

# FoodPro

CSIR - CFTRI Newsletter

April - June 2024



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



ಸಿ.ಎಸ್.ಐ.ಆರ್-ಕೇಂದ್ರೀಯ ಆಹಾರ ತಂತ್ರಜ್ಞಾನ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು  
ಸಿ.ಎಸ್.ಐ.ಆರ್ - ಕೇಂದ್ರೀಯ ಖಾದ್ಯ ಪ್ರೌಢೋಗಿಕ ಅನುಸಂಧಾನ ಸಂಸ್ಥಾನ, ಮೈಸೂರು  
CSIR – Central Food Technological Research Institute, Mysuru

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## Research Highlights

### Unlocking the Potential of Mushroom Waste: An Alternative Non-animal Source of Chitosan for Prebiotic Applications

The growing mushroom industry offers substantial economic opportunities but also grapples with considerable waste, leaving around 20% of mushrooms unutilized. Within this challenge, chitosan, a bioactive polysaccharide, has emerged as a key focus owing to its promising therapeutic properties. This study focussed on extracting chitosan from mushroom waste (MCH) and explored its prebiotic properties. Structural analysis via NMR, FTIR, and XRD revealed key characteristics of MCH; CP/MAS-<sup>13</sup>CNMR highlighted distinct peaks, FTIR showcased typical bands, and XRD identified a notable polymorph. The extracted MCH, averaging 47 kDa with 79% to 84% deacetylation, demonstrated promising prebiotic potential.

Supplementation of MCH (1%) with probiotic strains (*Lactobacillus casei*, *L. helveticus*, *L. plantarum*, and *L. rhamnosus*) showed prebiotic activity scores of MCH ranging from 0.73 to 0.82. MCH enhanced the growth and short-chain fatty acids (SCFA) production by *Lactobacillus* strains, particularly favouring *L. rhamnosus*. Moreover, MCH exhibited anti-pathogenic activity against *Escherichia coli* and *Staphylococcus aureus*. The findings of this study highlight that polysaccharides derived from mushroom waste can be used as potent prebiotics. They could potentially mitigate intestinal dysbiosis and improve gut health. This approach not only addresses environmental concerns but also opens new avenues for enhancing human health through a sustainable resource. Most of the chitosan used currently is of animal origin (crabs and shrimps), and MCH can be an alternative for foods industries catering to vegetarians and vegans.

(Divya Yadav, K.V. Harish Prashanth, Pradeep Singh Negi (2024). Low molecular weight chitosan from *Pleurotus ostreatus* waste and its prebiotic potential. *International Journal of Biological Macromolecules*, 267, art. no. 131419)

### Physicochemical comparison of chitin characteristics in three major stored-product beetle pests: Implications for biofumigant toxicity

Cuticle playing a vital role in insect for the protection of body from various environmental stress. Chitin, a polysaccharide composed of *N*-acetyl-D-glucosamine monomers linked by  $\beta$ -(1-4) bonds found as major component in insect cuticles or exoskeletons, predominantly located with proteins in the exocuticle and endocuticle layers. In addition, chitin triggering a systemic immune response and forming a biochemical barrier in insects. Understanding of chitin characteristics and responses in insect pests against pesticide exposure are important in the field of insect pest management. In this study, chitin characteristics of stored-product insect pests were studied with their association in fumigant toxicity of garlic (*Allium sativum*) essential oil. Chitin was isolated from *Callosobruchus maculatus* (Pulse beetle), *Sitophilus oryzae* (Rice weevil) and *Tribolium castaneum* (Red flour beetle) adults and the isolates were characterized using Fourier Transform Infrared Spectroscopy (FT-IR), X-Ray Diffraction (XRD), Element Analysis (EA), Scanning Electron Microscopy-Energy Dispersive Spectroscopy (SEM-EDS), and Nuclear magnetic resonance (NMR) techniques. Fumigant toxicity of garlic essential oil was performed against *C. maculatus*, *S. oryzae* and *T. castaneum* adults under airtight condition in glass vial.



