

**Knowledge Center on Functional Foods, Gut Health and Immunity (K-FFIG)**

**International Life Sciences Institute India**



# **About K-FFIG**

**An ILSI India  
Center of Excellence**



## Introduction

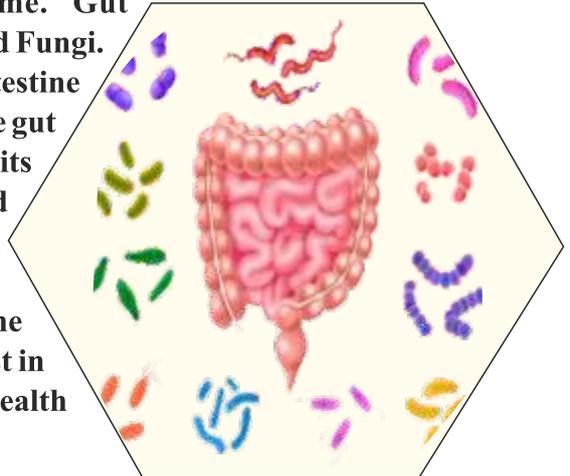
**Gut Microbiome** is an exciting new field of research. As the science of microbiome and the role of food based approaches in strengthening it over a lifetime is emerging ILSI India launched **Knowledge Center on Functional Foods, Immunity and Gut Health (K-FFIG)** - a Center of Excellence - in New Delhi in October 2019.

The Knowledge Center acts as a Think Tank, involving stakeholders from Government, Academia and Industry, that works towards sharing relevant research and technological developments in the area of human microbiome and functional foods.

K-FFIG has undertaken several activities including: organization of Scientific Meetings, undertaking Surveys, sponsoring Research, publishing Monographs and Articles in journals, creating Resource Centre on latest studies on Microbiome and Gut Health and Functional Foods including Probiotics and Prebiotics. For more information visit: <http://www.ils-india.org/kffig.htm>.

## Importance of Gut Microbiome – An Additional Organ

Gut Health primarily depends on Gut Microbiome. Gut Microbiome includes communities of Bacteria, Viruses and Fungi. Most of the bacteria in the gut are found in the large intestine (colon) and, over the past 30 years or more, interest in the gut microbial population – the microbiota – and its environment has intensified. This is an exciting new field of research. More and more research studies are showing that, far from being passive inhabitants of the gastrointestinal (GI) tract, the habitual residents of the gut (commensal micro-organisms) interact with their host in a very intricate manner and have specialized functions in health and disease. They may:



- Modulate the effect of potentially harmful bacteria.
- Impact the host's GI tract, digestion and metabolism.
- Strengthen immune system.
- They might even influence functions beyond the gut such as influence the eating psychology.

Environmental factors like Diet, Antibiotic Usage and Lifestyle behaviors influence the diversity and composition of microbiota (healthy microbiota profile).

These environmental factors may adversely alter gut ecosystem (dysbiosis) that is frequently associated with increased susceptibility to infections as well as to Non-Communicable Diseases like obesity, mental health, behavior, metabolic syndromes (e.g., diabetes and Cardiovascular Diseases), Allergy and other Inflammatory Diseases including IBS.

These observations imply that it may be possible to design new strategies for the management of diseases by manipulating gut microbiota. The common practice now available is the use of functional Foods including Prebiotics, Dietary Fiber, Probiotics, Postbiotics and Bioactives to rehabilitate gut Ecosystem.

## Functional Foods

According to Food Safety and Standards Authority of India (FSSAI) Functional Foods mean foods which provide benefits beyond basic nutrition and may play a role in reducing or minimizing the risk of certain diseases and other health conditions, as described in these regulations.

