

FoodPro

October-December 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



Kannada Rajyotsava Day



Fit India Freedom Run



ಸಿ.ಎಸ್.ಐ.ಆರ್.-ಕೇಂದ್ರೀಯ ಆಹಾರ ತಾಂತ್ರಿಕ ಸಂಶೋಧನಾಲಯ, ಮೈಸೂರು
ಸೀಎಸ್‌ಒಐಆರ್-ಕೇಂದ್ರೀಯ ಖಾಘ ಪ್ರೌಢೋಗಿಕ ಅನುಸಂಧಾನ ಸಂಸ್ಥಾನ, ಮೈಸೂರು
CSIR-Central Food Technological Research Institute, Mysuru

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

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Research Highlights

Drying kinetics, phytochemical profile and antioxidant potentials of *Coffea robusta* leaves and its valorization as a functional beverage

Coffee leaves are traditionally consumed as coffee leaf tea and are known to have medicinal properties in the traditional coffee growing regions. These leaves in the form of agri waste obtained during pruning is rich in phytochemicals and emphasis is laid for its valorization and utilization in food industries is. This gives a new outlook to the coffee industry and an increased source of income to the coffee farmers. In this article, insights on application of coffee leaves (*Coffea robusta*) as a functional beverage with respect to its processing and sensory evaluation was emphasized. Cross-flow drying was significant in terms of kinetics, rapid drying rate, moisture ratio and was modelled successfully by Page equation ($R^2 = 0.998$). Chlorogenic acid (32-33 mg/g) was one of the

major phytochemicals followed by quercetin (2-4 mg/g), caffeine (2-5 mg/g) and trigonelline (3-8 mg/g) contributing to significant antioxidant activities. Coffee leaves contain volatiles like methyl salicylate, 2, 4-decadienal, methyl tetradecanoate having green and floral aromas that govern the coffee leaf infusions. Hot infusions asserted significant yield (47.7 %), pH (6.54), °Brix (1.3), phenolics (89.9 mg/g) and other phytochemicals ensued by cold infusions and cold brew with an appealing hue. Sensory attributes are favourable with herbal, grassy, floral and bitter notes. Thus the cold beverage can be a soothing drink during summers and hot infusion more stimulating in the winters. This work provides insights on valorising coffee leaves in designing a functional beverage, besides adding economic value to the coffee industry.

(Patil, S., Pushpa, Murthy, S. Drying Kinetics, Phytochemical Profile and Antioxidant Potentials of *Coffea robusta* Leaves and its Valorization as a Functional Beverage, (2022), *Waste Biomass Valor* 13, 4239–4251)

IPR in the Horizon

Patent Filed

A method for Linalool synthesis in *Saccharomyces cerevisiae*, Sarma Mutturi Venkata Ravi Krishna,

Aneesha Abdullah, Nabarupa Gupta, Kalaivani Paramasivan, App.No.202211058469, 12-10-2022.

New Technologies

Process for Production of Quinoa Germ

Quinoa (*Chenopodium quinoa*), a super food, is popular for its high-quality proteins with a balanced amino acid profile and nutritionally favorable lipids. Quinoa differs in structure than conventional cereals with a peripheral germ containing most of the protein and fat reserve along with mineral. The germ is about 27% of the grain, which is much higher compared to any other conventional cereal. Quinoa germ is a potential individual nutrient dense component with numerous applications in food and pharma industries. Presently, there is no process available to separate germ from quinoa as the separation process is very challenging due to small grain size and complex structure. CSIR-CFTRI has developed a dry physical process which is more eco-friendly compared to wet method and scalable to industrial level. The novel process enables

separation of germ from quinoa with a recovery of >80% yield and purity. Germ obtained by developed process has higher protein with Lysine (6.00 g / 100 g) and Threonine 3.63 g / 100 g content that, meets the adult requirements suggested by WHO, 2007. Good quality of fat with more than 80% unsaturated fatty acids, good source of mineral content, antioxidant capacity, quinoa germ is a healthy food choice. Separated fractions with higher nutritional value have numerous functional applications in food industry. Specifically, germ and bran fractions can be used for the development of nutraceutical food products.



