

FoodPro

July - September 2023

Food Processing
Nutrition
Innovation
Value Addition
Traditional Foods
Food Machinery Shelf Life
Food Quality Nutraceuticals
Centre of Excellence
Pre & Probiotics PMFME
Skill Development
Technology Transfer
Incubation



One Week One Lab
Program



One Week One Lab
Program



ಸಿ.ಎಸ್.ಐ.ಆರ್.-ಕೇಂದ್ರೀಯ ಆಹಾರ ತಾಂತ್ರಿಕ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು
सीएसआईआर-केन्द्रीय खाद्य प्रौद्योगिक अनुसंधान संस्थान, मैसूरु
CSIR-Central Food Technological Research Institute, Mysuru

(Council of Scientific & Industrial Research)
Mysuru - 570 020



Shri Narendra Modi

Hon'ble Prime Minister & President, CSIR



Dr. Jitendra Singh

Hon'ble Minister of State
(Independent Charge)
for S&T & Vice President, CSIR



Dr. N. Kalaiselvi

Director General, CSIR &
Secretary, DSIR



Dr. Sridevi Annapurna Singh

Director, CSIR-CFTRI

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ಆಹಾರ ಸಂಶೋಧನೆಯ ಸಂಶೋಧನಾ ಸಂಸ್ಥೆ

एक सप्ताह एक प्रयोगशाला
खाद्य अनुसंधान महोत्सव

ONE WEEK ONE LAB

Celebrating Food Research

July 03 - 07, 2023

ಸಿ.ಎಸ್.ಐ.ಆರ್.-ಕೇಂದ್ರೀಯ ಆಹಾರ ತಂತ್ರಜ್ಞಾನ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು - 570020, ಭಾರತ
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CSIR-CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE, MYSURU-570020, INDIA

CONTENTS

Research Highlights	3	Entrepreneurs' Speak	5
IPR in the Horizon	4	Events	6 - 14
New Technologies	4	Visitors	14
Technologies Transferred	5	Selected Publications	14
Short Term Training Programmes	5		

Research Highlights

Utilization of by-products of wheat milling industry for the development of biodegradable plates

The current global consumption of plastics is over 200 million tonnes, and an estimated growth is about 5% annual. Since it does not decompose, the disposal of plastic is a major concern. The fast-food suppliers are being criticised for using of disposable tableware made of plastics, such as styrene, and the voluminous production of waste results therefrom. Despite wheat bran being a good source of dietary fiber (DF), antioxidants, B vitamins and minerals, only about 10% of it is used in the food industries as fibre source in bakery, fried foods and breakfast cereals. The current research focused on production of edible plates as a substitute to non-biodegradable disposable plates, utilizing wheat industry by- products. The edible plates were prepared using different combinations of wheat bran and resultant atta in different ratios viz., WB, 90:10 (WR10); 80:20 (WR20), 70:30 (WR30). Farinograph data showed that higher the bran content, will be the water absorption. The doughs from the blends were prepared with water at two different temperatures (100°C & 27°C), sheeted, moulded and baked. Plates produced from WR10,20,30 were analysed further and based on break test, leak test and sensory, WR30 was chosen as the best. WR 30 was found to leak at 23.01 ± 0.24 minutes with hot water and 85.42 ± 0.11 minutes with water at room temperature. Moisture, ash, fat, protein, and total dietary fibre content was 4.3 ± 0.016 , 4.90 ± 0.08 , 3.86 ± 0.075 , 16.06 ± 0.082 and 26.92 ± 0.166 , respectively. Shelf-life predicted for plate was 250-285 days based on MSI studies.

(Rana, A., Dogiparthi, O., Sakhare, S.D. et al. Study on the utilization of by-products of wheat milling industry for the development of biodegradable plates. J Food Sci Technol 60, 2042–2049 (2023).

Micro perforation based smart label to guide freshness of pasteurized milk packet

Monitoring the freshness of packed pasteurized milk packet is a challenging task in dairy industry particularly in developing countries due to improper handling during processing, transportation and storage. Thus, use by date on label can't be a reliable one. In this circumstance colour code-based Time Temperature Indicator (TTI) in the form of label which is with on time activation can be attractive option for consumer appeal. In these studies, we have developed a micro-perforation-based TTI label that can insightful to monitor the freshness/spoilage of the pasteurized milk packet. The developed sandwiched TTI with indicator paper can activate with optimized activator liquid (lactic acid) which is sensitive to time-temperature, thus changes in colour (Green to red via orange) of indicator that can be easily visualised. To see the feasibility first we have understood spoilage at various storage conditions, for quality parameters & milk, such as pH, COB, % TA and microbial load. These were used to estimate the shelf life of milk at storage conditions of 4 ± 1 , 27 ± 2 and 37 ± 4 °C. For implementation of TTIs, E_a of developed TTI co-related with E_a of spoilage of pasteurized packed milk and found that 0.15 M active solution was required for activation. The salient features of the proposed TTI are easy activation, consumer friendly and cost-effective solution to monitor quality/freshness of packed milk packet. Thus, developed TTI can be impactful to monitor the freshness of packed milk and ultimately help to reduce losses of milk.