Further, the chitin characteristics of insects were compared with the fumigant toxicity of garlic essential oil. Among the examined three insect species, highest chitin content (19 %) was recorded in *S. oryzae*, followed by *T. castaneum* (10 %) and *C. maculatus* (8 %). Whereas, the degree of crystallinity of chitin was lower in *C. maculatus* (67.13 %) compared to *S. oryzae* (77.05 %) and *T. castaneum* (76.56 %). In chitin morphology, flat lamellar surface with pores was observed in *C. maculatus* chitin, and densely arranged microfibrils based surface was observed in *S. oryzae* and *T. castaneum* chitins. The garlic essential oil was recorded as potential fumigant against the insect pest species. Though, fumigant toxicity assays revealed varied susceptibility levels, *C. maculatus* exhibited higher susceptibility (0.27  $\mu\text{L/L}$  air of LC50) compared to *S. oryzae* and *T. castaneum* (14.35 and 3.74  $\mu\text{L/L}$  air of LC50, respectively) to garlic essential oil.

Physicochemical properties and penetration potentiality of the bioactive constituents in garlic essential oil might be linked with the fumigant toxicity in insects. The study results revealed that *S. oryzae* is more tolerant to fumigant action of garlic essential oil compared to other two insect species. Further detailed studies are required to use garlic essential oil as alternative biofumigant to the conventional phosphine fumigant. Then, the chitin characteristics results indicated higher content, greater crystallinity, and densely arranged structures in *S. oryzae*, which might be contributed for tolerance against the fumigant action in insect body.

(Gawali P.P., Toragall V., Madhurya L., Yannam S.K., Ezhil Vendan S. (2024) *Physicochemical comparison of chitin characteristics in three major stored-product beetle pests: Implications for biofumigant toxicity*. *International Journal of Biological Macromolecules*, 265, art. no. 130759)

## New Technologies

### High-performance process for anaerobic digestion of food industry waste for enhanced biogas production

Most conventional anaerobic bioreactor systems suffer from suboptimal mixing arrangements and lack sustainable pretreatment processes, limiting digestion kinetics and biogas yield. This innovative process integrates sustainable pretreatment methods and a novel bioreactor design to enhance biogas production. It employs multi-optional pretreatment techniques tailored to the specific substrate type. The novel anaerobic digester design ensures optimal mixing of reactor liquid, suspended solids, and anaerobic microorganisms, facilitating effective contact between the substrate and anaerobic bacteria without inducing high shear stress. The system is adaptable for various types of food industry wastes, including multi-product food industries, industrial potato peel waste, dairy industry sludge and

wastewaters, snacks industry waste, and oil industry waste. It can achieve 90% reduction in total volatile solids and equivalent organics, with up to 30% enhancement in biogas yield. The flexible pretreatment system can be adjusted based on the substrate type and can be integrated with downstream wastewater treatment for Zero Liquid Discharge (ZLD). The system has been successfully demonstrated for processing 2 tons per day of dairy sludge and 100 kilolitres per day of wastewater at a model dairy site. This novel innovative system showcases the ability to handle significant volumes of both solid and liquid waste, making it suitable for large-scale applications in the food industry. The project was developed under the DST-Industry partnership program with funding from the DST, Government of India, for lab-scale trials, and pilot-scale trials were enabled by M/s Sun Enviro Technologies Ltd.



