

FoodPro

April-June 2021



Fortified Mango Bar



Spirulina Choco Bar & Cereal Bar



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Research Highlights

An exploratory trial of food formulations with enhanced bioaccessibility of iron and zinc aided by spices

Iron deficiency anemia and zinc deficiency have continued to be major nutritional problems in developing countries in all age groups including children. Poor bioavailability of minerals from plant foods due to presence of phytic acid is identified to be the major etiological factor. Complementary food mixes (CFM) and Indian flat bread mixes (IFBM) comprising of cereals and pulses were formulated in the Institute. Bioaccessibility of iron and zinc was enhanced by dephytinisation of the mixes by thermal treatment and further promoted by addition of acceptable spices at 1-2% level. Among the spices tested, cumin enhanced the *in vitro* protein digestibility to the maximum extent followed by fennel, cumin and ajwain. Ajwain and fennel enhanced the bioaccessibility of iron in CFM and cumin in IFB to a significant extent. Fennel enhanced the bioaccessibility of zinc to a maximum extent in both the products. On the whole, spices enhanced the bioaccessibility of iron

by 3-6 fold in CFM and 1.7-2.5 fold in IFBM and zinc bioaccessibility was enhanced by 1.2-2.0 fold in both the products. The increased bioaccessibility of iron and zinc in the products can be attributed to degradation of phytic acid, release of minerals entrapped in the food matrix by thermal treatments and improved digestibility of starch and protein hydrolysis by the spices. Addition of spices to these formulations at sensorial acceptable levels is a promising food based approach for alleviation of iron and zinc deficiencies.

(Source: Aishwarya Jaiswal, Vansdeep Patania and Jyothi Lakshmi A, 2021; *LWT Food Science and Technology*, 2021, 143)

Valorization of black gram by-product protein using ultrasonication and micronization

The milling of black gram generates substantial amount of by-product. Although black gram by-product is a valuable protein-rich source owing to its germ fraction, no attempts have been made to valorise it. As a result, the valorization of protein extracted from black gram using ultrasonication and micronization was attempted and the functional properties were compared.

The micronization increased water absorption capacity by 73%, and also improved emulsifying activity and zeta potential of protein. Ultrasonication technique yielded better results in the case of oil absorption capacity which increased by 15% and foaming capacity by 70%. Thermal analysis indicated changes in structure of protein, particularly in the case of ultrasonication. The structural analysis suggested changes in the protein sub-units; however, no changes were recorded in secondary structure of the protein. The outcomes suggested that the micronization (thermal) and ultrasonication (non-thermal) treatments has affected protein functionality differently and

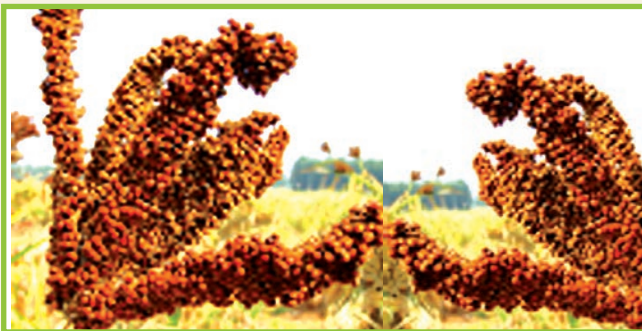
hence can be selected according to the desirable end-use. For instance, micronized black gram by-product protein could be used as potential binder/emulsifier agent in products where binding or oil-water interface is crucial. However, the sonicated protein can find application in products requiring suitable air-water interface properties. Therefore, this study indicates the potential of these techniques for the valorization of by-product proteins.

(Source: Mohammad Hassan Kamani, Jyoti Semwal, Meera M S, 2021; LWT Food Science and Technology, 2021, 144)

New Technologies

Ragi based biscuits

Biscuits, an all-time snack are ready-to-eat, convenient and low cost food product that is consumed among all age groups. They are easy to carry during travel in variety of pack sizes suiting to



individual tastes with a good shelf life. Biscuit apart from offering good taste, provide substantial energy having wholesome and nutritious quality at

affordable prices. Biscuits can function as a vehicle of nutrition to either common man or to targeted groups. There is potential for healthy/therapeutic products like sugar free, high fiber, low calories etc. As ragi is a rich source of protein, dietary fiber, vitamins and minerals, ragi has been utilized in the preparation of biscuits. Ragi based biscuits are made from soft dough based on creaming and processed in Rotary Moulder. The biscuits are baked in the continuous tunnel type oven as followed for sweet soft dough type biscuits. The technology of Ragi based biscuits is ready for transfer.



