

FoodPro

April - June 2022

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 ತಾಂತ್ರಿಕ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು
ಸಿಇಸಿಐಆರ್-ಕೇಂದ್ರೀಯ ಖಾಘ ಪ್ರೌಢೋಗಿಕ ಅನುಸಂಧಾನ ಸಂಸ್ಥಾನ, ಮೈಸೂರು
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Research Highlights

Anthelmintic constituents in over matured fruit of Spine gourd

Spine gourd (*Momordica dioica Roxb.*) is an underutilized perennial climber vegetable belonging to the family Cucurbitaceae originated from the Indo Malayan region. Mature tender green fruits are cooked as vegetables, whereas over mature fruits are disposed of as waste. Spine gourd is rich source of nutrients and bioactive compounds with numerous therapeutic benefits such as diuretic, laxative, hepatoprotective, anti-venomous, anti-hypertensive, anti-inflammatory, anti-asthmatic, anti-pyretic, anti-leprosy, antidiabetic and anti-depressant. Hence the study was taken up to evaluate variation in the accumulation of bioactive constituents in Spine gourd, by analyzing the changes in its phenolic compounds at mature green (fruit utilized) and ripe red (fruit wasted) stages. The study showed higher total phenolic content, tannins and flavonoid in ripe red fruits as compared to mature green fruits. Ripe fruit also showed higher anthelmintic activity against a model nematode (*Caenorhabditis elegans*) as well as the pathogenic nematode (*Heterorhabditis indica*). High antioxidant and anthelmintic activity was related to the accumulation of phenolic compounds such as catechins, quercetin, kaempferol, rutin and gallic acid in the fruits. The study indicated that the ripe Spine gourd fruits, which are considered a postharvest waste, had better anthelmintic activity as they accumulate various bioactive compounds in higher amount than mature green fruits. This study also shows the way forward for the utilization of over-matured fruits, which will prevent loss of valuable raw material and promote circular economy.

(Source: Rashmi, H.B., Negi, P.S. Utilization of over matured fruit waste of Spine gourd (*Momordica dioica Roxb.*) as a source of anthelmintic bioactive constituents, *Food Bioscience*, 2022, Vol.47, Art.No.101676)

Enhancing the nutritional and other quality profiles of buckwheat noodles

The methods of milling buckwheat can influence the nutritional profile and quality characteristics of buckwheat noodles. Although, buckwheat noodles with a high proportion of buckwheat are nutritionally valued, its production is difficult, as forming cohesive dough is tough, due to the presence of gluten. The present study investigated the performance of two differently-milled-buckwheat flours (roller-milled fine flour and hammer-milled whole groat flour) and the impact of improvers on the quality characteristics and nutritional properties of buckwheat noodles. The Fine flour noodle (FFN) was found to be lighter in color with a finer and continuous structure while whole groat flour noodle (WGFN) which has higher fiber content exhibited a coarser and disrupted pattern under scanning electron microscopy. The amount of rutin detected in WGFN was significantly higher (998.22 mg/100 g) than that of FFN (148.21 mg/100 g). Addition of gluten powder at 2–4% levels decreased the cooking loss while guar gum and xanthan gum resulted in highest water absorption capacity. Rather than the individual emulsifiers, their combination (SSL + GMS) had a better effect on the overall quality. The contents of dietary fiber, slowly digestible starch, resistant starch, total polyphenol, total flavonoid and minerals were higher in WGFN. The most abundant essential amino acids were leucine (7.23–8.52%), phenylalanine (6.93–7.27%) and lysine (5.83–6.03%). Thus, the study showed that combination of improvers can be employed in producing good quality buckwheat noodles with high buckwheat content.

(Source: Thanushree, M.P., Sudha, M.L., Asha Martin., Vanitha, T., Crassina Kasar. Enhancing the nutritional and quality profiles of buckwheat noodles: studies on the effects of methods of milling and improvers, *LWT-Food Science and Technology*, 2022, Vol.160, Art.no. 113286)

IPR in the Horizon

Patent Filed

An improved process for preparation of debittered endosperm meal from Fenugreek seed, Pura Naik, J.,

Madineni Madhava Naidu, Pullabhatla Srinivas. App. No: 0030del2011, Granted: 04/5/2022. Pat. No: 396131.