(a)



(b)

Prototype Anaerobic Bioreactor System (a) with Fat Sludge and demonstrated at 2 tonnes/day and 100 KLD wastewater (b)

## Technologies Transferred

- ✧ Tamarind candy
- ✧ Multigrain cereal-legume bar and Puffed rice bar
- ✧ Online fortification of Atta (Whole wheat flour) / Maida (Refined wheat flour)
- ✧ Coffee concentrate
- ✧ Food for diabetes
- ✧ Bread production (9 varieties - Brown, Plain, Sweet, Milk, Whole Wheat, Fruit, High Fiber, Ragi, Bajra)
- ✧ Process for the production of transglycosylating  $\alpha$ -glucosidase using novel fungal strain
- ✧ Fruit jams & jellies: preparation
- ✧ Bottling of sugarcane juice
- ✧ Tutti fruity (Papaya/ Carrot)
- ✧ Fortified mango bar
- ✧ Process for production of semolina (sooji/rava) from millets and preparation of multimillets semolina
- ✧ Instant *upma* mix, *halwa* mix, *rava idli* mix from millets and multimillets semolina
- ✧ Instant finger millet (Ragi) *rava idli* mix, *halwa* mix, *kichdi* mix, *upma* mix
- ✧ Finger millet semolina
- ✧ Millet and multimillet *puttu podu* mix

## Training Programmes Conducted

- ✧ A 15-days training program on “Fumigation, Prophylaxis and Pest Management Techniques for Stored Food Commodities” was organized at CSIR-CFTRI, Mysuru during 31-05-2024 to 14-06-2024.



Around 40 participants attended this program. The training program covered all the topics related to infestation control for stored food products, demonstrations and field visits to industry as well as FCI warehouses.

- ✧ A 3-days training program on “Processing of Fruits & Vegetables, Millets, and Value Addition” was organized at CSIR-CFTRI for the officials of Agricultural Technology Management Agency (ATMA), Salem, Tamil Nadu, during 25-06-2024 to 27-06-2024. Around 10 participants attended this training program.
- ✧ Strategies for Probiotic Dairy Product Development was organized at CSIR-CFTRI during 19-06-2024 to 21-06-2024.

## Short Term Training Programmes Schedule (July - September 2024)

- ✧ 3D bio printing (One Day Workshop) (18-07-2024)
- ✧ Post-Harvest Technologies for Fruits and Vegetables (22-07-2024 to 02-08-2024)
- ✧ Basics in Flour Milling and Quality Evaluation of Flour (5-08-2024 to 09-08-2024)
- ✧ Application of Liquid chromatography - mass spectrometry (LC -MS) in (glyco) protein analysis (5-08-2024 to 07-08-2024)
- ✧ Development of Pour over Millet Beverage and Curd through Probiotic Bacteria (5-08-2024 to 09-08-2024)
- ✧ Applications of Electronic nose (e - nose) and electronic tongue (e - tongue) in product development (12-08-2024 to 14-08-2024)
- ✧ Quantitative mRNA and microRNA expression studies in mammalian cells (20-08-2024 to 23-08-2024)
- ✧ Cell Culture and Molecular Biology Techniques (09-09-2024 to 11-09-2024)
- ✧ Basic Scientific Glass Blowing (09-09-2024 to 13-09-2024)



- ✦ Grain Process & Products For Health & Wellness (09-09-2024 to 13-09-2024)
- ✦ Chromatographic Techniques (GC, HPLC, UHPLC) and their Analytical Approaches in Food Analysis (09-09-2024 to 13-09-2024)
- ✦ Extraction and quality assurance of edible fats and oils (18-09-2024 to 20-09-2024)
- ✦ Application of Liquid chromatography - mass spectrometry (LC -MS) in quantitation (23-09-2024 to- 25-09-2024)

## Entrepreneurs' Speak

Nurrishelite Diversities LLP (Brand Name: Vinessence), is a young entity based in Kodagu district of Karnataka, specializes in producing nutritious millet and fruit-based products. The inception of the company is based on the growing demand for unique organic, value added Millet based products. Nurrishelite Diversities LLP has been recognized as a food start-up entity by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce & Industry, Government of India. The firm is also an incubatee at Nutrihub, which is a Technology Business Incubation Startups Confederation, initiated by the Indian Institute of Millet Research, Hyderabad.