Herbal disinfectant and sanitizer products

Due to Covid-19 pandemic there is considerable demand for sanitizer and disinfectant products. In this direction, CSIR-CFTRI has developed five different herbal disinfectant and sanitizer products (aerosol disinfectant, liquid & gel based hand sanitizers, potable and bulk goods spray disinfectants) with proven potential of antimicrobial actions against the most common bacteria viz., Escherichia coli, Staphylococcus aureus, Salmonella and Bacillus cereus. Further, validation on COVID-19 virus has revealed 99% viral reduction or disinfection. These intended products could be used as disinfectant in mist sanitization system or walk-in chambers. Furthermore, the formulation could also be used as aerosol spray, liquid or gel based hand sanitizers and bulk goods disinfection systems. The formulated ingredients have GRAS status.

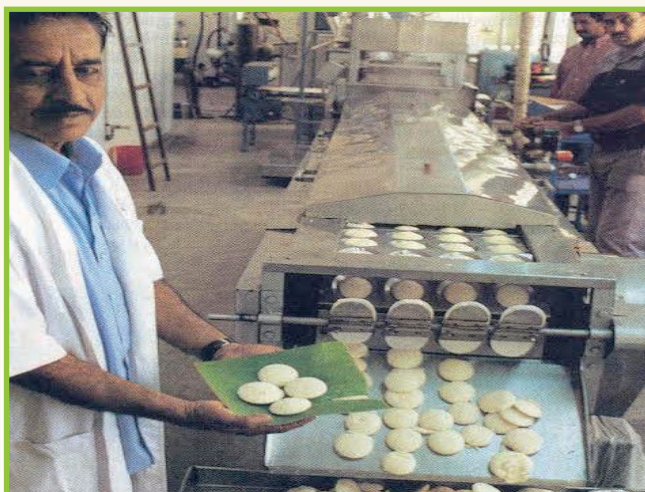
Technology scale up studies and field trials were carried out and the products were found as potential alternatives to chemical disinfectants and sanitizers. Product storage/stability studies suggested that the products are safe and stable. Also these herbal formulations did not cause any adverse effects like allergic reactions/irritations on the skin and body.



Technologies Transferred

- ✦ RTS Fruit juice and Beverages (Mr. Kavan Raje Ursu, Periyapatna; State Mission Management Unit, Aizwal)
- ✦ Spirulina Choco bar and Spirulina Cereal bar (Algae Centre, Tirupur; Servosonic Foods, Kerala)
- ✦ Nutra Chikki with added Spirulina (Algae Centre, Tirupur)
- ✦ Tomato products: preparation (Manikonda Foods OPC Pvt. Ltd., Telangana)
- ✦ Nutri Fruit bars with immune boosters (Integrated Management Services, Mumbai)
- ✦ Shelf Stable Chapati (Shivtara Grain Milling Pvt.Ltd., Patancheru)

- ✦ Continuous idli making unit (Tarani Foods Pvt. Ltd., Hyderabad)
- ✦ Modified atmosphere packaging of minimally processed vegetables (Aparna Agro, Belgaum)
- ✦ Fruit syrups and squashes (State Mission Management Unit, Aizwal)



Entrepreneurs Speak...



SIA Fresh Foods Private Limited, Chennai was incorporated in the Year April 2020, a startup officially recognized by Department for Promotion of Industry and Internal trade (DIPP), GOI which is managed by young Ex-corporate professionals with a diverse background.

Products Ranges and Brand

Our company is selling Fresh Fruits, Vegetables and Processed Vegetables retail sales through our own mobile app under the brand name "I Love Fresh" which is available on both Google Play store and as well as iOS APP store. We are also planning to include other daily essentials, groceries to our customers very shortly.

Vision and Challenges

The essentials e-commerce purchase is growing at a CAGR of 20% every year and being a start-up, we want to utilize this growing space and create value addition to our customers and generate more employment to the people. Currently, we are providing services in 10 pin code locations at Chennai and we want to spread out the operations throughout Chennai city in the next 2 years.

