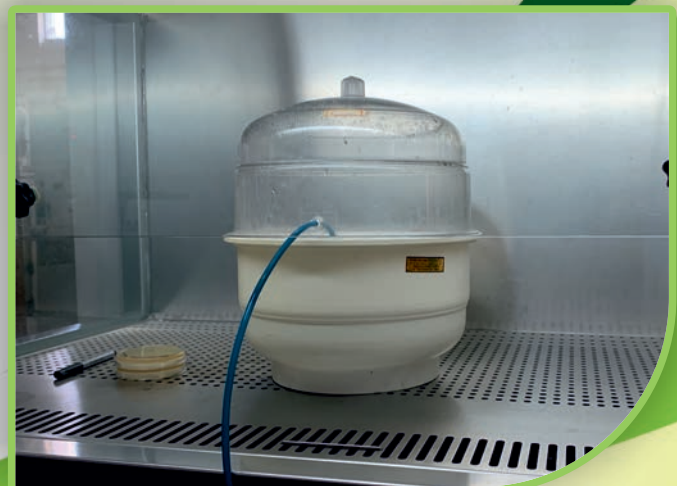


FoodPro

July-Sep 2020



CSIR-CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE
(Council of Scientific & Industrial Research)
Mysuru - 570 020

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Shri Jitendra J Jadhav, Director, CSIR-NAL as Director, CSIR-CFTRI with Additional Charge



Shri Jitendra J Jadhav, currently the Director of CSIR - National Aerospace Laboratories (CSIR-NAL), Bangalore has been given additional charge as Director, CSIR-CFTRI since Sept 1, 2020. Shri Jadhav has

obtained his BE (Electronics) from University of Pune and MS from Computer Engineering Department of the Defense Institute of Advanced Technology, Pune.

He has more than 29 years of experience in Design and Development of Military Systems for Army, Navy, Air Force, Industrial and Railway applications. He has designed, developed and commercialized major systems like Fire Control Systems for Tanks, Airborne Digital Optronic Pedestal for Nishant, Optical Fire Control Systems

for Navy, Mission & Display Computer and Weapon Control System for Light Combat Aircraft (LCA-Tejas), Tactical Mission System for Helicopter and Digital Servo Systems for Automobiles and Railways. Prior to joining CSIR, he was functioning as an Outstanding Scientist and Project Director associated with LCA Programme at DRDO. At present under his leadership, CSIR-NAL, is making important contributions towards both civil and military aeronautics / aviation sectors, in addition to the strategic, space, automotive and societal sector programs.

Shri Jadhav in his earlier stint as Director, CFTRI during 2017-18 was instrumental in steering many mega projects such as Sugar fortification, Carbonated fruit beverages, Non-thermal processing of fruit juices and Maharashtra Govt. funded scheme for the enhancement of Human Development Index (HDI) in selected districts of the State along with many other initiatives.

Aatma Nirbhar Bharat-PM FME Scheme Workshop

About the Scheme

Aathmanirbhar Bharat is one of the major initiatives launched by Govt. of India to make India a self-reliant nation in terms of products and services. In this respect, Ministry of Food Processing Industry announced a Scheme to promote rural microenterprises in the informal Sector for reaching out nearly 25 lakh enterprises. However, this is the sector which faces major hurdles due to multitude of factors such as limited access to modern technologies, Skillsets, quality aspects, lack of branding and inability to integrate with supply chains etc. In order to overcome these constraints, handholding support in term of skilling, technology, credit & marketing and participation in value chain are essential. The scheme will be beneficial to SHGs, FPOs in the state who would like to venture into the food processing.