Germ



Bran



Flour

Technologies Transferred

- ✦ Fermented & dehydrated ready mix for *Dosa* batter (Vasavi Foods, Telangana)
- ✦ Tamarind juice concentrate (Kakaria Exim India Limited, Umbergaon)
- ✦ Virgin coconut oil (Kareeda Agroforedlings LLP CPP, Kannur, Premier Coco Products, Coimbatore)
- ✦ Pickles & chutneys: Preparation (Mrs. Sowmya Rani, Mysore)
- ✦ Tamarind candy, pickles & chutneys: Preparation (Mrs. Geeta Saxena, Chhattisgarh)
- ✦ Preparation of ready to cook multi grain whole mix for drink/porridge (Mr. Darshan, Hosadurga)
- ✦ Pickles and chutneys: Preparation (Mrs. Rajalakshmi R Vishnu, Coimbatore)
- ✦ Preparation of beverage mix from malted Ragi (RamGold Organics, Ramanagara)
- ✦ Legume based pasta (Nurrishelite Diversities LLP, Kodagu)
- ✦ Ragi based papads (Mrs. G.R. Shashikala, Tumkur, S.C.S.Flour Mill and Condiments)
- ✦ Fruit syrups and squashes (Udupi Home Made)
- ✦ A Green process for production of Methylxanthines for food and other applications (Vedaatmana IT & Abtes, Mysuru)
- ✦ RTS fruit juice and beverages (Mr. Rupesh Dilip Late, Maharashtra)
- ✦ Ready mix: Jamun, Instant traditional food: Sambar (Kalparuchi Foods Pvt Ltd, Bengaluru)
- ✦ Online fortification of atta (Whole wheat flour/Maida, refined wheat flour) (Fortify Health at development consortium, New Delhi)
- ✦ Process for production of Quinoa germ (C and I Calibrations Pvt Ltd, Rajasthan)
- ✦ Preparation of beverage mix from malted Ragi (Aesthebio, Bengaluru)
- ✦ Fruits & vegetables: Canning (Shri Varalakshmi Sago Foods Pvt. Ltd, Tamilnadu)

Entrepreneurs' Speak.....

PICK N SERVE FOODS PVT LTD are the fastest growing Fresh Produce company in India with dedicated professional operations team for the management of the Contract Farms, supply chain management from Farm to Port till it reaches to customer. The management of the company has two decades of experience in working with Fresh Produces like Banana, Pomegranates, Grapes, Mango, Papaya & strawberry, Onions etc. The purpose of entering into highly competitive Fresh Produce industry is to leverage the Indian Agribusiness opportunities for the nearest gulf market and South East Asian markets. We also want to cater the domestic consumers with Imported Fruits and Vegetables along with Indian fresh produces. Recently, we have started supplying Cut-Vegetables and Cut-Fruits to our domestic customers by getting the technical know-how from CSIR-CFTRI, the premier Institution in India in Food Technological researches.

Product ranges & brand:

Our cut vegetables brand is 'PICKFRESH'. We have different products in cut-vegetables like Leafy Vegetables, Basic Vegetables, Cole Vegetables, Recipe Based RTE Vegetables, Sprouts, etc. to cover the entire need of the consumers.

Vision & challenges:

To become one of the largest suppliers of cut-vegetables and cut-fruits to the end consumers all across India with technological interventions to streamline the supply chain with highest level of efficiency and add value to the end consumers' life.

Role of CFTRI in catalyzing growth of your firm:

We were searching the right kind of technological intervention for developing the Cut-Fresh business and found out that the CSIR-CFTRI has developed a robust system of process intervention for

increasing the shelf life while retaining the nutrients characteristics of the produce intact for longer period. We are thankful that we get the technology we were looking and get associated with CSIR-CFTRI in time to speed up the process and go to market faster.

Your advice to emerging startups:

Startups looking to enter into Cut-Vegetables business may seek the technology from CSIR-CFTRI as has been proven with right kind of support at any point of time during the product development phase which is crucial for any startups. The CSIR-CFTRI team is highly skillful and approachable anytime and they are helping the new startup companies to the best of their abilities.



New Collaborations

Karnataka Health Promotion Trust (KHPT), Bengaluru (October 3, 2022)

Under this MoU, the expertise of CSIR-CFTRI will be utilized to develop flour fortification initiatives in the public and private sectors, as a means of combating malnutrition in the nation.

Development Consortium, New Delhi (October 10, 2022)

A MoU was signed between CSIR-CFTRI and Development Consortium for implementation of flour fortification initiatives through non-government, open market, and government streams for addressing malnutrition in the country.

Defence Food Research Laboratory (DFRL), Mysuru (November 16, 2022)

CSIR-CFTRI has initiated a collaborative project with DRDO-DFRL on the development of postbiotics fermentation formulation for the management of diabetes, hyperlipidaemia and gut health.