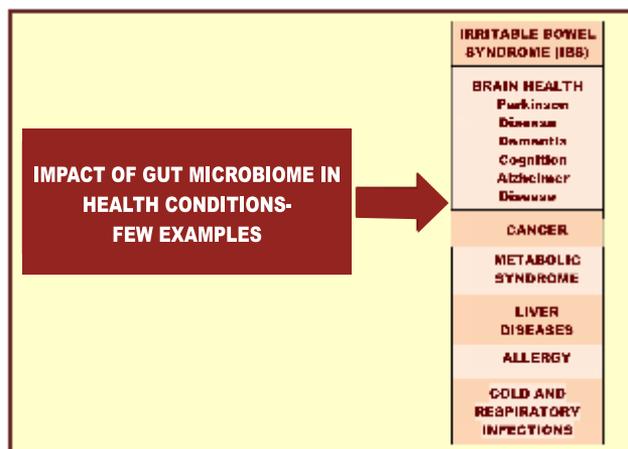
Functional foods are divided into two categories:

- First are Natural Foods which consist mainly fruits and vegetables which are loaded with Antioxidants, Phytochemicals and Physiologically Active Components that protect humans from illness or enhance their health.
- Second are Foods which are processed and modified for bioactive ingredients. Processed functional foods enhance, add, remove or replace one or more of the components in food with special qualities by enzymatic, chemical, or technological means or increase the bioavailability of these components.



The Bio-Components present in the Food make it Functional. As mentioned above it includes both Biochemical Ingredients (Antioxidants, Phytochemicals and Physiologically Active Compounds) and Bioactive Ingredients such as Probiotics and Prebiotics.

## WHY K-FFIG ?



International Life Sciences Institute India (ILSI India)\*\* has been working on role of Gut Microbiome in Gut Health and the ways to strengthen it from as early as 2009. ILSI India kept track of ongoing research on Gut Microbiome, particularly related to its role in preventing and managing different diseases, including IBS, NCDs, Cancers, Allergy etc. It was felt by ILSI India Board, that it would be important to study the subject in-depth and, that led to setting up of ILSI India Center of Excellence, that is Knowledge Center on Functional Foods, Immunity and Gut

Microbiome-K-FFIG. It was set up in consultation with relevant Research Institutes, Ministry of Health, DBT, CSIR, Ministry of Food Processing Industries, as also Industry. An exclusive Governing Council was set up with experts from Government, Academia and Industry with Dr. B. Sesikeran, an eminent scientist as the Chair.

K-FFIG was established at a time when the link between Gut Microbiome and Human Health was gaining scientific attention. It was launched in October 2019, just before the onset of COVID 19. It proved to be an asset as it exclusively devoted itself to how functional foods could be beneficial in preventing and managing not only NCDs but infectious diseases like COVID 19.

## K-FFIG MISSION

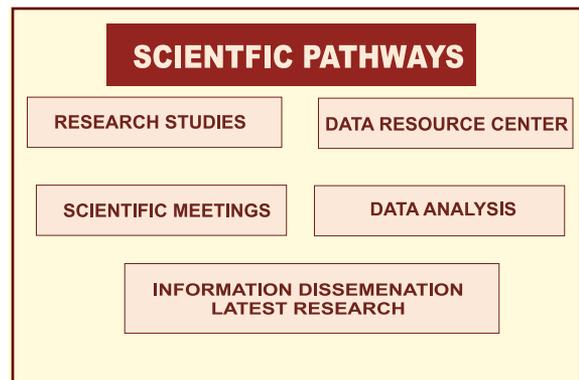
K-FFIG's mission is to study how food based approaches particularly Functional Foods can be used as vehicles to strengthen Gut Microbiome for better health and immunity of population covering all age groups.



## WHAT K-FFIG DOES?

K-FFIG works through the following Scientific Pathways to achieve its mission :

- Conducts Research Studies;
- Undertakes Data Analysis;
- Sponsors Scientific Meetings;
- Promotes Scientific Education through Publications, Newsletters; and
- Facilitates Adoption of Appropriate Strategies by the Stakeholders.



As ILSI India center of excellence. K-FFIG enjoys the benefits of being part of a large, vibrant global scientific network and has access to information generated by any of ILSI Federation Entities in Asia, Europe, North America and Latin America. It works with large number of experts and institutions from India and other countries.

In a short period of its existence (since October 2019) K-FFIG has undertaken a wide array of impactful activities, contributing significantly to the scientific understanding of the Gut Microbiome and its relevance to health. More particularly:

### Scientific Meetings

K-FFIG has organized Seminars and Conferences on very timely subjects such as Nutrients, Health and Immunity; Bioactives and Functional Foods; Clinical Evaluation/Intervention Studies for New Foods & Food Ingredients; Nutrient Risk Assessment; Functional Ingredients in Indian Traditional / Indigenous Products, Postbiotics – New Emerging Area in Functional Foods and Gut Microbiome and Neurodegeneration-Can Functional Foods be The Key?