(Pawde S.V., Chaudhari S.R., Matche R.S. Micro perforation based smart label to guide freshness of pasteurized milk packet. Food Control. 2023; 151:109783)



Graphical representation of the work

IPR in the Horizon

- A Flavoured Sugar Composition with Natural Essential Oil and Food Colourant and Process for Preparation thereof. Nagarajan, S, Shivakumar, L, Anil Kumar, K. 11-May-2023, No.202311033470.

- Eco-Friendly Oxygen Scavenger Containing Food Grade Catalyst and Process for Preparation of the same. Matche R S, Sachin Rama Chaudhari, Subhash Vishwanath Pawde, 16-Aug-2023, No.202311057427.

New Technologies

Freshness Keeper Paper for Cut flowers- A paradigm shift

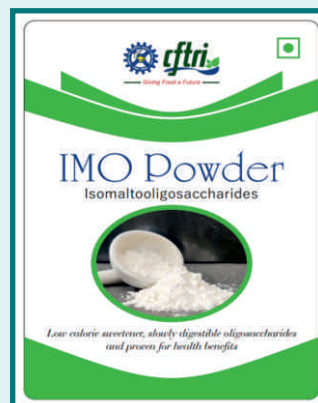
Paper-based freshness keeper, a patented technology developed by CSIR-CFTRI is a simple, chemical-free design to keep cut rose flowers fresh during transport and storage, without disturbing the protocol of cut rose flowers. Freshness keeper paper can be wrapped with direct contact with rose flower petals that helps to enhance fresh-cut rose flower quality and shelf life by 2 fold. Increase in shelf life impacts transportation and cold supply chain, helping export.



Process for the production of transglycosylating α -glucosidase using novel fungal strain

Isomaltooligosaccharides (IMO) are oligosaccharide mixture consisting of slowly digestible and non-digestible components which serve as an alternative (lower calorie) sweetener and bulk filler in the food sector. During the industrial production of IMO, a key enzyme, transglycosylating α -glucosidase serves as a processing aid along with other starch degrading enzymes. In this process, the production of

transglycosylating α -glucosidase has been established using a fungal fermentation platform. The strain belonging the *Aspergillus spp.* is safely deposited and can be procured from the culture collection centers (NCIM and MTCC). Also, the medium is starch based (tapioca or potato starch) with optimal salt and mineral composition. The process technology for transglucosylating α -glucosidase is divided into upstream and downstream processing. The upstream primarily involves rejuvenation of fungal culture and preparation of inoculum (10%) for the production scale. Here, the fermentation process is established at 100 L scale. The medium has been mathematically optimized for increased α -glucosidase. The operational parameters such as RPM, pH, agitation and aeration have been optimized for improved enzyme production. After harvesting, the culture broth undergoes series of downstream processing. This enzyme powder can be used as the processing aid for production of isomaltooligosaccharides. The fungal genome has been checked for presence of toxin synthetic gene clusters (in-silico) and also the fungal broth has been evaluated in-vitro for the aflatoxin release. From both these studies it has been demonstrated that the fungus does not produce any toxins. The fungal spores were tested for safety using in-vivo animal studies. The analysis of waste water from the UF unit showed that the BOD and COD levels are within



the prescribed limits and heavy metals are below detection limits. The enzyme is stable in the lyophilized

powder for more than a year when stored at 4 °C.

Technologies Transferred

- Doly mix (Saptagiri Orange Family Restaurant, Kalaburagi)
- Shelf stable Jowar flour (Shri Manjunath Dall Industry, Kalaburagi; M/s Buhler (India) Pvt. Ltd., Bengaluru)
- Tomato products: preparation (Sri Manjunatha Enterprises, Kolar)
- Layered parotta (South Indian) (K P C Food Enterprises, Kerala)
- RTS fruit juices and beverages (Pulppio Industries, Ahmedabad; Mrs. Chaitra B N, Hassan)
- Eggless cake premix (Mr.Rajiv Chawla, Mumbai)
- Fermented and dehydrated ready mixes for idli/dosa batter (Adithyaa Ram Industries, Dindigul)
- Instant upma mix from millets and multimillets semolina, Instant halva mix from millets and

multimillets semolina, Instant rava mix from millets and multimillets semolina (Jainum Food & Waste Projects Pvt.Ltd, Dewas)

- Coffee concentrate (Hatti Food and Beverages Pvt. Ltd.,Bengaluru)
- Preparation of shelf stable roti from non-wheat cereal and millet (Ragi, Rice, Maize, Jowar, Bajra) (Indian Delicious Foods, Hubballi)
- Egg wafers, preparation of ready to eat shelf stable egg crunchy bite (Mr. Nithesh Narayana Reddy, Bengaluru)
- Preparation of protein, vitamin and mineral fortified chikki (KL Food Processors, Andhra Pradesh)
- Preparation of ready to cook multigrain whole mix for drink/porridge (Mamma mills, Nanjangud; Mrs. S Renuka Devi, Bengaluru)
- Chikki/Nutra chikki (3 formulations) (Durga Agro Foods, Bengaluru)

Short Term Training Programmes Scheduled (Oct-Dec, 2023)

- Spices and Flavours: Current Trends in Processing, Formulations and Quality Evaluation (Oct 9-13, 2023)
- Nutri-Cereal Process and Products Technology (Nov 6-10, 2023)
- Sensory Analysis – an Approach to Consumer Preference (Nov 13-15,2023)
- Fundamentals of Food Analysis for Process Hygiene

and Microbial Food Safety Criteria (Nov 20-24, 2023)