New Technologies

Gluten Free Cookie Cake

Celiac disease is an autoimmune disorder of the small intestine that occurs in genetically predisposed people of all ages. Symptoms include chronic diarrhea and fatigue. The only treatment is lifelong diet with absence of gluten. There is a demand for gluten free products to cater to the needs of the people suffering from celiac diseases. Hence good market exists for gluten-free products. The gluten free cookie cake is a specialty product with unique texture which falls between cakes and cookies. Commercially available cakes are usually rich in sugar and fat which are not preferred by obese, diabetic, hypertensive patients. The process consists of the preparation of gluten free cookie cake using millet blend and other cookie cake ingredients and permitted additives. It has slightly dark golden brown crust & crumb colour, smooth and uniform surface, soft and chewy texture with spicy tinge. It is rich in proteins, fiber and mineral content. Immunological validation of gluten free cookie cake has showed the absence of gluten protein. Hence, these cookie cakes can be considered as immunologically safe for celiac disease patients.



Multigrain Nutri Cookies

Cookies are one of the prominent segments in Indian bakery industry. Cookies are popular for its crisp texture

and sweet taste. The texture of cookies plays an important role in the acceptability of the product and is directly related to the main ingredients such as flour, fat and sugar used in the formulation. The use of high fat and sugar helps in structure development and increases its palatability but makes them nutritionally inferior. Fat and sugar replacers are ingredients used in the formulation to mimic the role in the product without affecting the textural and sensorial characteristics. Fat has a shortening effect and also acts as a lubricant during mixing, enhancing flavour, mouthfeel and palatability. Sugars, apart from adding sweetness, help to incorporate air inside the shortening during dough processing and during baking. It also contributes to biscuit spread and recrystallization of sucrose which provide structure to the product. Decreasing the fat and sugar content in the cookies without affecting the texture and taste involves technological challenges. There is an increasing customer demand for cookies with low fat and sugar with functional health benefits. Therefore, in this technology, part of sugar and fat is replaced with natural ingredients. The use of multigrain further improves the nutritional quality of cookies. The cookies thus prepared are crisp in texture, acceptable mouthfeel and appealing overall quality. The nutritional profile of cookies indicated that the total fat content decreased, the mono and polyunsaturated fatty acid profile of cookies improved apart from increase in protein and dietary fibre content by two-fold and three-fold respectively.



Technologies Transferred

- ✦ Dehydration of coriander foliage (Landcraft Agro LLP, Kolhapur)
- ✦ Online fortification of atta (whole wheat flour/maida) (Refined wheat flour), High protein biscuits, High protein rusk, Multigrain nutra cookies (Nutrivite Pvt Ltd., Maharashtra)
- ✦ DOLY MIX, a ready to use mix for soft and enhanced number of IDLYS (GL Enterprises, Bengaluru)
- ✦ Food for diabetics (Biosprout Natural Pvt Ltd., Kerala)
- ✦ Low GI beverage for diabetics (Winter Greens Pvt Ltd., Kerala)
- ✦ Ready to cook multigrain whole mix for drink/porridge (Mr. Subramanya Kini K, Udupi, Elite Agro Specialities, Kerala)
- ✦ Instant traditional foods: Rasam, sambar, fermented and dehydrated ready mixes for Idli/dosa batter. Ready mix: Upma, Maddur vada (Ms. Rupinder Kaur, Barnala)
- ✦ Groundnut (Peanut) butter (Mr. Ajay P, Bengaluru)
- ✦ Sugar free biscuits, cake, rusk, cupcake and bread (Bit Baker, Kerala)
- ✦ Compounded asafoetida (The Boudhi Tree, Ahmedabad)
- ✦ Eggless cake premix (Falahgo Agrotrade (OPC) Pvt Ltd., Kolhapur)
- ✦ Tomato products: Preparation (Tree Top Food

Products, Calicut)