These Meetings were addressed by more than 75 National and International Scientists and participation by more than 3000 participants from India, South Asia, Europe and United States from Government Organizations, Academia, Industry etc..



## Scientific Publications

K-FFIG brought out 14 Scientific Publications. These have been circulated widely to all stakeholders including Government, R&D Institutions and Industry and are available free of charge on K-FFIG website.

## Guidance Documents

K-FFIG has brought out science based Guidance Documents which focus on Best Practices to be adopted for hitherto, unexplored or little explored areas of Nutrient Risk Assessment, Human Intervention Trials for Novel Foods /Food Ingredients, Use of Traditional Knowledge in Scientific Evidence-Based Novel Foods and Ingredients, Personalized Nutrition etc.

## Surveys

K-FFIG has also conducted Surveys.

## Data Resource Centre

K-FFIG has its own Website which lists its activities, FAQs as well as hosts a Unique Data Resource Center.

The Data Resource Centre includes compilation of studies (2017 onwards) from 35 Peer Reviewed Journals on : Microbiome and Gut Health; Immunity and Probiotics; Prebiotics; Postbiotics; Functional Foods; Gut Microbiome and Neurological and Neuropsychiatric Disorders; Gut Microbiome and Antimicrobial Resistance and Select Latest Indian Studies on Functional Foods: Probiotics, Bioactives, Specific Product Based etc. These are frequently updated.



## Communication



For information dissemination, K-FFIG brings out Monthly Newsletter - K-FFIG Research Briefs – so far 31 Issues have been published. 4 Special Issues were published exclusively on Studies from India. Information is provided on latest research on: Probiotics; Functional Foods, Prebiotics, Synbiotics, Novel Foods, Postbiotics and Bioactive Compounds; Non-Communicable Diseases and Gut Microbiome; Neurological and Neuropsychiatric Diseases and Gut Microbiome; Gut Brain-Axis; and Gut Microbiome and Antimicrobial Resistance.

## Building Leadership

To encourage younger generation to learn more about Gut Microbiome and Functional Foods, K-FFIG along with ILSI India has been conducting Essay Writing Competitions and instituted Young Scientists Awards for Outstanding Contributions for Improving Public Health in the areas of Food Safety, Nutrition & Wellbeing.



## IMPACT OF K-FFIG ACTIVITIES

- ◆ It has influenced Analytical Thinking on Gut Microbiome and Functional Foods.
- ◆ It has provided the Reference for Information on Credible Science.
- ◆ It has Analysed and Explored the Application of Latest Research for Improving Public Health in India.
- ◆ It has Generated Evidence based Information used as Inputs for Framing Guidelines by the Concerned Authorities.
- ◆ It has encouraged Development of New Food and Beverage Products containing Probiotics / Prebiotics / Postbiotics / Bioactives as well as Nutraceuticals, based on Latest Scientific Information for improving health.
- ◆ It has emphasized the Importance of Substantiation of Claims to all stakeholders.
- ◆ It has brought information on benefits of Indian Traditional Knowledge on Food Ingredients and Traditional Products to the Global Arena as also worked on scientific support with the intention to promote wellbeing of the Global Population.

## GOVERNANCE

Formed in a tripartite manner, K-FFIG Governing Council includes representatives from Ministry of Health and Family Welfare, Department of Biotechnology, Council of Scientific and Industrial Research, Indian Council of Medical Research, National Institute of Nutrition, ILSI India, Academia and Industry. It is headed by Dr. B. Sesikeran, an eminent scientist and former Director of ICMR NIN as Chair.



## TERMS OF REFERENCE

- Provide a knowledge sharing platform by Organizing Seminars/ Conferences/ Workshops on recent advances in the science of human microbiome and functional foods.
- Undertake studies to help fill/ understand gaps in consumer/industry understanding of science of probiotics.
- Share recent developments in research with all stakeholders.
- Look at challenges faced by this sector and encourage all stakeholders – Government, including Regulatory Agencies, Industry and Academia – to adopt Global Best Practices.
- Act as a Think Tank, involving stakeholders from Government, Academia as well as Industry and work towards sharing relevant research and technological developments in the area of Human Microbiome and Functional Foods.