- Development of Pour Over Millet Beverage and Curd through Probiotic Bacteria (Nov 20-23, 2023)
- Overview of Food Packaging Materials and their Applications (Nov 22-24, 2023)
- Extraction and Quality Assurance of Edible Fats and Oils (Nov 29-Dec 1, 2023)
- Fumigation, Prophylaxis and Pest Management Techniques for Stored Food Commodities (Dec 1-15, 2023)

Entrepreneurs' Speak

About Our Company

At ESSKAY FRUITS AND FLAVOURS PRIVATE LIMITED we take immense pride in manufacturing premium Tamarind Concentrate, which forms a core part of our product range. We are committed to offer high-quality natural products to our consumers. Our Tamarind Concentrate is known for its rich flavor, deep color, and versatility in various culinary applications. It has been an favourite ingredient for chefs and food manufacturers seeking the finest tamarind-based solutions.

Our Brand

Under our brand, ESSKAY NATURAL provide Tamarind Concentrate and Powder, meeting the growing demand for authentic, natural flavors.

Vision & Mission

Our vision is to become a trusted brand for fruit packers and suppliers, ultimately achieving market leadership in Indian Agricultural products through fruit export while prioritizing human health. Our mission is to supply the highest quality fresh, natural, and organic Agricultural products directly from the farm, with an unwavering commitment to maintain purity of our offerings. We take pride in ensuring that our Tamarind products contain no added preservatives, aligning with our mission to

provide products that contribute positively to health.



New Collaborations

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Hyderabad (July 6, 2023)

The MoU signed between CSIR-CFTRI and ICRISAT aims to develop co-operation and collaboration in research and development in the areas of nutrition, agro-food processing and value addition. The focus would be on nutritious and climate resilient crops such as millets pulses etc., towards promoting food system transformation, especially among smallholder farming communities.

Indian Institute of Technology, Delhi (IITD) (July 18, 2023)

The Memorandum of Agreement was signed with IITD to undertake a project entitled “Analytical Quality Control and Quality Assurance in Rice Fortification”.

Advice to Emerging Startups

To emerging start-ups, we strongly recommend tapping into the valuable resources and opportunities provided by institutions like CSIR-CFTRI. These collaborations can be transformative and instrumental in achieving success.

Jan Swasthya Sahyog (JSS), Bilaspur, Chhattisgarh (August 1, 2023)

The collaboration will promote social entrepreneurship for livelihood generation in the area of millets and other cereals and enable and sustain the value chain of farmers and SHGs.

JSS College of Arts, Commerce & Science, Mysuru (September 13, 2023)

CSIR-CFTRI to assist in organising training programmes for supporting the academic programmes of both B.Voc and M.Voc courses with customised topics and to provide knowledge-based support to the academic programmes of JSS Institute, Mysuru.



Events



One Week One Lab Program (OWOL) - (July 3-7, 2023)

The “One week One lab (OWOL)” campaign stands as an ambitious initiative by the Government of India, encompassing laboratories under the Council of Scientific and Industrial Research (CSIR) to actively engage with the public. Its purpose extends beyond showcasing innovative technologies; it aims to ignite the minds of young innovators, students, start-ups, academia and industry professionals, encouraging them to explore the vast potential to deep tech ventures. In line with this nationwide endeavour, CSIR-CFTRI proudly organized the OWOL program, serving as a

platform to promote and exhibit cutting-edge research, advanced technologies, expertise and state-of-the-art facilities in the dynamic field of Food Science & Technology. Through this program, CSIR-CFTRI strived to raise awareness, foster collaboration among diverse stakeholders and facilitate the exchange of ideas, ultimately driving innovation within the food industry. CSIR-CFTRI showcased its journey of 72+ years existence during the OWOL campaign.

Curtain Raiser event

CSIR-Central Food Technological Research Institute, Mysuru, celebrated the “One Week One Lab” (OWOL) campaign from July 3-7, 2023 which was initiated with a curtain raiser event held at CSIR-CFTRI on June 20th,

2023. Dr. N. Kalaiselvi, Director General (DG), CSIR & Secretary, DSIR addressed the staff and students on this occasion unveiled the OWOL logo and released the brochure. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI welcomed the gathering and spoke about OWOL campaign and its objectives. The Chief Guest and dignitaries launched the Recruitment Software developed by CSIR-CFTRI. Director General, CSIR also visited various facilities, products display and posters venues, and interacted with staff and students.

In her address DG-CSIR stated that CFTRI has developed nearly 700 technologies over the years. In her address, the DG of CSIR stated that CFTRI has developed and transferred over 700 technologies over the years. She also stated that CFTRI-developed idli and dosa batter technology and "One Week One Lab" initiative has been planned in such a way that the CFTRI's research achievements can be effectively highlighted. She stated that the "One Week One Lab" initiative has been planned in such a way that the CFTRI's research achievements can be effectively highlighted.