Salient feature of the scheme include

- ✦ Increased access to credit by existing micro food enterprises, FPOs, SHGs and Corporations
- ✦ Integration with existing supply chain by strengthening branding & marketing
- ✦ Support for transformation of existing 2 lakh enterprises to the formal sector
- ✦ Access to common services such as common processing Facility, laboratories, storage, packaging, marketing & Incubation Services
- ✦ Strengthening of Institutions, research and training in the food processing sector
- ✦ Increased access to Professional and support

The scheme will adopt One District One Product approach (ODOP) to reap the benefits of scale in terms of procurement of inputs, availing common Services and marketing of products. This will help ODOP to utilize the value chain infrastructure including the Cluster development. The ODOP product could be a perishable agriproducts, cereal

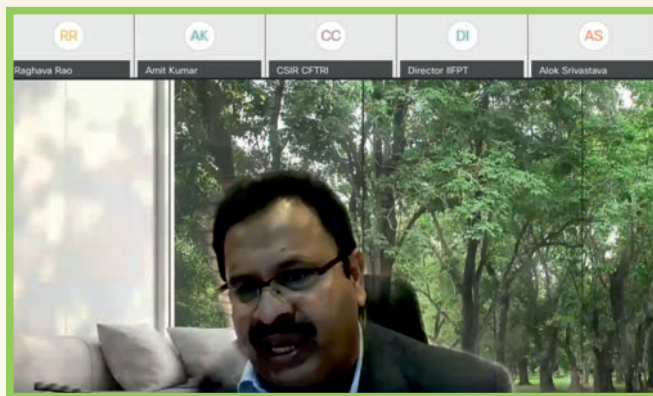
based products or a food product widely produced in a District such as mango, ragi, jowar, fisheries, turmeric, honey, including waste to wealth products. Further, the scheme would be supporting the existing units processing other products as well. However, for the new units it will be limited to ODOP alone. Individual micro-entrepreneurs would be provided credit-linked Capital Subsidy @35% of the project cost with a maximum unit of Rs. 10.00 lakh per unit.

In this respect, CSIR-CFTRI has been identified as the State Level Technical Agency for the implementation of the scheme in Karnataka.

About the Workshop

CII Mysuru and CSIR-CFTRI in association with Dept. of Food Processing and KAPPEC, Govt. of Karnataka organized a webinar on August 28, 2020 regarding PM Formalisation of Micro Food Processing Scheme under Atmanirbhar Bharat. The salient features of the centrally sponsored Entrepreneurs scheme was shared along with technological vistas available from CFTRI for micro entrepreneurs in the area of Food Processing. The inaugural session was presided over by Director, CSIR-CFTRI. Faculties from CSIR-CFTRI and National Institutes/Organisations delivered talks on the theme of the seminar.

The event was inaugurated by Shri Manoj Rajan IAS Special Secretary to Food Processing, Govt. of Karnataka.



Research Highlights

A feasible method for isolation of pongamol from karanja seed oil

Pongamol, a major bioactive compound of karanja (Pongamia pinnata) seed oil, belongs to the

flavonoid family is known for its medicinal properties & therapeutic applications. The Institute has developed a feasible technique to efficiently extract pongamol from karanja seed oil by complexing it with boron trifluoride etherate

(BF₃.OEt₂). The yellow crystalline complex so formed was hydrolysed with 6N HCl to afford pure pongamol. In this method, a recovery of pongamol ~64% with >95% purity (HPLC) was achieved. The existing method for the isolation of pongamol involves several solvents and tedious chromatography procedure with a very low yield. The pongamol isolated from karanja seed oil exhibited anti-inflammatory potential with the IC₅₀ value for soy lipoxygenase-1 (LOX-1) at 72.2 µM.

Interaction of pongamol with soy LOX-1 by fluorescence revealed that a quenching maximum of 50.25% with the binding constant of 0.75×10⁵ M⁻¹. Pongamol binds with soy LOX-1 with least binding energy of -5.79 kcal/mol by forming two hydrogen bonds. Pongamol also exhibited

antioxidant activity with an IC₅₀ value of 12.2 µg/mL. Edema was induced in paw and ear of Wistar rats using Carrageenan and xylene. Pongamol of 50 ppm body weight reduced the edema by 55% in the paw and 74% in the ear within 3 h of its administration. The study reveals that pongamol with good recovery and purity could be obtained by simple complexing the methanol extract of the oil and hydrolysing the complex. Pongamol is also a suitable bioactive compound which could be used to semi-synthesize several congeners to understand the structure activity relation in the path of drug discovery.