## SCIENTIFIC MEETINGS- FEW EXAMPLES

### ◆ Webinar on Nutrients, Health and Immunity

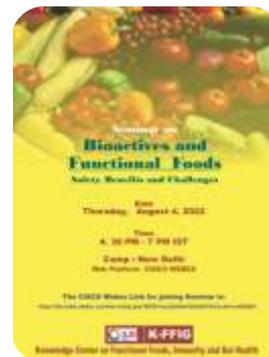
This Webinar created awareness on role of Gut Microbiome in health and how functional foods can strengthen it. Research on new generation probiotics was highlighted.

### ◆ Seminar on Bioactives and Functional Foods Safety, Benefits and Challenges

K-FFIG Seminar on Bioactives and Functional Foods: Safety, Benefits, and Challenges addressed various aspects related to these bioactive molecules and substances.

*Presentations download from: <https://tinyurl.com/45a85e3a>*

*Video recording can be viewed from: <https://tinyurl.com/2euc378v>.*



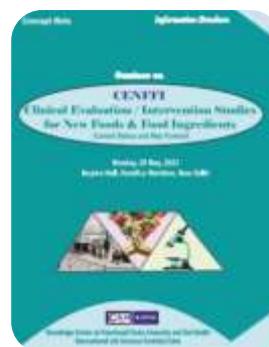
### ◆ Seminar on Clinical Evaluation/Intervention Studies for New Foods & Food Ingredients-CENFFI

While the country has Guidelines for an effective mechanism for conducting Clinical Trials for Drugs but there are no Guidelines for conducting Clinical Evaluation for Food and Food Ingredients Including Nutrients.

This Seminar discussed the need for evolving specific “Guidelines for conducting Clinical Evaluation/ Intervention Studies for New Foods & Food Ingredients”. The Seminar, first of its kind, organized in the country, was considered highly Successful, Useful and quite timely.

The need for laying down Guidelines - to be called “Guidelines for conducting Human Intervention Studies for Food and Food Ingredient” was strongly recommended by the experts.

*Presentations download from: <https://tinyurl.com/43m943rb>.*



### ◆ Scientific Symposium on Nutrient Risk Assessment – Is It A Tool for Ensuring Safe Use & Improving Nutrition Status

It discussed the usefulness of Nutrient Risk Assessment as a tool for setting up safe Upper Levels for Nutrients consumed through all sources from public health perspective.

*Presentations download from: <http://tinyurl.com/3bkcb5y5>*

*Video Recording can be download from: <https://tinyurl.com/4tdkwr3j>.*



◆ **First National Seminar on Postbiotics- New Emerging Area in Functional Foods: Health Benefits, Applications in Food Industry and Future Prospects**

Emerging science shows that Postbiotics not only promote good health but also offer benefits that extend beyond general health improvement. However, limited knowledge was available in the country. Keeping in view its importance K-FFIG sponsored this seminar to generate information and applicability in India.

*Video Recording can be viewed from: <https://tinyurl.com/yfjvrrpr>*



◆ **Seminar on Functional Ingredients in Indian Traditional / Indigenous Products- Safety, Benefits and Way Forward**

Some natural or food ingredients used in traditional Indian products have a long history of consumption in India, yet they remain underutilized in mainstream food products due to limited awareness and acceptance.

This Seminar discussed the importance, health benefits, and safety of such ingredients. It also explored the existing scientific evidence supporting their use and emphasized the need for further data generation in alignment with global best practices, with the goal of facilitating their wider adoption beyond India.

*Video Recording can be viewed from: <https://tinyurl.com/5fajjssa>*



◆ **Seminar on Gut Microbiome and Neurodegeneration: Can Functional Foods Be the Key?**

This seminar looked at scientific evidence on role of functional foods (including products containing Antioxidants, Polyphenols, Bioactives, Dietary Fibres, Prebiotics, Probiotics, Synbiotic) in preventing and managing Neurodegeneration. Experts shared research findings and discussed future strategies for brain health.