Central Pulp and Paper Research Institute (CPPRI), Saharanpur (December 20, 2022)

This MoU was signed with the objective of fostering collaboration between the institutions to promote research, development and innovation activity at both the institutions.



Short-term courses (Dec 2022-Jan, 2023)

- ✦ Fumigation prophylaxis and pest management techniques for stored food commodities (Dec 2-16, 2022)
- ✦ Applications of sophisticated analytical instruments (FT-IR GC-MS HRMS IR-MS & NMR) in the analysis of biomolecules in food (Jan 9-13, 2023)
- ✦ Extraction and quality assurance of edible fats and oils (Jan 16-18, 2023)

Events

Ayurveda day (October 10, 2022)

On October 10, 2022, CSIR-CFTRI hosted an Ayurveda Day programme. As part of the event, Dr. Kavya delivered a talk on "Disease Preventive Modalities in Ayurveda". Free health check-up for employees and students and distribution of free medications were also organized.



CSIR Foundation Day (October 25, 2022)

CSIR Foundation Day and World Food Day celebrations were held on 25th October, 2022. Dr. Chindi Vasudevappa, Vice-Chancellor, NIFTEM, Kundli, Sonapat (Haryana) was the Chief guest and delivered the Chief Guest address on the topic "Social obligations for Food Scientists". Shri R.K. Labh was the Guest of Honour and Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over. The dignitaries distributed prizes to school children who won CSIR foundation competitions as well as Mementoes to retirees and staff.



CSIR-CFTRI Foundation Day (October 26, 2022)

The 72nd CSIR-CFTRI Foundation Day celebration was held on 26th October, 2022. Padmabhushan Dr. T. Ramasami, Former Secretary, Department of Science & Technology was the Chief Guest and delivered Foundation Day Address. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided. The Annual Institute Awards were presented on the occasion.



Kannada Rajyotsava Day (November 1, 2022)

Kannada Rajyotsava celebration was conducted on 1st November, 2022 and the programme was graced by Prof. C.P. Krishna Kumar, Poet & Writer and former President, Kannada Sahithya

Sammelana as the Chief Guest. The Director, CSIR-CFTRI and Chief Guest hoisted the Flag on this occasion.

Vigilance Awareness Week (November 4, 2022)

The Vigilance Awareness week celebrations were held on 4th November, 2022 at CSIR-CFTRI. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the event and Shri H.S. Sathish, Chief Scientist addressed the gathering. Prizes were distributed to the winners of various competitions conducted as part of the celebration.



SciFinder Training (November 17, 2022)

Training Programme on CAS SciFinder Discovery Platform for Scientific research was held on Nov 17th, 2022. The software was demonstrated to the staff/students by Ms. Nikita Karandikar, Customer Success Specialist, American Chemical Society.

ISMT Course Award Ceremony (November 21, 2022)

The award ceremony and valedictory function of 41st ISMT course was held on 21st November, 2022. The valedictory address was given by Mr Haris Nellikote, Director, Parisons Foods Pvt. Ltd., Kozhikode (Kerala). The occasion was presided over by Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI and medals were presented to meritorious students.



Constitution Day (November 26, 2022)

Constitution Day was celebrated on 26th November, 2022 at CSIR-CFTRI. Sri Shivasundar, Journalist & Social Activist was the Chief Guest and delivered the special Address on “Indian Constitution: Values & Principles”. Shri H.S. Sathish, In- Charge Director and Chief Scientist, presided over the function. The Preamble of the Constitution was read by the gathering.



Dr. B. R. Ambedkar Mahaparinirvan Diwas (December 6, 2022)

In Commemoration of 67th Death Anniversary of Bharath Ratna Dr. B. R. Ambedkar Mahaparinirvan Diwas was observed on 6th December, 2022 at CSIR-CFTRI. Floral tributes were offered by Director, CSIR-CFTRI & staff of the Institute.



JIGYASA (December 7, 2022)

CSIR JIGYASA Scientist - Student Connect Program was conducted by CSIR-CFTRI on December 7th, 2022. About 120 students from Kendriya Vidyalaya schools from Mysore, Mandya, BRBNMPL and Chamarajanagar participated in the programme.



Workshop (December 9, 2022)

Hybrid workshop on “Egg-based value-added products – Processing, Packaging and Preservation” conducted by CSIR-CFTRI was held on December 9th, 2022 under Integrated CSIR Skill Initiative. Shri H.S. Sathish, In-Charge Director presided, and various talks were delivered and technologies were demonstrated by scientific staff. About 40 participants attended the training program.