- ✦ Quick cooking, germinated & dehydrated pulses (Kountry Kitchen Pvt Ltd., Andhra Pradesh)
- ✦ Process for extension of shelf life of bread with natural preservatives & Shelf Stable Muffins with natural preservatives, preparation of gluten free bakery products (Satyacorp Foods Pvt Ltd., Kolkata)
- ✦ RTS Fruit juices and beverages (Maraca Fruit Processing Company, Kerala)
- ✦ Nutra chikki with added spirulina (Annapurneshwari Mahila Chikki Utpadakara Sangah, Chitradurga, Kallayee Kadalai mittai Kuzhu, Thiruvannamalai Dist, Podhigai women SHG, Thiruvannamalai Dist, Navatha SHG, Andhrapradesh, Mallikarjuna SHG, Andhra Pradesh, Sri Shakthi, Andhra Pradesh, Spandana SHG, Hobli, Health India Wealth India Trust, Kolar)
- ✦ Rural based biotechnological production of spirulina (Navachethana SHG, Hobli, MMorphosis Pvt Ltd., Mysuru)
- ✦ Chicken & egg wafers (A Begins Enterprises, Karur)
- ✦ RTS fruit juice and beverages (Hopcoms, Mysuru)
- ✦ Pickles and chutneys: Preparation (Mr. R. Jagadeeswaran, Erode)
- ✦ Eggless cake premix, baking powder (Maa Kailadpvi Ji Foodtech India Pvt Ltd., Gwalior)

Entrepreneurs Speak...

The origin of Srinivasa Farms dates back to 1965. A brand leader in the Indian Poultry Industry for five decades with a strong foundation based on a powerful vision and extraordinary leadership, combined with an uncompromising focus on technological excellence and proven operational efficiency.

Product Range and Brands

A diverse portfolio of products and services include Poultry Breeding (Layer & Broiler), Animal Feed

Production, Animal Health & Nutrition, Soya extractions, Chicken processing, Chicken retail, Value added products, Retail eggs & Mega Food Park. The business operations are spread across various states and further expanding rapidly across pan India.

Vision and Challenges

We are a business house empowering communities in achieving food security. As a trusted and reliable partner to all stakeholders, we are committed to our customers getting value and being delighted to do business with us. Our purpose is to provide quality and affordable nutrition.

Role of CFTRI in catalyzing growth of our firm

CSIR-CFTRI has provided the technology transfer of RTE products- Egg wafers, egg crunchy bite, dehydrated egg cubes and egg loaf. The support provided to us throughout the entire process has been very helpful, and we have been recognized as important stakeholders.

Advice to Emerging Start-ups

We would like to encourage the start-ups to visit CSIR-CFTRI, Mysuru to learn more about the process and to see samples and demonstration of trial products related to food technology. All of the deliverables are specifically described in detail in the technology transfer documentation, which are are immaculate, whole and complete.

New Collaborations

DBT-Centre for Cellular and Molecular Platforms (C-CAMP), Bengaluru (May 20, 2022)

The MoU aims to support as a Knowledge Partner for the C-CAMP Social Immersion Innovation Program (SIIP) scheme in the theme of “Food and Nutrition”.



Aragen Life Sciences Pvt Ltd. (ALSPL), Hyderabad (May 25, 2022)

R&D programs for health and wellness in the domain

of nutraceutical/bioactive compounds have been initiated as part of this collaboration.

Zum Heilen Diagnostic & Therapeutics Pvt Ltd., Thrissur (June 29, 2022)

Collaborative project has been initiated on taste masking of cardamom and rosemary extract and incorporation in juices – namely mango and grape.



Events

National Webinar (May 5, 2022)

Webinar on “Fumigation and alternative methods for safe storage and trade of food grains: Current & future prospects” was conducted on May 5, 2022 in association with UPL Ltd, Mumbai. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI inaugurated the event and various eminent speakers delivered lectures.



Product Launch (May 9, 2022)

On May 9, 2022, Dhriti Bio Solutions, an incubator for the NPIC-CIF at CSIR-CFTRI, launched the product “Phimer, a biophilic polymer that can replace single-use plastic”. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI released the Phimer products during the event.