*Presentations and Video Recording can be download from: <https://tinyurl.com/aetz753v>*



◆ **ALSIN Meetings on Functional Foods**

An organization of ILSI Entities in Asia including India, Japan, South East Asia, Taiwan, Korea and Shanghai J S Life Sciences Institute, China, have formed “Asia Life Sciences Institutes Network (ALSIN)” in 2023. The main objective is to promote collaboration and update on country/regional developments. Meetings are held in in different Asian countries.

ALSIN has organized Roundtable on “Functional Material Research-Application in Asia” and a Symposium on “Application of Multi-omics on Probiotic, Prebiotic and Postbiotic Studies: Safety, Functionality and Precision Health”.



◆ **Symposium on Enhancing Functionality of Crops & Improving Nutrition Status Through Gene Editing**

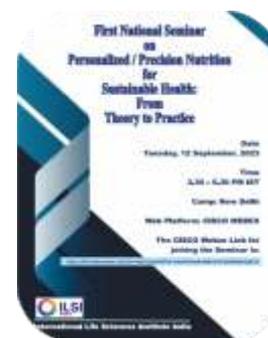
This Symposium discussed how Gene Editing can improve nutritional traits in crops, their safety as also impact on Gut Microbiome, Nutrition Profile and Public Health.

## ◆ First National Seminar on Personalized / Precision Nutrition for Sustainable Health –From Theory to Practice

Personalized/ Precision Nutrition is a new upcoming area in Nutrition and many countries are working on it.

This Seminar highlighted the importance of Personalized / Precision Nutrition as a new tool for improving health and recommended that it would become popular if right environment is created. Use of well-designed Clinical Trials, availability of technology for data collection and counselling at affordable price, good infrastructure and availability of trained manpower along with appropriate ethical and legal requirements to protect individual's interest could be part of the strategy to facilitate use of Personalized Nutrition (PN) by the general population.

Presentations can be downloaded from: <https://tinyurl.com/mtazxdss>



## STUDIES & PUBLICATIONS

### ➤ Status Paper on “Role of Probiotics in Promoting Healthy Microbiome for Health and Immunity”

By *Dr. Bani Tamber Aeri*, Institute of Home Economics, University of Delhi and *Dr. Joshita Lamba*, World Bank. Download from: <https://tinyurl.com/2p83dpup>.

### ➤ Survey on “Probiotics and Consumer Perception”

By *Ms. Bhavica Saxena*, University of Washington. Download from: <https://tinyurl.com/2p93vf3n>.

### ➤ Guidance Document on “Scientific Basis for Labelling Claims and Regulations for Probiotics”

By ILSI India Secretariat. Download from: <https://tinyurl.com/bdh6xvze>.

### ➤ Review Article on “Role of Probiotics and Vitamins in Maintaining a Healthy Gut Microbiome: Recent Advances” Published in Indian Journal of Community Health

By *Dr. Bani Tamber Aeri*, Institute of Home Economics, University of Delhi. The article can be viewed at: <https://tinyurl.com/2p8s54k5>.

### ➤ Monograph on “Nutritional Benefits of Enriching Dairy Foods with Probiotics”

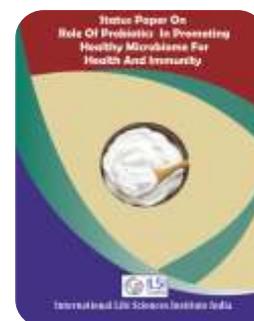
By *Prof. (Dr.) Jashbhai B. Prajapati*, Anand agricultural University. Download from: <https://tinyurl.com/mpksztpv>.

### ➤ Report on “Bioactives and Functional Foods- Safety, Benefits and Challenges”

By *ILSI India Secretariat*. Download from: <https://tinyurl.com/23pbha68>.

### ➤ Concept Paper on “Best Practices for Ethical Conduct of Human Intervention studies for Novel Food/ Ingredients/ Processes/ Technology/ Claim Substantiation”

By *Dr. B. Sesikeran*, Chairman, K-FFIG, ICMR-National Institute of Nutrition. Download from: <https://tinyurl.com/2hwf8n86>.