Fit India Freedom Run (December 23, 2022)

“FIT INDIA FREEDOM RUN 3.0” was Organized on 23rd December, 2022 in CSIR- CFTRI campus. Deputy Commissioner and also the District Magistrate of Mysuru District Dr. K V Rajendra, IAS, flagged off the event and Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over. About 200 participants, including staff and students of the Institute took part in the event covering 3 km.

MSc Course Award Ceremony (December 23, 2022)

Presentation ceremony of medals, awards and scholarships to M.Sc (Food Technology) students was held on 23rd December, 2022 at CSIR-CFTRI. The Chief Guest, Dr. V. Prakash, Former Director, CSIR-CFTRI & Distinguished Scientist, CSIR delivered the inaugural address and distributed medals, awards and scholarships to meritorious students. The occasion was presided over by Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI.



Visitors

- ✦ ASC student Army Officers (SO-68) visited CSIR-CFTRI and its facilities on 21st November 2022.
- ✦ Denmark delegation consisting of Dr. Jakob Williams Ørberg, Senior Advisor & India Lead and

Ms. Louise Hindenburg, Team Coordinator, Novo Nordisk Foundation visited the Institute on 8th December, 2022 and interacted with scientists to explore possible alignments in the fields of biotech, preventive measures for lifestyle disorders, combat malnutrition, etc

Technical and Invited Talks

- ✦ Dr. Asha M.R., Traditional Food and Applied Nutrition Department, CSIR-CFTRI gave Technical seminar on the topic “Emotional Intelligence” on 11th October, 2022.
- ✦ Dr. Vinay Vyas, Associated Director, Bio Pharmaceutical Development Programme (BDP), Frederick National Laboratories for Cancer Research (FNLCR), USA delivered Technical talk entitled “Challenges to the Process Development and GMP manufacture of recombinant IL-15 for clinical trials” on 15th November, 2022.

- ✦ Dr. Prabha Sampath, Genome Institute of Singapore, A*STAR, Singapore presented a talk on “OncomiR-138: A Therapeutic Target for Malignant Gliomas” on 22nd November, 2022.
- ✦ Prof. M.P. Nagendra Murthy, JSS law College, Mysore delivered invited talk on “Sexual Harassment of Women at workplace” on 14th December, 2022.
- ✦ Shri Mukul Kanitkar, General Secretary Bharatiya Shikshan, Karnataka delivered an invited talk on “Science and Technology for Society” on 7th November, 2022.

Awards

Dr. Hrishikesh Tavanandi has received the Indian National Science Academy (INSA), New Delhi, Medal for Young Scientist. Dr. Hrishikesh has carried out his research work on “Ionic liquid based aqueous biphasic extraction for purification of phycocyanin”.

He is currently the PMFME Scheme Training Coordinator at CSIR-CFTRI, Mysore. He received this honour from INSA President Prof. Chandrima Shaha at the CSIR-National Institute of Oceanography on December 16th, 2022, during 88th Annual General Meeting of INSA.

Selected Publications

- ✦ Torbica A., Radosavljević M., Belović, M., Tamilselvan T., Prabhasankar P., Biotechnological tools for cereal and pseudocereal dietary fibre modification in the bakery products creation – Advantages, disadvantages and challenges, *Trends Food Sci. Technol.*, 2022, 129, pp. 194-209. (IF: 16.002)
- ✦ Trideva Sastri, K., Vishal Gupta, N., Anbarasu Kannan., Balamuralidhara V., Ramkishan A., Potential nanocarrier-mediated miRNA-based therapy approaches for multiple sclerosis, *Drug Discov. Today*, 2022, 27(11), art. no. 103357. (IF: 8.369)

- ✦ Kumar G., Arya M., Radhika P., Giridhar Parvatam., Genome-wide identification, characterization of Serotonin N-acetyltransferase and deciphering its importance under development, biotic and abiotic stress in soybean, *Int. J. Biol. Macromol.*, 2022, 220, pp. 942-953. (IF: 8.025)
- ✦ Mary P.R., Mukesh Kapoor., Co-culture fermentations suggest cross-feeding among *Bacteroides ovatus* DSMZ 1896, *Lactiplantibacillus plantarum* WCFS1 and *Bifidobacterium adolescentis* DSMZ 20083 for utilizing dietary galactomannans, *Food Res. Int.*, 2022, 162, art. no. 111942. (IF: 7.425)

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