We are a boot-strapped startup with funding limits which has its limitation in competing with big players and controlling the wastage is a big challenge. To minimize wastage, we have started with next day delivery which gives us time

to collate the day's orders and procure raw materials accordingly.

The delivery of the goods in proper condition is a task as we're dealing with various types of fruits and vegetables in varying maturity stages. Soft items tend to get damaged easily in bulk packaging and in transit so better packaging techniques and handling methods are a constant work in progress.

Role of CFTRI in catalyzing growth of your firm

The brand name of CFTRI has by itself been a source of respect among the public. The learning gained with reference to product preservation and shelf-life enhancement has been immense and we have been implementing the same at our firm.

Minimally Processed Vegetables technology of CFTRI will foster the growth of our brand because the majority of the population prefer to cooked food at their home to be healthy and also, they like to strike a balance between eating home cooked food and eating outside There is a need for convenient product like Minimally processed Vegetables and Fruits which will encourage individual, working women's and families to cook healthy food regularly at their home.



The introduction of cut vegetables in the near future has already been welcomed by many for its

Your advice to emerging startups

- ✦ Connect with respective technology research institutes like CFTRI for your product development and also to understand the industry best practices.
- ✦ Make use of every opportunity to learn and never shy away from any responsibilities be it big or small.
- ✦ Create a budget and examine your source of funds even before you start, keeping in mind that reaching the break-even point could be a year away.

convenience and hygienic methods of packaging.

- ✦ Survival of the fittest is the norm in every industry and creating a brand, a name for your firm among hundreds and thousands of firms will take time. So patience and constant self-assurance is important.
- ✦ Don't be afraid to make changes to your business plan. Changing along with customer preferences and social conditions will only help your business grow in the long run.
- ✦ Do not focus on phenomenal short-term growth, instead aim at sustained long-term growth.

New Collaborations

Khadi and Village Industries Commission (KVIC), Mumbai on (April 16, 2021)

MoU was signed to collaborate in areas of mutual interest in developing the village industries

verticals covered under Gramodyog Vikas Yojana Scheme of the Govt. of India. CSIR-CFTRI will be sharing the knowledgebase for the Implementation of flagship programmes of KVIC such as SFURTI, PMEGP etc.

Events

Covid-19 Webinar (April 16, 2021)

Webinar on “Covid-19 Appropriate Behaviour and Vaccination Strategies (Kannada)” was held. The event was inaugurated by Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI. Dr. P.V. Ravindra, CSIR-CFTRI Covid Testing centre spoke on CSIR-Sero Survey & SARS Cov2 genomics. Dr. Mudassir Azeez Khan, Head, Dept. of Community Medicine, MMC&RI delivered talk on “Vaccination options and realising the herd immunity”. Dr. Kala R. Swamy, Chief Medical Officer,

CSIR-CFTRI spoke on “Covid-19: Clinical perspectives of Covid-19 positive patients” on this occasion.



National Technology Day (May 11, 2021)

National Technology Day 2021 was held at CSIR-CFTRI on 11th May, 2021 in the virtual mode. The Chief Guest, Dr. V. Prakash, Former Director, CSIR-CFTRI & Formerly CSIR-Distinguished Scientist delivered National Technology Day Lecture “Food Science for Food Technology”. Dr. Sridevi Annapurna Singh, Director, CSIR-CFTRI presided over the function. Dr. Rajesh Matche, Head, TTBD gave an overview of the technologies licensed to parties in 2020-21.