National Technology Day (May 11, 2022)

National Technology Day celebrations was held on May 11, 2022. Prof. K Chidananda Gowda, Former Vice-Chancellor of Kuvempu University, Shivamogga was the Chief Guest and delivered talk on “Artificial Intelligence (AI) and Blockchain”. Certificates were distributed to entrepreneurs who have taken technology from CSIR-CFTRI during 2021-22. Seven new technologies developed during 2021-22 were also released on this occasion. Sri. B.V. Sathyendra Rao, Chief Scientist, Head, Technology Transfer and Business Development, CSIR-CFTRI presided over the function.



TECHBHARAT 2022 (May 19-21, 2022)

- ✦ Techbharat 2022 (Edition 3.0), Empowering Agri-Tech & Food-Tech, an initiative of Laghu Udyog Bharathi-Karnataka (LUB-K) and IMS Foundation, Bengaluru was organised during May 19-21, 2022 at CSIR-CFTRI, Mysuru. Shri Kailash Choudhary, Union Minister of State for Agriculture & Farmer's Welfare, Govt. of India, Shri B.C. Patil, Hon'ble Minister for Agriculture, Govt. of Karnataka were Chief Guests for the inaugural session of the event on May 19, 2022. The Guests of Honour Shri Kris Gopalakrishnan, Former CEO, Infosys Technologies & Chairman, Axilor Ventures, Dr. M. Angamuthu, IAS, Chairman, APEDA, Dept. of Commerce, Govt. of India, Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI graced the event. The dignitaries inaugurated the Mobile Food Processing Unit developed by CSIR-CFTRI and witnessed the demonstration by Drone Federation India & Drone Technology companies.
- ✦ Shri Jitendra Singh, Minister of State (IC), Ministry of Science and Technology & Ministry of Earth Science & Minister of State in the PMO was the Chief Guest on May 20, 2022 and released the products developed by CSIR-CFTRI. Director, CSIR-CFTRI presided over the function. The Hon'ble Minister along with Sushri Shobha Karandlaje, Hon'ble Minister of State for Agriculture

& Farmers' Welfare, Govt. of India, inaugurated EXPO of the main event of TechBharat 2022 and visited CSIR-CFTRI and CSIR Pavilions. He also inaugurated CSIR-CFTRI Showcase, released Coffee Table Book covering 72 years of Journey of CSIR-CFTRI, monograph on Spices, interacted with scientists and visited various facilities of CSIR-CFTRI.



- ✦ On May 20 & 21, 2022, as part of the TechBharat 2022 event, a number of panel discussions on wide range of topics, including agriculture development, food business ecosystem, opportunities for women in agritech and food protech, trends in food technology, etc., were held. Business meets and interactions with the Exhibitors & Incubates were also held at the main event.

Azadi Ka Amrit Mahotsav Webinar Series

Webinar on "Technologies on Nutritional Security" under Theme Agri & Nutri Biotech (ANB) – Event No. iCEN10 coordinated by CSIR-CFTRI was held through virtual platform on May 30, 2022, which was organised under I-CONNECT, Ministry of Science & Technology. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI was the theme coordinator for the event.



On June 2, 2022, Prof. Hosahalli Ramaswamy, Department of Food Science and Agriculture Chemistry, McGill University, Canada gave a talk on the topic "Thermal Processing: A Journey from Apparet to Pascale." Dr. Sridevi Annapurna Singh, rendered presidential remarks.

World Nutrition Day (June 1, 2022)

World Nutrition day celebration was held on June 1, 2022 organized by AFSTI(I) and CSIR-CFTRI. Dr. S. Kowsalya, Registrar, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore was the Chief Guest for the event and delivered World Nutrition day lecture on "Nutrition and Life Style-Disease Management". Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function and delivered Nutrition day talk on "Malnutrition".



Environment Day (June 6, 2022)

As part of World Environment Day celebration Tree planting ceremony was held on June 6, 2022 in CFTRI Campus. Shri H.S. Chandrashekar, Deputy Range Forest Officer, Territorial Range, Mysuru graced the function in presence of Director, CSIR-CFTRI and staff.