**Mission :** Millet and fruit based value added products of for the nourishment of all.

**Vision :** To empower farmers and be the leader in the production of unique artisan-pure products for holistic nourishment.

**Role of CSIR – CFTRI :** The firm is incredibly grateful to the entire CSIR-CFTRI team as well as her mentors for motivating her to pursue entrepreneurship. Additionally, the company is appreciative of CSIR-CFTRI for helping to create millet pasta, which is being exported to Canada.

### Advice for Entrepreneurs

- ✦ The Golden rule: Never compromise on quality
- ✦ Perseverance is a key trait for entrepreneurial success entrepreneurs who embody perseverance possess essential traits that enable them to navigate challenges, adapt to change, and drive sustainable growth in their ventures. Determination, one of the cornerstone traits of perseverance, fuels the relentless pursuit of entrepreneurial goals even in the face of adversity.
- ✦ Rural entrepreneurs certainly act as a key figure in economic progress of India. It provides employment opportunities and balanced regional growth. Rural entrepreneurship provides a check on migration of rural population and helps in improving the standard of living.
- ✦ Educational institutions need to focus on synergies between education, innovation and entrepreneurship

**Products :** Gluten free pasta, vermicelli, noodles. Sprouted Millet Noodles, Sprouted Little Millet Pasta, Sprouted Barnyard Millet Pasta, Sprouted Finger Millet Pasta, Sprouted Foxtail Millet Pasta, Sprouted Pearl Millet Pasta, Sprouted Millet Vermicelli, Sprouted Multi Millet Mix, Sprouted Millet Pancake Mix with Carrot, Sprouted Millet Pancake Mix with Beetroot, Sprouted Millet Pancake Mix with Banana, Gluten Free Pancake Mix, Kokum Jelly with Chia, Millet Kokum spread, Mixed Fruit jam with Chia, Millet Mixed Fruit spread, Millet Amla spread, Millet Almond Spread ,Millet Almond with Chocolate, Millet Peanut Spread with Chocolate, Garcinia gummi gutta concentrate, Little Millet Biscuits with Coconut Sugar, Millet Passion Fruit Delight. Millet Kokum Delight, Millet Coffee Delight, Millet Choco Delight Cupcakes, Millet Chocololipop, Millet Cakesicles, Millet Date Delight

### Incubatees

#### Firelance Technologies Pvt. Ltd.,

Firelance Technologies is a beverage industry, dedicated to the creation and promotion of innovative Indian drinks. Specializing in traditional beverages, clean label formulations, and advanced packaging, the company focuses on natural ingredients rooted in Indian tradition and customs. We prioritize sustainability and transparency in our operations, offering a diverse range of products that cater to various consumer preferences. Firelance Technologies emphasizes eco-friendly packaging and sustainable practices. Our product portfolio includes a variety of beverages designed to appeal to different tastes and preferences. We aim to educate consumers and elevate industry standards through effective communication of our product benefits.

#### Immunza Foods Pvt. Ltd.,

Immunza Foods Pvt. Ltd. is an innovative firm that creates healthy and health-conscious food products. With a firm dedication, we seek to provide wellbeing through our everyday basic products, focusing on ingredients with health promoting capabilities. Using our considerable supply chain and procurement experience, we ensure that our operations are

traceable, sustainable, and profitable. Our product lines include unique low glycemic index multigrain rice and vermicelli, for health-conscious consumers and high protein, high fiber snack products. Our flagship brand demonstrates our commitment to providing quality, flavour, and nutritional value, making healthy eating accessible and delightful for all. Our mission is to become a household name in the health food business by offering products that not only meet but exceed our consumers' daily nutritional demands. Through our carefully developed products, we hope to encourage positive shifts in food habits and digestive wellness, as well as promote a better lifestyle.