Source : Rekha, M.J., Bettadaiah, B.K., Sindhu Kanya, T.C., Govindaraju, K., A feasible method for isolation of pongamol from karanja (*Pongamia pinnata*) seed and its anti-inflammatory activity, *Industrial Crops & Products*, 2020, 154, 112720

New Technologies

Ozone Air Disinfection

A new gadget was designed for air disinfection in hospital and non-hospital settings like offices schools, restaurants, hotels and buses which is effective for controlling COVID-19 spread. The design was standardised for various process design parameters such as ozone concentration, exposure time, temperature, relative humidity, mixing requirements and functional relationship. The results were validated with airborne indicative pathogens as per WHO and USFDA guidelines. The technology has been transferred to two of the Industries.



Raw Banana Powder (Unripe)

Banana is an important horticulture crop and Cavendish (Pachbale), Nendran, Elakki, Poovan, Rasabale are some of the important varieties marketed as fresh. Raw banana used in various food preparations and used for the preparation of raw banana powder which is a rich source of carbohydrates and free from sugars. The technology facilitates the manufacture of raw banana powder under controlled conditions. Unripe, mature bananas free from spoilage, with firm texture of any edible varieties viz., Cavendish, Nendran, Elakki, Rasbale, Poovan etc., can be used for the preparation. Bananas are washed, peeled, pretreated and dehydrated. Raw banana powder is packed in glass bottles or flexible food grade packaging materials in unit packs.

Technologies Transferred

- ✦ Tamarind Juice concentrate & Powder (Swasthik Masala pickles & food products, Bengaluru)
- ✦ Coffee concentrate (Manjushree Plantations Ltd., Nilgiris; Hebbe foods, Mysuru)
- ✦ Pickles and Chutney's: Preparation (Vivaan Agro Foods, Tumkur)
- ✦ Fruits jam & jellies preparation (Sindhu beverages, Anantapur)
- ✦ Nutra chikki with added spirulina (Saroj food Industries, Bantwal)
- ✦ Fruit jam & jellies: Preparation (Mr. Stanly S alukal, Kerala)
- ✦ Osmo air dried fruits Amla, Jack fruits, Pineapple, Mango (Mr. Stanly S alukal, Kerala)
- ✦ Instant coffee cubes, Banana pseudostem juice, Dehydrated drum stick powder, Instant moringa leaves soup mix, Flaking of fox tail millet, Low glycemic Index noodles (Mr. Subramanian TS)
- ✦ Nutra chikki with added spirulina (R P Associates, Bengaluru)
- ✦ Pickles and chutney: Preparation (Puttaiah M N, Kushalnagar)
- ✦ Fruits jam & jellies: Preparation (M/s Elite foods Pvt Ltd, Ernakulam)
- ✦ Nutrachikki with added spirulina (M/s Synergy India Foundation, Hyderabad)

Entrepreneurs Speak

"Yogi Foods", Gujarat is a flagship company of Yogi Group launched in the year of 1997 with the enriched experience of 21 years in juice industries. We strive for best Quality and taste of products, innovation in beverages and a huge portfolio of 54+ juices product basket. Yogi Group has developed a vast Network of 250 distributors within a year in the state of Gujarat which is a major milestone and helped to capture huge market share under brand of "Shree Yogi Sharbatwala" & "Shree Yogi Nutritious". Today Yogi Foods has become market leader with a very strong & unique brand identity. We are aggressively expanding our operations pan India and in overseas market to become a Global brand.



Vision & Challenges: Shree Yogi Foods has vision to become a global beverage brand and aggressively tap the international Market of African Countries and Middle East through quality products.

Product Range: Dry fruits crushes, Fruit Crush, Flavours Sharbat Syrup, Concentrated Sharbat, Jam.

Role of CFTRI in catalyzing growth of your firm: The company has availed 7 RTS beverage technologies from CSIR-CFTRI. The technologies have helped to have improved market share and also contributed to the demand for a global brand of fruit juices. CFTRI's support and advice as a research institute is extremely helpful to our growth

Your advice to emerging startups: Therefore, we will advise other start-ups to efficiently use the RTS beverage technologies of CFTRI.

New Collaborations

CSIR-CFTRI signed MoUs with the following Organisations/Institutions during this period.