World Food Safety Day (June 7, 2022)

World Food Safety Day celebrations was held on June 7, 2022 at CSIR-CFTRI organized by AFSTI(I) and CSIR-CFTRI. Students and teachers from various schools and colleges of Mysuru participated for awareness programme of Food Labelling and Food Adulteration. Dr. A.K. Srivastava, President, AFST(I) delivered keynote address and Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI addressed the students on safety aspects of food.



Product Launch (June 12, 2022)

On June 12, 2022, the product "Jellnex: An indigenous natural and edible hydrocolloid as stabiliser, emulsifier, and thickening agent for food applications" was officially launched by the startup at NPIC-CIF, Duosis Bioinnovations Pvt Ltd. The product was released by Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI.



International Yoga Day (June 21, 2022)

CSIR-CFTRI staff and students participated in International Yoga Day 2022 held on June 21, 2022 at Mysuru palace which was Inaugurated by Sri Narendra Modi, Hon'ble Prime Minister, Govt. of India.



JIGYASA (June 24, 2022)

On 24-06-2022 students from CSIR-CFTRI school, Mysuru visited CSIR-CFTRI as part of Jigyasa programme. 50 students and 2 teachers participated in this event called "Jigyasa Inauguration". The students interacted with scientists to learn about Food Science & Nutrition. A lecture on "Importance of Artificial Intelligence in our daily life" was delivered by Dr. Mahanand, HoD, (Inf.Sci & Tech), Jayachamarajendra College of Engineering, Mysuru.



Visitors

- ✦ Dr. C.N. Ashwath Narayan Hon'ble Minister of Higher Education, IT, BT and S&T, Skill development, Entrepreneurship & Livelihood, Govt. of Karnataka visited CSIR-CFTRI on April 8, 2022 and interacted with scientists. After interaction, he was taken around to various facilities including the CSIR-CFTRI Incubation Center (NPIC-CIF) funded by GoK.
- Commodore Amit Rastogi (Retd.), CMD, NRDC, New Delhi visited CSIR-CFTRI on April 12, 2022. He interacted with scientists on Technology transfer and Incubation services and was shown various facilities including CSIR-CFTRI Incubation Center (NPIC-CIF) funded by GoK.



- ✦ Shri A G Thankappan, Chairman, Spices Board; Shri D Sathiyar IFS, Secretary; Dr. A.B. Rema Shree, Director and other team members of Spices Board visited CSIR-CFTRI on April 27, 2022. The team interacted with scientific staff and various facilities of CSIR-CFTRI were shown.



Short-term courses (July-Aug, 2022)

- ✦ Nutri- cereal process & products technology (Jul 04–08)
- ✦ Baking science and technology (July 11-15)
- ✦ Post-harvest technologies for fruits and vegetables (July 18–29)
- ✦ Application of LC - MS in (glyco) protein characterization (Aug 01–05)
- ✦ Safety of food in plastics and metal packaging (Aug 10–12)
- ✦ Science of sugar & chocolate confectionary (Aug 17-19)
- ✦ Chromatographic technique (GC, HPLC, UHPLC) and their analytical approaches in food analysis (Aug 22-26)

Selected Publications

- ✦ Pahwa, H., Sharan, K., Food and nutrition as modifiers of the immune system: A mechanistic overview, *Trends Food Sci Technol.*, 2022, 123, pp. 393-403. (IF: 12.563)
- ✦ Mondal, P., Kaur, B., Natesh, J., Meeran, S.M., The emerging role of miRNA in the perturbation of tumor immune microenvironment in chemoresistance: Therapeutic implications, *Semin. Cell Dev. Biol.*, 2022, 124, pp. 99-113. (IF: 7.727)
- ✦ Lokesh, D, Suresh, P.S.N., Kammara, R., PeSTK db a comprehensive data repository of Probiotic Serine Threonine kinases, *Sci. Data*, 2022, 9(1), art. no. 282. (IF: 6.444)
- ✦ Arya Devi, K.P., Shimoga Janakirama, A.R., Martin, A., SIRT1 activation by Taurine: in vitro evaluation, molecular docking and molecular dynamics simulation studies, *J. Nutr. Biochem*, 2022, 102, art. no. 108948. (IF: 6.048)

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