management along with other weight management strategies. NNS use alone may not decrease energy intake if people compensate by eating other energy dense foods/meals. Overall human data suggests that NNSs do not affect insulin levels and do not stimulate insulin secretion to the same extent as nutritive sweeteners. Evidence is of low certainty for long term benefits on blood sugar control and decreased risk of complications of diabetes. Studies from Asia and India are limited. Adequate evidence is not available to conclusively say that NNSs influence gut health at doses relevant to human use. Well-designed randomized control trials in humans are needed to generate strong evidence on the health effects of long-term use of NNS. Evidence based use of NNS may help in management of patients without compromising their sweet palate, appetite, and quality of life.