Econut Coconut Producer Company Ltd., Hunsur (July 1, 2020)

This MoU intends to enhance coconut farmer's income in terms of adopting robust technology and best industrial practices towards neera processing and value added products.

Central Silk Board – Central Silk Technological Research Institute (CSB-CSTRI), Bengaluru (Aug 3, 2020 & Sep 21, 2020)

Under this MoUs with CSTRI on "Production of Mulberry Sericin Powder for Nutraceutical Applications" and "Utilization and diversification of silkworm pupae products for human and animal consumption and composting" were initiated.



University of Agricultural Sciences, Raichur (July 6, 2020)

CSIR-CFTRI has initiated a collaborative project with the Agricultural University to develop a responsive, cost-effective, easy-to-use dipstick kit for the accurate detection of COVID 19 infections.

Institute of Chemical Technology, ICT, Mumbai (Aug 6, 2020)

This MoU is aimed for the exchange of faculty and research students, organisation of symposiums and training programmes in specified areas, the formulation of in-house / external funding of collaborative research programmes and sharing of R&D resources, including pilot plant facilities.

Grassroots Research and Advocacy Movement (GRAAM), Mysuru (Aug 20, 2020)

The aim of this MoU is to encourage social entrepreneurship for the generation of livelihoods in identified areas and to provide the social enterprise initiative with technical support in terms of know-how, certification and training.

Indian Institute of Technology IIT-Tirupathi (Aug 26, 2020) and IIT -Guwahati (Aug 28, 2020)

CSIR-CFTRI signed an MoU with IIT-Tirupathi, a third generation IITs established in the year 2015,

recently in a virtual meet. The collaborations is intended to undertake joint projects in the advanced areas of food processing, exchange of faculty and mentoring of students from both the Institutions.

Institute also signed a MoU with IIT-Guwahati towards forging collaborations in the areas of bioprocessing, polymers, fermentation and bioengineering R&D in the country. The partnership would be helpful for formulating twinning Projects under various schemes of Department of Biotechnology for the development of North East Region. In the Virtual function along with Director,

CFTRI and Prof. T.G. Sitharam, Director, IIT-Guwahati and other faculty Members were present.



Happenings

Summer Research Training Programme(SRTP)

CSIR - Summer Research Training Programme (SRTP) was conducted in the virtual mode during August 2020. A total of 300 students were enrolled along with faculties affiliated to UGC / AICTE / Universities etc. The programme included assignments from the identified mentors, lectures by CFTRI scientists and eminent scholars of the country. E-certificates were issued to the successful candidates.

CSIR-CFTRI establishes a COVID-19 Testing Centre at Mysuru

Aligning with the CSIR's efforts to step up testing of COVID-19, CSIR-CFTRI established a Testing Centre at the premises of Govt. Ayurvedic High-Tech Panchakarma Hospital, Mysuru. The centre was inaugurated on August 10, 2020 with support



of District Administration jointly by the Honourable DG-CSIR, Dr. Shekhar C Mande and District Commissioner Shri. Abhiram G Sankar, IAS and,

Shri. L. Nagendra, MLA, Chamaraja Constituency, Mysuru in the presence of Director, CSIR-CFTRI.

Food Business Accelerator at CFTRI

CSIR-CFTRI inaugurated a "Food Business Accelerator" on August 31, 2020 to augment its startup Innovation System in the Campus. While speaking on the occasion, Director, CSIR-CFTRI commented that the centre would be a boon to budding entrepreneurs and startups who have the Proof-of-Concept ready. He also opined that Prime Minister-Formalisation of Micro Enterprise (PM-FME) Scheme launched under 'Aatma Nirbhar Bharat' would help more microenterprises enter into the food processing scenario.

The Centre will provide opportunities for prospective entrepreneurs and startups to be part of the Accelerator Facility for a period up to 1 year or so. These companies can explore the avenues for product development, Scale-up operations, packaging and shelf-life studies for commercialising their products. Expert mentoring sessions also will be available for sharpening the technical and business skills in fulfilling the tasks effortlessly. The Centre supports a total of 8 suites covering over 2000 Sq Ft.