### BIRAC BioNEST Incubatees

The BIRAC- BioNEST incubator facility at CSIR-CFTRI is designed to nurture entrepreneurial talent in food bioprocessing and biotechnology research. BioNEST has signed MoU's with three incubation centres. These incubation centres will collaborate, and coordinate to support the startup ecosystem in specific domains of food biotechnology, functional foods, bio-manufacturing, and other allied domains. They will also actively engage in organizing joint workshops/events. The incubation centers with whom the MoUs were signed are as follows:

- ✦ Atal Incubation Centre (AIC)- Central Coffee Research Institute, Bangalore
- ✦ Bootstrappers Research Council (BRC) by SRM Institute of Science and Technology, Chennai
- ✦ Siddganga Institute of Technology, TBI, Tumkuru



BioNEST and STP in collaboration with the Coffee Quality Division of the Coffee Board of India organised a 5-day Barista training program. Skill Training in brewing coffee, cupping, manual brewing, signature beverages, introduction to green coffee, etc. was conducted at the incubation centre at CSIR-CFTRI, Mysuru.



BioNEST has boarded two start-ups namely :

**1) Ninigey :** They are an urban youth-focused food-tech start-up founded by a group of passionate entrepreneurs committed to bring new and innovative food offerings. Their mission is to develop nutritious, delicious, and shelf-stable food products that seamlessly integrate into the daily lives of consumers, enhancing their food experience with convenience and variety. They are currently focused on developing a Ready-To-Eat Sandwich Filler using Retort Processing Technology.

**2) Terraforms Innovation Pvt. Ltd.:** They are a start-up company that focuses on a line of beverages made with upcycled food that would otherwise be trashed. They aim to develop nutritious and healthy drinks using avocado. They are passionate about sustainability and creating a beverage that alleviates food waste.

## New Collaborations

- ✦ **Padmashree Institute of Management & Sciences (PIMS), Bengaluru (April 19, 2024)**

Strategic positioning through collaborations between both the institutions in meeting emerging scientific and technological challenges of the society.

- ✦ **Madras Diabetes Research Foundation (MDRF), Chennai (May 13, 2024)**

To undertake joint research projects through collaborations between both the institutions in

meeting emerging scientific and technological challenges of the society.

- ✦ **Grassroots Research and Advocacy Movement (GRAAM), Mysuru (May 13, 2024)**

To promote social entrepreneurship for livelihood generation in identified areas and to provide technical support to the social business initiatives in terms of know-how, certification and training.



## Events

### Dr B R Ambedkar Birth Anniversary (April 14, 2024)

Floral tribute paid by Director and Staff to Bharat Ratna Dr B R Ambedkar, architect of Indian Constitution on his 133<sup>rd</sup> birth anniversary on 14<sup>th</sup> April, 2024.



### International Women's Day (April 19, 2024)

As part of International Women's Day 2024, CSIR-CFTRI celebrated "She Leads: Celebrating Women Achievers". Dr. S. Rathnamma, Research Associate, JSS, Mysore and Mrs. Prema N. Mahendrakar from Mysuru were the Chief Guests and Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function. During this function, Director felicitated both women achievers for their outstanding contributions in their fields. Women entrepreneurs were also felicitated on this occasion.

### Voice Screening Camp (May 8, 2024)

Voice Screening camp was held on 8<sup>th</sup> May, 2024, wherein the Scientific staff of All India Institute of Speech and Hearing (AIISH), Mysore conducted screening of voice to detect voice related vocal cord problems. Around 40 employees of CSIR-CFTRI took part in the camp.

### National Technology Day (May 13, 2024)

National Technology Day celebrations was held on 13<sup>th</sup> May, 2024. Shri Arjun Ranga, Partner of NR Groups, the makers of "Cycle Pure Agarbathi" and CEO & Managing Director of N. Ranga Rao & Sons Pvt Ltd, Mysuru was Chief Guest and delivered National Technology Day 2024 lecture entitled "From Agarbathi to Aerospace...Creating a Innovation Mindset". In presence of dignitaries, agreements were exchanged with three industries, namely M/s DDR Ventures LLP, Bengaluru for a sponsored project, M/s MCPI Pvt Ltd.,

Kolkata and M/s Sun Enviro Technology Pvt. Ltd., Bengaluru for transfer of technologies. The Chief Guest distributed Mementoes and certificates to Licencees of CSIR-CFTRI technologies and also Appreciation Certificates to S&T team of CSIR-CFTRI. During the event, 12 new technologies developed by scientific staff during 2023-24 were also introduced to the audience. Dr. Aashitosh A Inamdar, Head, TTBD welcomed the gathering and spoke about National Technology Day. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function.