This event organized during July 3-7th, 2023 served as a platform for showcasing Institute's (CSIR-CFTRI) cutting-edge research, technologies, expertise, and facilities in the field of Food Science & Technology. With a theme of "Celebrating Food Research," the campaign was aimed to ignite the minds of young innovators, students, start-ups, academia, and industry, encouraging them to explore opportunities through deep tech ventures. The week-long campaign showcased the diversity and depth of CSIR-CFTRI's research since 1950 and expertise in the field of Food Science & Technology through a series of sessions, panel discussions, interactive programs, culinary show, open day, expo and poster presentation competition with a focus on "Research, Innovations, and Sustainability in Food Science and Technology." The competition was divided into different categories for participants to present their innovative work. Each day was dedicated to a specific theme, providing participants with valuable insights, networking opportunities, and a glimpse of food science and technology world.

The inaugural event was held on July 3rd, 2023. His Highness Shri Yaduveer Krishnadatta Chamaraja Wadiyar, the 27th and current custodian of erstwhile Kingdom of Mysore was the Chief Guest on this occasion. Guests of Eminence, Dr. Ashok Dalwai, CEO of National Rainfed Area Authority (NRAA), Ministry of Agriculture and Farmers Welfare, in the rank of Secretary, Govt. of India, Chairman of Inter-Ministerial Committee on Doubling Farmers' Income, former

Directors of CSIR-CFTRI Padmashree Dr. Vishweshwaraiah Prakash & Distinguished Scientist CSIR and Dr. S.R. Bhowmik, as well as Dr. Sridevi Annapurna Singh, current Director of CSIR-CFTRI were present. In the inaugural address, His Highness Shri Yaduveer Krishnadatta Chamaraja Wadiyar emphasized the importance of innovation in nutritious and high-quality foods, particularly indigenous foods and praised CSIR-CFTRI's contributions to the nation. Dr. Ashok Dalwai emphasized the need for science of delivery rather than science of discovery.



A poster session on innovation in food science and technology for "Start-ups" was organized with 12 start-ups from different parts of the country presenting their work and displaying innovative food products.

Four CSIR-CFTRI products were launched during the event, which included Baker's Yeast, Freshness Keeper Paper, SeaSlim, and Arabinoxylan (soluble and insoluble) from wheat bran.



There were two talks by eminent speakers including Dr. Vishweshwaraiah Prakash, former Director of CSIR-CFTRI and distinguished Scientist, CSIR and Mr. Anand Chordia, Director, Technology and Innovation, Suhana Spices, Pune. Dr. Prakash highlighted the importance of quality in the food processing and the need for training to enter domains without compromising the basics. He suggested vertical growth in the field itself to improve agricultural produce yield. Mr. Chordia spoke of his learnings in food industry and importance of circular economy and carbon footprint reduction.

This was followed by investment pitches for food

processing, featuring seven entrepreneurs and five investors. The event showcased diverse pitches ranging from product development to food packaging and millets-based innovations.

Another session on the first day focused on the start-up ecosystem, with six panellists discussing funding opportunities, mentorship, networking, and the role of incubators in supporting start-ups. They emphasized the importance of innovation, scalability, market readiness, commercialization, and accessing resources. The government's role in supporting start-ups through funding programs and policy initiatives was highlighted.

The second day of the OWOL program (4th July 2023) focused on "Women Self Help Groups and Farmer Entrepreneurship," and was inaugurated by Dr. Soumya Swaminathan, Chairperson, M.S. Swaminathan Research Foundation and former Chief Scientist, World Health Organization (WHO). She emphasized the importance of nutrition education in schools and the integration of agriculture, health, and climate change sectors to ensure holistic health. She also spoke about the importance of returning to traditional food practices, conservation of seeds, and promoting tribal income. Dr. Mallela Venkateswara Rao, IAS, Chairperson of the West Bengal Electricity Regulatory Commission, emphasized the initiatives to promote secondary agriculture practices.



Culinary contest was organized on July 4th and 6th, 2023, recognizing Mysore's diverse culinary dishes and promoting the institute's link to the Heritage City. The contests were open to all and featured two themes: traditional foods with modern twists or fusion foods, novel dishes with millets, and fireless cooking. The contest was held in two rounds, with the top three dishes selected by a team of judges.

The session titled "SHG/FPO focus," featured a keynote address by Mr. Kurubur Shanthakumar, a prominent farmer leader, emphasizing the empowerment of farmers as a key driver of national development and contributing to economic and societal well-being. The keynote speaker, Dr. Anura V. Kurpad, Head of

Physiology, St. John's Medical College, Bengaluru, emphasized the importance of holistic nutrition and the need to focus not only on proteins, but also on fats as part of wholesome foods.

The final session of the day focused on "Supplementary Foods for Women and Child Development," featuring esteemed panellists from diverse backgrounds. The session concluded with remarks by Director, CSIR-CFTRI, detailing institute's contributions to overcome malnutrition in the country and its future role in meeting the nutritional needs of the nation's population through supplementary foods. Overall, the day served as a platform to celebrate women's contributions, encourage collaboration, and promote the integration of traditional knowledge with modern technologies in the pursuit of holistic health and societal well-being.

Poster sessions on the day focused on Self Help Groups, with 15 posters being presented. Three poster on cashew vinegar production, mycelium-based ingredients for plant-based meat applications, and a social business initiative received best poster award.