➤ **Monograph and Executive Summary on “Risk Assessment of Vitamins, Minerals & Bioactive Compounds”**

By *Dr. K. Bhaskarachary*, ICMR - National Institute of Nutrition & *Dr. V. Sudershan Rao*, ICMR - National Institute of Nutrition. Download from: <https://tinyurl.com/4wvzm3bx>. Can be procured from ILSI India.

➤ **Monograph on “Scrolling to Health: Evaluating Nutrition Guidance on Social Media - An Update from Students”**

By *ILSI India Secretariat*. Download from: <https://tinyurl.com/r9c2w7k6>.

➤ **Monograph on Systematic Review and Meta-Analysis of “Nutrition, Lifestyle and Brain Health: A Lifecycle Approach”**

By *Dr. Seema Puri*, Former Professor, Department of Food and Nutrition, Institute of Home Economics, University of Delhi. Download from: <https://tinyurl.com/as2kc5uz>.

➤ **Monograph on “Micronutrient Levels in COVID-19 Patients –Systematic Review of Hospitalized Patients”**

By *Dr. Swati Jain*, Lady Irwin College, University of Delhi. Download from: <https://tinyurl.com/22s2r6ac>.

➤ **Study on “Efficacy of Nutraceuticals (Probiotics or Prebiotics or Synbiotics) in the Prevention or Treatment of COVID -19: A Systematic review and Meta-Analysis”**

By *Dr. Anju Pradhan Sinha*, Former Scientist Consultant, Division of Reproductive, Maternal and Child Health, Indian Council of Medical Research Hqrs, New Delhi.

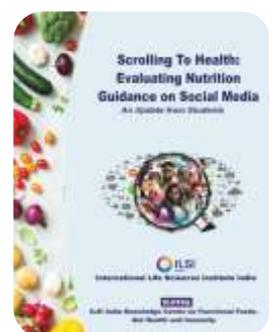
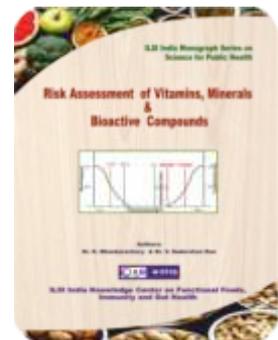
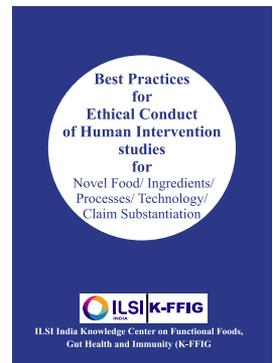
Review Article on “Efficacy of Nutraceuticals (Probiotics or Prebiotics or Synbiotics) in the Prevention or Treatment of COVID -19: A Systematic Review and Meta-Analysis” Published in Journal of Cogent Food & Agriculture. View from: <https://tinyurl.com/mrxjus5t>.

➤ **Study on “Dairy Products Consumption and Risk of Incident Type 2 Diabetes Mellitus (T2D): A Systematic Review and Meta-Analysis”**

By *Mrs. Sudha Vasudevan*, Sr. Scientist & Head, Department of Foods, Nutrition & Dietetics Research, Madras Diabetes Research Foundation, Chennai.

Review Article on “Effect of Milk and Cultured Milk Products on Type 2 Diabetes: A Global Systematic Review and Meta-analysis of Prospective Cohort Studies” Published in Journal of the Indian Institute of Science.

View from: <https://tinyurl.com/4bk9s3ep>.



➤ **Systematic Review and Meta-Analysis of “Nutrition, Lifestyle and Brain Health: A Lifecycle Approach”**

By **Dr. Seema Puri**, Former Professor, Department of Food and Nutrition, Institute of Home Economics, University of Delhi. This study has looked at Gut Brain Axis.

Review article on “Nutrition and Cognitive Health: A Life Course Approach” Published at *Frontiers in Public Health*, section Aging and Public Health.

The article can be viewed at: <https://tinyurl.com/wyz23zyh>.

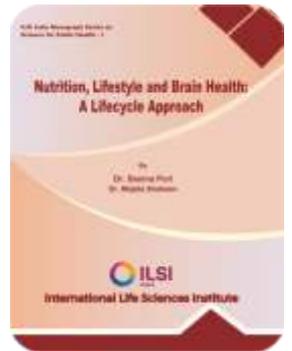


➤ **Study on “Nutritional Benefits of Enriching Dairy Foods with Probiotics”**

By **Prof. (Dr.) Jashbhai B. Prajapati**, Anand agricultural University.