### JIGYASA Laboratory (May 20, 2024)

In connection with Jigyasa activities, which is a motivational and scientific temper inculcating initiative for high school students by CSIR, a dedicated Jigyasa laboratory was inaugurated by Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI on 20<sup>th</sup> May 2024. 50 Students and two teachers from CSIR-CFTRI high school participated in the event. The laboratory will be a platform for demonstration and performing experiments that convey basic aspects of food science and nutrition.



### Society of Biological Chemists (India), Mysore Chapter (May 29, 2024)

Society of Biological Chemists (India), Mysore Chapter

in association with CSIR-CFTRI, Mysore and AFST(I), conducted a Symposium on **'Food for our Future: The Role of Biochemistry, Food Science and Nutrition'** on 29<sup>th</sup> May 2024 at IFTTC auditorium, CSIR-CFTRI, Mysuru. It was organised in commemoration with the Birth centenary year of Late Dr. M.R. Raghavendra Rao, Late Dr. HSR Desikachar, Late Dr.M.S. Narasinga Rao {1924-2024} formerly Deputy Directors. The above symposium was inaugurated by Dr.V. Prakash, Former Director of CSIR-CFTRI and Distinguished Scientist of CSIR. Dr. Chandrashekara N, Former Chief Scientist & Head of Biochemistry, Dr. Tharanathan R N, Former Chief Scientist & Head of Biochemistry, Dr. Salimath P V, Former Chief Scientist & Head of Biochemistry, Dr. Ali S Z, Former Chief Scientist & Head, Grain Science Technology, Dr. Malleshi N G, Former Chief Scientist & Head, Grain Science Technology, Dr. Appu Rao A G, Former Chief Scientist & Head, Protein Chemistry and Technology of CSIR-CFTRI, Dr. Arun Chandrashekar, Sr.Pr.Sct, Plant Cell Biotechnology shared memories of their association with the centenarian Scientists. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function.



### World Environment Day (June 5, 2024)

World Environment Day 2024 was celebrated at CSIR-CFTRI on 5<sup>th</sup> June 2024. This year, the theme of World Environment Day is **“Land restoration, Desertification and Drought resilience.”** As part of celebrations, noted Environmentalist from Mysore, Sri U.N. Ravi Kumar, Former Director, Centre for Appropriate Rural Technologies (CART), NIE, Mysuru who was the Chief Guest along with Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI planted



saplings in the campus marking the occasion. The Chief Guest delivered Environment Day Lecture entitled **“Restoration, Desertification and Drought action”**. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function.

### World Food Safety Day (June 7, 2024)

World Food Safety Day 2024 with theme “Food Safety: Prepare for the Unexpected” was celebrated in its campus on 7<sup>th</sup> June 2024 for the benefit of students in the Food Safety & Analytical Quality Control Laboratory (FSAQCL). Dr. Parvatham Giridhar, Chief Scientist & Head, FSAQCL welcomed the gathering which mainly had students. Shri. Rajeshwar S. Matche, Chief Scientist & Head, Food Packaging Technology Dept. formally inaugurated the event and addressed the gathering on the importance and awareness on World Food Safety Day 2024. Various demonstrations on detection of adulterants in edible oils, spice products, sweets, milk, honey etc., and use of analytical instruments used by the food safety laboratories were exhibited during the programme. Demonstration on food hygiene and microbial safety was also arranged. More than 200 students from various colleges participated in the programme.