Three gluten-free products developed by CSAIR - CFTRI were launched viz., Buckwheat-based cake mix, Spice bread, and Gluten-enriched Rusk on the second day.

The third day of the campaign July 5th, 2023 aimed at engaging students and the general public in the field of Food Science and Technology. It featured various programs and sessions aimed at inspiring and educating the younger generation. The JIGYASA student-scientist connect program included 97 students and 10 teachers from Kendriya Vidyalaya Schools (KVS) – Mandya, Chamarajanagar, Mysuru, BRBNMPL (RBI), and CFTRI Mysuru, school. The program was inaugurated by Chief Guest Dr. Chindi Vasudevappa, former Vice-Chancellor of NIFTEM, Haryana. Dr. Sridevi Annapurna Singh, Director CSIR-CFTRI, interacted with the young minds and encouraged curiosity and scientific exploration. Innovative posters were displayed, showcasing the creativity and potential of the young minds.



A session on "Students Meet Scientists" featured experts like Dr. Chindi Vasudevappa, Mr. K.S.V.A.S. Sharma, Dr. Suresh Bhamidi, Dr. Obul Reddy Bandapally, and Prof. Jamuna Prakash. They interacted with students, sharing knowledge & experiences, and fostering curiosity.

"Eat Right India Movement session," emphasized the importance of promoting healthy eating habits and food safety practices. Dr. Sachdev Meenakshi, Chief Dietitian, spoke on the importance of millets as a healthy and sustainable food source. Experts from Food Safety and Standards Authority of India (FSSAI) delivered talk and interactive session, highlighting the benefits of incorporating millets into the diet and their role in ensuring food security and nutritional well-being.

The third day concluded with the "Eat Right Walkathon 2023," flagged off from Chaluvamba Mansion by dignitaries. About 500 participants, including staff and students, walked 2-3 km in CSIR-CFTRI campus holding placards on importance of millets and eat right habits. Overall, the day provided a platform for students to engage with scientists, learn from experts, and showcase their research.



Two products viz., Quinoa germ production and Glucose amla beverage mix of CSIR-CFTRI were released on 3rd day of the programme.

The fourth day of the campaign July 6th, 2023 focused on the importance of millets in promoting sustainable and nutritious food. The event featured activities and discussions on millet research, health benefits, and their potential in addressing malnutrition and lifestyle diseases. The event was lauded by Shri. Pratap Simha, Hon'ble Member of Parliament, Mysore- Kodagu constituency and conveyed his best wishes for the programme. Eminent experts including Dr. Rekha Singhal, Chairperson of Research Council, CSIR-CFTRI and Dr. KSMS Raghavarao, former Director, CSIR-CFTRI delivered insightful lectures on traditional foods and food engineering aspects and also emphasizing their importance. The Food Expo, showcased the diverse range of innovative solutions developed by CSIR-CFTRI in the millet sector. MoU was

signed between CSIR-CFTRI and Dr. Jacqueline d'Arros Hughes, Director General International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), aiming to undertake joint research activities focused on value addition to dry land crops (millets and pulses), ultimately promoting food and nutritional security in dry lands.

The dignitaries inaugurated drones shows by NAL Octa-Med and NAL Octa-Agri, created by CSIR-National Aerospace Laboratories (NAL), Bengaluru.



The CSIR-CFTRI Licensee meet was held to foster collaborations and partnerships between CSIR-CFTRI and industry players in the food sector. Dr. R. Subramanian, Former In-charge Director, CSIR-CFTRI moderated the second session of the meet. Experts such as Dr. Abhay Anant Pashilkar, Director, CSIR-NAL, Mr. Ananta Padmanab from Bigbasket, Dr. Akanksha Jain from NRDC New Delhi, Dr. Ashish Ranjan from Flipkart, Shri M. P. Banthanal from KAPPEC, and Dr. Reeba Abraham from APEDA participated in the meet.

Panel discussions on millets were held with participation from NGO-Sahaja India, students, faculty, and budding entrepreneurs, discussing various topics related to millet research, entrepreneurship, and also addressing nutritional challenges.

Academia-industry session focused on fostering collaboration and knowledge exchange between academia and industry. Dr. Ajit Kumar Shasany, Director CSIR-NBRI, Lucknow highlighted the diversity of CSIR competencies for industry needs and the need for a culture of collaboration. Dr. Prabodh Kumar Trivedi



stressed the importance of good basic science in institutions and strengthening the CSIR S&T culture. Dr. Kannan Srinivasan stressed the benefits of CSIR and the diversity of CSIR S&T culture. Dr. J I X Antony discussed about bench-marking of CSIR products for global needs, while Dr. Dilip Kulkarni discussed the need for more lectures to strengthen academic programs. Rajneesh Kumar discussed effective collaboration between CSIR-CFTRI and UPL, while Sam Cherian Kumbukattu discussed capacity building and industry relationships. The “Culinary Clash” event combined traditional flavours with modern culinary techniques, showcasing the versatility of millets in culinary creations.

The Millet Research, Product Development, and Entrepreneurship Exhibition showcased 30 innovative posters on millets, highlighting their potential in addressing nutritional challenges and promoting sustainable food systems. The Food Expo showcased CSIR-CFTRI Licensees' stalls, offering information on innovative technologies and their relevance to entrepreneurship.