Sero surveillance for COVID-19

Serological study was conducted in the Institute (Sep 15-16, 2020) under a project initiated by CSIR-IGIB, titled "Phenome India- A long-term longitudinal observational cohort study of health outcomes". With the rise in COVID-19 across

country, CSIR-IGIB initiated this study to identify various risk prediction tools for several major diseases including COVID-19. The primary objectives of this study was to develop accurate diagnostic and prognostic tools using various digital biomarkers, prior conditions such as cardiometabolic disorders and their effect on COVID-19 frequency, in which the COVID-19 burden will be ascertained using serology-based assay.



Events

Future India Series (Aug 6, 2020)

As part of the series, a lecture on 'Energy and Cooking' was delivered by Prof A B Pandit, Vice Chancellor, ICT, Mumbai on Aug 6, 2020. In the function presided by Director, CSIR-CFTRI in the virtual mode, Prof. Pandit discussed the efforts at ICT over the past few years about cooking process and energy transfer especially at a household level.

Independence Day Celebrations (Aug 15, 2020)

74th Independence day of the Nation was celebrated with flag hoisting by Director, CSIR-CFTRI. Due to the prevailing situation of COVID 19, Director, CSIR-CFTRI addressed staff and students through MS-Team platform virtually.



Presentation of Certificates and Medals to ISMT Students (Aug 31, 2020)

39th ISMT course completion certificates and medals were distributed to 28 students on the August 31, 2020 in a virtual function held in the Institute.

Engineer's Day (Sep 15, 2020)

Engineers' Day celebration and Birth Anniversary of Bharat Ratna Dr. Sir M. Visvesvaraya was held at CSIR-CFTRI on Sep 15 2020.

CSIR Foundation Day (Sep 26, 2020)

CSIR Foundation day was celebrated in the Institute. Dr. R. Subramanian, Advisor (M&A), in his opening remarks summarized the contribution of CSIR laboratories since its inception.

Shri. Jitendra J Jadhav, Director, CSIR-CFTRI & NAL delivered the Foundation day address. In his address, the efforts of the Scientists in development of technologies under FTTs, Sugar fortification, development of Ozone Disinfection unit and supply of RTE foods and food supplements to migrant labourers during calamities were lauded.

As part of the celebrations, awards to meritorious students, felicitation of retirees, staff who have completed 25 years of service, Covid warriors and awards under Hindi incentive scheme were distributed.



Webinar

Under the JIGYASA programme, lectures were arranged, in which Students and Teachers from KVs, NVS and Govt. schools attended in virtual mode.

- ✦ June 22, 2020 by Director, CSIR-CFTRI on “Food Processing: Current Status and Future Directions”
- ✦ August 20, 2020 by Dr. Sridevi Annapurna Singh on “Science Behind What We Eat”

Sports Nutrition Webinar

Recent advances in R&D carried on “Sports Nutrition” was organised by CSIR-CFTRI in association with Human Performance Lab, SAIL, Ministry of Youth Affairs & Sports, Govt. of India on September 29, 2020 for Sports Nutrition Professionals in the virtual mode.

Selected Publications

- ✦ Siewe, F.B., Kudre, T.G., Bettadaiah, B.K., Narayan, B., Effects of ultrasound-assisted heating on aroma profile, peptide structure, peptide molecular weight, antioxidant activities and sensory characteristics of natural fish flavouring. *Ultrason Sonochem.*, 65, Article number 105055. (IF: 7.630)
- ✦ Vidya C.H., Gnanesh Kumar B.S., Chinmayee C.V., Singh S.A., Purification, characterization and specificity of a new GH family 35 galactosidase from *Aspergillus awamori*. *Int. Journal of Biol. Macromolecules*, 2020, 156, 885-895. (IF: 5.162)
- ✦ Ganesh Kumar B.S., Rawal A., Sequence characterization and N-glycoproteomics of secretory immunoglobulin A from donkey milk. *Int. Journal of Biol. Macromolecules*, 2020, 155, 605-613. (IF: 5.162)
- ✦ Kumar S.S., Arya M., Mahadevappa P., Giridhar P., Influence of photoperiod on growth, bioactive compounds and antioxidant activity in callus cultures of *Basella rubra* L. *J Photochem. Photobiol. B: Biology*, 2020, 209, Article number 111937. (IF: 4.170)

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