### Research Council Meeting (June 13-14, 2024)

The 1<sup>st</sup> meeting of the 12<sup>th</sup> Research Council (RC) of CSIR-CFTRI was held on 13 & 14<sup>th</sup> June 2024. The Institute's scientific and technical team participated in the RC meeting and discussed about the R&D projects and other related activities.





## International Yoga Day (June 21, 2024)

International Yoga Day 2024 with theme “Yoga for Self and Society” was held on 21<sup>st</sup> June 2024 at CSIR-CFTRI Campus. Director, staff, research scholars and students actively participated in the event.

## JIGYASA

As part of its JIGYASA activities, “Summer Camp” with the theme “obesity” was conducted for 40 high school students and 4 teachers of KV Chamarajanagar and KV BRBNMPL Mysuru on 26<sup>th</sup> June 2024, at CSIR-CFTRI. The program featured talks delivered on “Balanced nutrition for adolescents” by Dr. Jyothi Lakshmi A., and “Childhood obesity – a growing

concern” by Dr. Uma V. Manjappa. They were followed by visits to CFTRI and Millet showcases and a demonstration of “Diversity in edible oils and their beneficial role in health” by Dr. Vijayaraj P.



## Visitors

- ✦ Armed Forces Resident Doctors- MD Aerospace (IAM, IAF), Bangalore visited CSIR-CFTRI and its facilities on 15<sup>th</sup> April, 2024.
- ✦ Delegation from Australian Consulate-General, Bengaluru headed by Ms. Hilary McGeachy, Consul General; Mr. Andrew Collister, Consul & Ms. Steffi Cherian, Strategic Communication & Public Diplomacy Officer visited CSIR-CFTRI on 19<sup>th</sup> June, 2024. The team interacted with scientific staff for exploring collaborations in the areas of Agro-Food

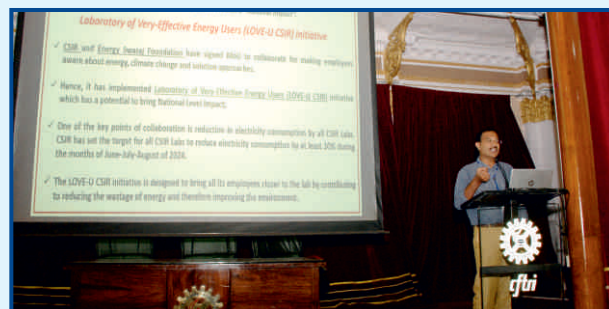
Processing Technologies, Infestation control, Food Security and HRD activities. The team also visited some of the facilities in the campus such as CSIR-CFTRI Showcase and Millet Showcase.

- ✦ Officers from Indian Army, Navy and Air Force who are participants of Officer Catering Course conducted by ASC Centre & College, Bengaluru visited CSIR-CFTRI and its facilities on 26<sup>th</sup> June 2024.

## Institute Seminar

- ✦ As a part of the Swachhata Pakhwada Celebrations (SAP-2024), a seminar was held on 15<sup>th</sup> May, 2024.
- ✦ Voice Screening orientation talk was held on 7<sup>th</sup> May, 2024, wherein the Scientific staff of All India Institute of Speech and Hearing (AIISH), Mysuru spoke about the importance of undergoing voice screening.
- ✦ As part of awareness programme on Energy Conservation-Reduce Electricity Consumption (REC), Initiative of CSIR, talk was presented on 27<sup>th</sup> June 2024 on the topic “Energy Conservation: Ways & Means to Achieve” by Sri K. Narayanan, Principal

Technical Officer, E&MM Section, Food Engg. Department.



## Awards and Certificates

CSIR-CFTRI was certified as “Eat Right Campus” as per guidelines established by Food Safety and Standard

Authority of India(FSSAI) for the period of May 6, 2024 to May 5, 2026.