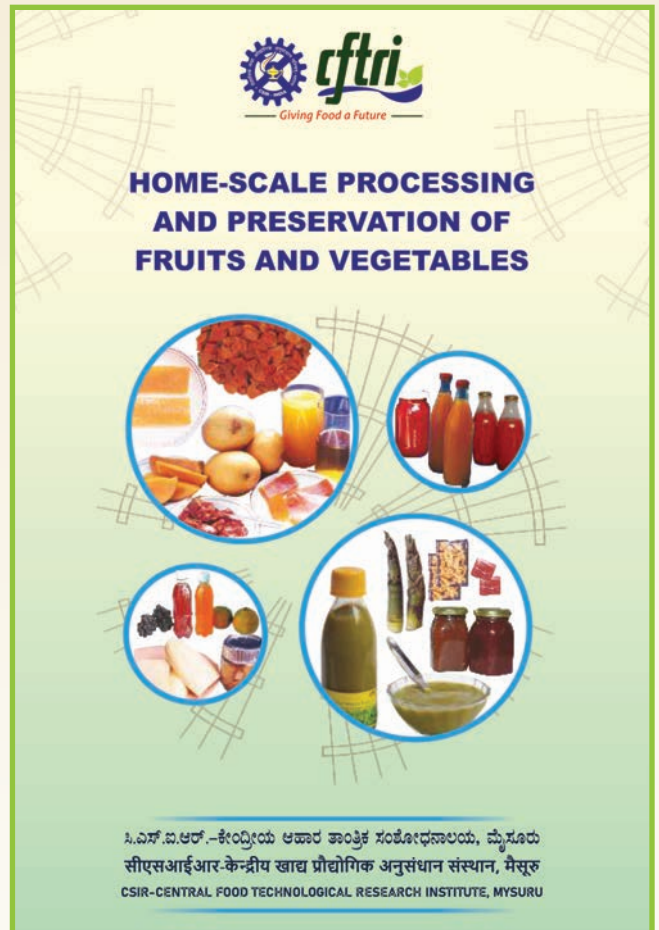
Monograph on Home-scale Processing and Preservation of Fruits and Vegetables

This monograph which is of comprehensive nature details basic principles as well as techniques adopted for preservation of fruits and vegetables, while highlighting the key technical points related to each of the processing techniques.

Various value added products from fruits such as Lemon, Orange, Mango, Tomato, Cashew apple, Sapota, Apple, Banana, Pineapple, Jackfruit, Guava, Grape, Papaya, Carambola, Loquat, Musk Melon, Bilwa and Palmyrah Palm Kernel are covered in detail.

The section on vegetables details about value addition to widely grown items such as Sweet turnip, green Chilies, Carrot, Peas, Peth and Bamboo, besides canning of non-acid and curried vegetables and drying protocols.

Cost: Rs.330/- (including Rs.30/- towards handling and postage charges by Registered parcel). Payment may be made by SBI Collect



For more details visit:
<https://www.cftri.res.in/publications>

Food Processing Machineries Portal

The B2B market is growing exponentially, and the food industry isn't lagging behind in adapting to the growing trend. Machinery suppliers, which serve to MSMEs and emerging entrepreneurs, are one of the primary stakeholders in the food processing business. CSIR-CFTRI being one of the leading R&D institutions in the country in the area of Food Technology, caters to the needs of the food industry, MSMEs and entrepreneurs. CSIR-CFTRI launched a Food Machinery Portal to facilitate a platform for sharing the details of the state-of-art food processing machineries marketed by manufacturers with entrepreneurs. There are 232 registered users with the portal. The portal will be a One-stop solution for both suppliers and buyers, which can ease out the challenges faced by entrepreneurs and startups.

Registration Link URL: <http://fmp.cftri.res.in>



Selected Publications

- ✦ Shewale, S.R., Hebbar, H.U., Low humidity air and radiofrequency wave based sequential drying of *Rosmarinus officinalis* for improvement of quality, *Ind Crops Prod*, 2021, 162, art. no. 113303. (IF: 4.244)
- ✦ Naveen, J., Baskaran, R., Baskaran, V., Profiling of bioactives and in vitro evaluation of antioxidant and antidiabetic property of polyphenols of marine algae *Padina tetrastrum*, *Algal Res.*, 2021, 55, art. no. 102250. (IF: 4.008)
- ✦ Jaiswal, A., Pathania, V., Lakshmi, A.J., An exploratory trial of food formulations with enhanced bioaccessibility of iron and zinc aided by spices, *LWT-Food Sci Technol.*, 2021, 143, art. no. 111122. (IF: 4.006)
- ✦ Talawar, S.T., Chetana, R., Roopa, B.S., Suresh Kumar, G., Effect of wheat bran oil concentrates on quality and nutrition of WBO dark compound chocolates, *LWT-Food Sci Technol*, 2021,142, art. no. 111005. (IF: 4.006)

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DIRECTOR

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

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