The two-day “Open Day” attracted around 8500 visitors, including school students and the general public, who enjoyed the exhibits. Notable exhibits included a hand-operated jowar roti-making machine, a mobile millet processing unit, Dosa making machine, and carbonated fruit juice unit. The mobile processing unit also showcased CSIR-CFTRI's activities and technologies to farmers, SHGs, and FPOs.



Eight new CSIR-CFTRI products based on millets were launched on the 4th day. This included Instant finger millet upma mix, little millet puttu podi, ragi-based ready to eat weaning food, finger millet semolina, instant finger



millet rawa idli mix, instant finger millet kichadi dal, instant finger millet halwa, and ragi-based malt hydrolysate.

The final day of the campaign July 7th, 2023 celebrated the contributions of CSIR-CFTRI alumni and the intersection of AI and food science, emphasizing the importance of Ayurvedic food for holistic health. The event began with an alumni function of MSc (Food Tech.) course of CSIR-CFTRI, where Dr. Dilip Kulkarni, President of Jain Irrigation Systems Limited, was the Chief Guest. The Golden Jubilee and Silver Jubilee alumni of MSc (Food Tech.) course of CSIR-CFTRI were honoured for their achievements. Dr. Dilip Kulkarni received the outstanding Alumnus award 2023.



The robots exhibited by Holoworld and Holosuit were inaugurated by Shri Jitendra J Jadhav, Director, ADA & Programme, Director (Combat Aircraft), Ministry of Defence, Former Director, NAL, Dr. G. Narahari Sastry, Director, CSIR-NEIST, Jorhat, Dr. Sridevi Jade, Head, CSIR-4PI, Dr. Meenakshi Singh, Chief Scientist, Head, Technology Management Directorate, Dr. C. Janaki Associate Director, C-DAC and Dr. Sridevi Annapurna Singh, Director CSIR-CFTRI. The robot exhibition attracted school children and the experts addressed their queries.



Dr. R.S Sodhi, former MD, Amul and President, Indian Dairy Association, provided valuable insights into the dairy industry and its advancements. He emphasized the challenges faced by the industry and appreciated CSIR-CFTRI's contribution in the development of infant milk powder, which earned nearly 3000 crore revenue

for AMUL. The panel discussion on Artificial Intelligence (AI) and Natural Language Processing in the food industry focused on the challenges faced by the industry, AI techniques & need for AI-based technologies for food processing, smart farmer investment, and quality assurance. The panel also suggested initiating a nodal FT-AI Hub in collaboration with other CSIR, ICAR, and start-up industries.

The panel discussion on the application of Artificial Intelligence in Food Science and Technology focused on various aspects of AI, including its role in industry 4.0, food product categorization, high-performance computing (HPC) facilities, natural language processing, and data intelligent utilization. Dr. G. Narahari Sastry, Director, CSIR-NEIST highlighted the need for AI algorithms and technologies for food sector empowerment and income generation. Dr. Sridevi Jade highlighted the need for food product categorization, while Dr. C. Janaki highlighted the need for high-performance computing facilities and natural language processing for labeling, grading, packaging, and supply chain management. Dr. Gopal Krishna Patra highlighted the importance of block chain and physics-based AI in food technology applications. Dr. Suvendu Bhattacharya highlighted the need for genetic algorithms in understanding rheology and food processing. Shri Manilal P. emphasized the need for valid datasets on nutrition aspects of food and their availability for future projects.

The Ayush Ahaar session focused on the integration of traditional Indian medicinal practices in promoting health and well-being. Speakers Dr. Narahari Sastry, Director of CSIR-NIEST, Dr. Sulochana Bhat, and Mr. Vilas R. Shirhatti discussed the importance of Ayurveda, Rasa, seasonal dietetics, food consumption approaches, and FSSAI regulations. The day also featured 17 posters showcasing research and innovations in Alumni contributions, AI, and Ayurvedic food.

The valedictory function was graced by Chief Guest, Dr. K. V. Rajendra, Deputy Commissioner, Mysuru, and Guest of eminence, Mrs. Shilpi Agarwal, Divisional



Railway Manager, Mysuru, Dr. G. Narahari Sastry, Director CSIR-NEIST, Jorhat and Dr. Sridevi Annapurna Singh, Director CSIR-CFTRI. During the valedictory function, OWOL Souvenir was also released. A brief proceeding of OWOL was presented by Dr. Prakash M. Halami, Chief Scientist, CSIR-CFTRI. Later, the dignitaries Dr K. V. Rajendra and Mrs. Shilpi Agarwal and Dr. G. Narhari Sastry appreciated CSIR-CFTRI's contributions to the country as well as its visionary aspects in food innovation and technologies.

Four products developed by CSIR-CFTRI were launched on the last day and it included prawn wafers, chicken wafers, fish wafers, egg wafers, meat wafers, Pandhara Rassa, and Isomaltooligosaccharides powder (IMO).

The "One Week One Lab (OWOL)" campaign was a testament of the institute to the power of knowledge sharing, networking, and collaboration in advancing the field of Food Science & Technology. It served as a platform for budding entrepreneurs, students, researchers, and professionals to connect, learn, and contribute to the ever-evolving landscape of the food industry.