## Upcoming Events

- ✧ Independence Day on August 15, 2024 at CSIR-CFTRI.
- ✧ CSIR Foundation Day on September 26, 2024 at CSIR-CFTRI.
- ✧ National Nutrition Week 2024 celebrations at CSIR-CFTRI during September 1-7, 2024.

## Retirees

1. Shri. B.S. Ramaprasad, Controller of administration - April 2024.
2. Dr. V.B. Kudachikar, Sr. Principal Scientist, Fruit & Vegetable Technology Department - June 2024
3. Smt. Sudha M L, Principal Technical Officer, Flour Milling, Baking and Confectionery Technology Department - June 2024

## Ph.D.s Awarded



Vidhyalakshmi, R (2024). [Guide: Dr. Meera M S, Grain Sci. & Tech. Dept.] Processing of Pearl Millet (*Pennisetum Glaucum*) for the development of low glycaemic index food product for pre-diabetes, AcSIR.



Pinchu Elizabeth Thomas. (2024). [Guide: Dr. Prabhasankar P, Flour Milling, Baking and Confectionery Technology Dept., CSIR-CFTRI] Structuring of virgin coconut oil based oleogel and its application in bakery products, AcSIR.



Urvashi Sahu. (2024). [Guide: Dr. S. Ezil Vendan, Food Protectants & Infestation Control Dept., CSIR-CFTRI] Physiological and toxicological effects of phytochemical volatiles on *Sitophilus oryzae* (Rice weevil): A comprehensive study, AcSIR.



Sonkar Rutuja Murlidhar. (2024). [Guide: Dr. Praveena B. Mudliar, Microbiol.Fermentation Technol. Dept., CSIR-CFTRI] Green process for xylooligosaccharide production from wheat bran and its prebiotic potential AcSIR.





Yogendra Prasad K. (2024). [Guide: Dr. Poornima Priyadarshini C G, Molecular Nutrition Dept., CSIR-CFTRI] Characterization of molecular mechanism underlying the cancer chemo-preventive potential of carotenoids in luminal and triple-negative human breast cancer cells.



Gade Pravin Savata. (2024) [Guide: Dr. Praveena B. Mudliar, Microbiol.Fermentation Technol. Dept., CSIR-CFTRI] Biosensing and Mitigation of Sterigmatocystin, AcSIR.



Vandana Padmanabhan. (2024) [Guide: Dr. Giridhar P, Plant Cell Biotechnology Dept., CSIR-CFTRI] Investigations on nutrients and nutraceutical potential of seeds and flowers of *Clitoria ternatea* L., AcSIR.

## Select Publications

- ✦ Gawali P.P., Toragall V., Madhurya L., Yannam S.K., Ezhil Vendan S., Physicochemical comparison of chitin characteristics in three major stored-product beetle pests: Implications for biofumigant toxicity, Int. J. Biol. Macromol., 2024, 265, art. no. 130759. (IF: 8.2)
- ✦ Divya Yadav., Harish Prashanth K.V., Negi, Pradeep Singh., Low molecular weight chitosan from *Pleurotus ostreatus* waste and its prebiotic potential, Int. J. Biol. Macromol., 2024, 267, art. no. 131419. (IF: 8.2)
- ✦ Sruthi, P., Madhava Naidu, M., Rao, Pooja J., Valorization of cashew nut testa phenolics through

nano-complexes stabilized with whey protein isolate and  $\beta$ -cyclodextrin: Characterization, anti-oxidant activity, stability and in vitro release, Food Res. Int., 2024, 181, art. no. 114110. (IF: 8.1)

- ✦ Vidhyalakshmi R., Prabhasankar P., Muthukumar S.P., Prathima C., Meera M.S., The impact of addition of pearl millet starch-germ complex in white bread on nutritional, textural, structural, and glycaemic response: Single blinded randomized controlled trial in healthy and pre-diabetic participants, Food Res. Int., 2024, 183, art. no. 114186. (IF: 8.1)



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