Review Article on “Use of Probiotics for Nutritional Enrichment of Dairy Products” Published in *Functional Foods in Health and Diseases Journal*.

View from: <https://tinyurl.com/2p9xprrs>.

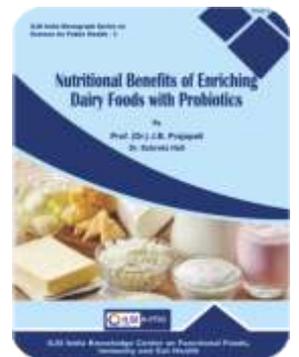


➤ **Study on “Non-Nutritive Sweeteners and their Role in Insulin Regulation and Related Metabolic Factors: A Systematic Review”**

By **Dr. Pulkat Mathur**, Professor and Head, Department of Food and Nutrition and Food Technology, Lady Irwin College, Delhi University. This study has looked at the impact on Gut Microbiome.

Review Article on “Effect of Non-Nutritive Sweeteners on Insulin Regulation, Glycemic Response, Appetite and Weight Management: A Systematic Review” Published in *Journal of Nutrition and Food Science*.

View from: <https://tinyurl.com/mvd4pa>.



➤ **“Systematic Review on Postbiotics”**

By **Dr. Prakash M. Halami**, CSIR- Central Food Technological Research Institute and **Dr. Jai Kumar Kaushik**, ICAR-National Dairy Research Institute.

➤ **Guidance Document on “Use of Traditional Knowledge in Scientific Evidence-Based Novel Foods and Ingredients”**

By **Dr. Harsha Hegde**, ICMR- National Institute of Traditional Medicine and **Dr. Banappa S Unger**, ICMR- National Institute of Traditional Medicine.

## K-FFIG WEBSITE

Details about activities, Information on Data Resource Center can be accessed from: <https://www.ils-india.org/kffig.htm>



## **\*\* ABOUT ILSI India**

Set up in 1997, ILSI India is an Entity of the International Life Sciences Institute (ILSI), headquartered in Washington DC., USA. ILSI Federation includes 10 Entities across the Globe totally devoted to promoting collaborative science for safe, nutritious & sustainable foods.

ILSI India provides scientific inputs and secretariat assistance to the South Asian Region. It has headquarters in New Delhi. It is a scientific, non-profit organization.

ILSI India designs programs to foster multi-sector collaboration for conducting, summarizing, and disseminating science related to most pressing health issues in the region. ILSI strategy encourages global action on identifying and then resolving outstanding scientific questions in the three thematic areas that capture the core of ILSI/ ILSI India's work: Diet and Nutrition, Food Safety, Food Sustainability. They also help elucidate new opportunities for driving scientific progress. All activities follow Principles of Scientific Integrity which are part of ILSI Mandatory Policies.

ILSI India has been in the forefront of activities in India and other countries in the SAARC region. Focus Areas of Scientific Work for promoting Health and Wellbeing include:

- **Micronutrient Fortification of Food.**
- **Nutrition and Health for All.**
- **Lifestyle for improving Health and Environment.**
- **Improving Food and Water Safety.**
- **Building Agriculture Sustainability.**
- **Enhancing Food and Nutrition Security.**
- **Healthy Aging.**
- **Exploring New Frontiers of Science – Brain Health, Gut Microbiome, Nutritional Diagnostics, Personalized Nutrition, Food Processing Technologies, New Plant Breeding Technologies, Nanotechnology, Nutritional Diagnostics, Personalized Nutrition and Bioactive Molecules.**
- **Climate Change and its impact on Food and Nutrition Security and Water Availability and Food Safety.**

More information can be downloaded from: <http://www.ilsi-india.org>

## **CONTACT US**

If you are interested to learn more about our programs, or how you or your organization can participate as a partner, please contact us:



**ILSI India K-FFIG**

C-39, Ground Floor, Lajpat Nagar III  
New Delhi-110024, India

Tel: 91-11-29848752, 29843478, 41654760

Email: [info@ilsi-india.org](mailto:info@ilsi-india.org) Website: <http://www.ilsi-india.org>