Director, CSIR-CFTRI and CSIR-CFTRI team expressed immense gratitude to all the esteemed guests, panellists, speakers, participants, and organizers who made this event a resounding success. It was opined that the knowledge gained, connections formed, and inspiration ignited during the campaign will continue to drive innovation, empower entrepreneurs, and contribute to a sustainable and healthier future in the field of food science and technology.

Rashtriya Boudhik Sampada Mahotsav (July 2023)

As part of Rashtriya Boudhik Sampada Mahotsav, IP Awareness Programmes were conducted by CSIR-CFTRI at different venues in Mysuru.

- GSSS Institute of Engineering & Technology on 14th July, 2023 with participation of 400 students.
- JSS Arts and Science College on July 21st, 2023 for 150 PG Students.
- JSS Medical College on July 24th, 2023 for 100 Medical PG Students.
- CSIR-CFTRI campus on July 24th, 2023 for 200 students from Davangere and Bangalore degree colleges.

IP Awareness Programme was organised as part of Rashtriya Boudhik Sampada Mahotsav workshop on

"IPR for Academia, Researchers & Industry on September 18th, 2023. It was conducted by CSIR-CFTRI under Integrated CSIR Skill Initiative. Various talks were delivered by Resource persons and Scientific staff. Nearly 280 Participants attended the above training programme held in Hybrid mode.

CSIR Integrated Skill Initiative (July 31-Aug 11, 2023)

Short term course was organised on "Development of Pourover Millet Beverage and Curd through Probiotic Bacteria" under CSIR Integrated Skill Initiative during July 31st to August 11th 2023.

Indian Pulp & Paper Technical Association (IPPTA) Zonal Seminar (Aug 3-4, 2023)

Indian Pulp & Paper Technical Association (IPPTA) Zonal Seminar 2023 was held at CSIR-CFTRI during August 3-4th 2023. Director, CSIR-CFTRI & other dignitaries inaugurated the event and released the IPPTA Journal. About 380 delegates participated in the seminar. As part of IPPTA Zonal Seminar, Valedictory Function was held on 4th Aug 2023. His Highness Shri Yaduveer Krishnadatta Chamaraja Wadiyar was the Chief Guest of the function and he distributed Best Paper Awards.



JIGYASA (Aug 11, 2023)

As part of JIGYASA activities, CSIR-CFTRI conducted a Rural Outreach Programme with the theme "CSIR-CFTRI on Wheels" on 11th August 2023 to showcase and disseminate knowledge on food related processes and technologies to school students and teachers. As part of the programme, scientists, technical staff and research students visited Keelanapura Govt. High School, and demonstrated the steps in food processing (tomato processing) involved students and teachers, on a Mobile Food-Processing Unit, developed by CSIR-CFTRI. Dr.

Sridevi Annapurna Singh, Director, CSIR- CFTRI, flagged off the Mobile Food Processing Unit.



Independence Day Celebration (Aug 15, 2023)

As Part of 77th Independence day celebration, Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI hoisted National Flag in front of chaluvamba mansion and also addressed staff and students. She highlighted the achievements of CSIR-CFTRI and the path forward.



Training Programmes (Aug-Sep, 2023)

Training programs on "Post-Harvest Technologies for Fruits & Vegetables" and "Grain Process and its Products for Health & Wellness" were organised during Aug 21st to Sep 1st, 2023 & August 22nd to 26th, 2023, respectively under the aegis of CSIR Skill Initiative. Nearly 75 participants attended the programmes.

Birth Anniversary Celebration of Dr. B R Ambedkar (Aug 30, 2023)

132nd Birth Anniversary celebration of Bharath Ratna Dr. B. R. Ambedkar was held on August 30th, 2023 at CSIR-CFTRI. Justice H.N. Naga Mohan Das, Former Judge, High Court of Karnataka inaugurated the event and Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function. Sri Basvalingaiah, Former Director, Rangayana, Mrs. B.T. Lalitha Nayak, Former

Minister for Kannada Culture, Women and Child Welfare, Govt. of Karnataka were the Chief guests and delivered the special address.



National Nutrition Week Celebration (Sept 1-8, 2023)

As part of National Nutrition Week celebrations, Nutrition Awareness lectures & various competitions were organized by CSIR-CFTRI during Sept 1-8th, 2023. The concluding programme was held at CSIR-CFTRI on September 8th, 2023. Prizes were distributed during the concluding session by Chief Guest Dr. Praveen Kulkarni, Associate Dean, JSS AHER and Dr. P. Vijayanand, Chief Scientist presided over the function.



Curtain Raiser for 9th IFCON (Sep 11, 2023)

Curtain Raiser event of 9th International Food Convention (IFCoN) and IFCON App Launch was held on September 11th, 2023. The 9th edition of IFCoN is



scheduled to be held at CSIR-CFTRI during Dec 7th to 10th, 2023 and is organized by AFSTI and co-organised by CSIR- CFTRI, DRDO-DFRL and CSIR-IITR. IFCON App was also launched on this occasion.

Research Council Meeting (Sep 14-15, 2023)

Meeting of the 11th Research Council (RC) of CSIR-CFTRI was held during September 14-15th, 2023.

Engineer's Day Celebration (Sep 15, 2023)

55th Engineer's Day celebrations was held on September 15th, 2023 on the occasion of 162nd Birthday of Bharat Ratna Sir M.Visvesvaraya. Prof. Rekha Singhal Chairperson, CSIR-CFTRI Research Council, along with other members of RC & Director garlanded the portrait of Sir M V. Dr. Rekha Singhal delivered a talk on this occasion.



Birth Anniversary Celebration of Dr. V. Subramanyan, Founder Director, CSIR-CFTRI (Sep 22, 2023)

Birth Anniversary celebration of Dr. V. Subramanyan, Founder Director, CSIR-CFTRI, was held at CSIR-CFTRI on September 22nd, 2023. The Chief Guest, Dr. N Krishnamurthy (Former Chief Scientist & Head PPSFT department) delivered a talk on "Dr. V. Subrahmanyam A Pioneering Techno Food Scientist".



Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function.

Open Day (Sep 26, 2023)

On the occasion of CSIR Foundation Day 2023, Open day was celebrated at CSIR-CFTRI on September 26th, 2023 with the theme "A day with Food Technologists". Nearly 650 students from various schools and colleges visited CSIR-CFTRI and its facilities. Demonstration of technologies, machineries and analysis techniques

were arranged on this occasion.



Visitors

- Dr. Kishore Sreenivasan, Head, CSIR- URDIP and team visited CSIR-CFTRI to Review of IP Filing activities and interacted with Scientific staff during August 24-25, 2023.
- Denmark delegation consisting of Henrik Casper



Wegener, Rector, University of Copenhagen, Soren Tranberg Hansen, Deputy Head of Mission, Consulate General of Denmark in Bengaluru, Mahesha Manjunatha Poojary, Assoc. Prof. visited CSIR-CFTRI on September 22, 2023 and interacted with Scientific staff pertaining to Indo- Denmark cooperation strategies including funding tools, research opportunities and student mobility.



Upcoming Events

9th International Food Convention (IFCoN) event to be held at CSIR-CFTRI during Dec 7-10th, 2023. The event is organized by AFSTI and co-organised by CSIR-CFTRI, DRDO-DFRL and CSIR-IITR.



Selected Publications

- Kumar Meghana N., Kalarikkal Sreeram Peringattu., Bethi Cathrine M.S., Singh Sukriti Narendra., Narayanan Janakiraman., Sundaram Gopinath M., An eco-friendly one-pot extraction process for curcumin and its bioenhancer, piperine, from edible plants in exosome-like nanovesicles, *Green Chem.*, 2023, 25 (16), pp. 6472–6488. (IF: 9.8)
- Biswas A., Naresh K.S., Jaygadkar S.S., Chaudhari S.R., Enabling honey quality and authenticity with

NMR and LC-IRMS based platform, *Food Chem.*, 2023, 416, art. no. 135825. (IF: 8.8)

- Semwal J., Meera M.S., Modification of sorghum starch as a function of pullulanase hydrolysis and infrared treatment, *Food Chem.*, 2023, 416, art. no. 135815. (IF: 8.8)
- Patel K., Mangu S.R., Sukhdeo S.V., Sharan K., Sesamol improves bone mass in ovary intact growing and adult rats but accelerates bone deterioration in the ovariectomized rats, *J. Nutr. Biochem.*, 2023, 119, art. no. 109384. (IF: 5.6)



9th INTERNATIONAL FOOD CONVENTION (IFCoN)

“TRIMSAFE – Technology Re-engineering for Innovation and Mitigating the risk for a Safe, sustainable Affordable & secure Food Eco-system”.

Dec 7, 2023 - Dec 10, 2023

Venue : CSIR-CFTRI Campus, Mysuru

Organized by



In association with



About 9th International Food Convention (IFCoN) & its Scope and Objectives:

We are pleased to inform that the Association of Food Scientists & Technologists (India), is organizing its “9th International Food Convention (IFCoN) on 7th-10th December 2023” at Mysuru in association with CSIR-CFTRI DRDO-DFRL & CSIR-IITR as a co-organizer. The Theme of the conference is “TRIMSAFE – Technology Re-engineering for Innovation and Mitigating the risk for a Safe, sustainable Affordable & secure Food Eco-system”. The IFCON is planned to have about 30 technical sessions spread over four days and involve about 150 Internationally recognized speakers from research and academic institutes, industry, government, and autonomous bodies; and students from food science and technology institutes across the globe. The conference is expected to fetch about 4000 registered delegates. The 4 four-day mega event is an ideal platform for the deliberation, networking, and the exchange of knowledge and

partnerships between global stakeholders for addressing the issues related to societal outreach, industrial, research and academic collaborations. The mega Food Expo organized during the conference provides a unique opportunity for the manufacturing industry, analytical laboratories, ingredients manufacturers, educational institutes, and various other stakeholders in the field of food to showcase their activities and scope for business and other mutual collaborations.

Organizing an event of this magnitude involves considerable financial support. The conference would provide an opportunity for all stake holders to exhibit their products and present their experiences and also provide for the Local travel and accommodation of invited speakers/delegates who would be the peers in their field.



CSIR-CFTRI Staff & Students with Dr. N. Kalaiselvi, DG-CSIR & Secretary, DSIR during OWOL Curtain Raiser June 20th, 2023

Published by

DIRECTOR
CSIR-CFTRI, Mysuru
director@cftri.res.in

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