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## FROM DIRECTOR'S DESK



ICAR-CIPHET has completed 29 years and we celebrated 30<sup>th</sup> Foundation Day on December 29, 2018. During the past years this institute has been contributing to the post-harvest sector of agriculture and its allied branches

immensely. The second issue of ICAR-CIPHET quarterly newsletter for the year 2018 covers research outputs of this quarter-the chilli destalking machine, the stainless steel storage tank for fermented fish, refinement in rice flaking machine, processes for noodles supplemented with sprouted bengal gram and mint and cryogenic grinding of curry leaves. During this quarter, one winter school, seven EDPs and two farmers training were organized too. I am delighted to share the news that a patent on "Process for dehulling guar seed for refined guar gum split production" vide patent no. 302861 has been granted. The institute is highly involved in extension activities and has celebrated *Mahila Kisan Divas*, *Kisan Diwas* and World Soil Day to mention few and also has participated in five exhibitions and melas to showcase ICAR-CIPHET technologies. I appreciate all the scientific and non-scientific staffs for their contributions and look forward for better achievements in future.

Dr. RK Singh



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## Research Highlights

### Development of technology for destalking and packaging of dried chilli

-Kirti R. Jalgaonkar, Manoj K. Mahawar and Prerna Nath Kale

Chilli destalking prototype was designed and developed in order to mechanize destalking operation. The developed system consists of a feeding hopper, rotating drum, cutting blades, triangular bridges, rectangular slots, stalk collector and destalked chilli outlet. Trapezoidal feeding hopper with curved bottom surface made of stainless steel (SS) was fitted on a vibrator for uniform flow of chilli. Rotating drum (diameter:480 mm and length: 1870 mm) was made of mild steel and was embedded on a central shaft (30 mm diameter, 2060 mm length) supported on bearings. The power source to operate the machine was 1 HP motor, belt-pulley system was used to obtain desire rotation speed. The cutting blades (5 blades) were fitted on a sturdy assembly along the drum circumference. The triangular bridges made of polyurethane foam (PUF) were fitted hemi-spherically over the inner surface of drum throughout the length with a uniform spacing of 30 mm between the two bridges. Such bridges are 46 in number forming an isosceles triangle with the angle of 60° from the base. The length of each bridge was 300 mm. The rectangular slots from which protrusion of stalk needs to take place have 3-4 mm width (Fig. 1).

For performance evaluation, initially the feed rate was optimized to 6.5 kg/h, while drum speed (10, 15, 20, 25 and 30 rpm) and drum inclination (2, 3, 4, 5 and 6°) were varied at five levels. The best performance of machine was achieved, with the chillies having moisture content of 8-10 % at the feed rate of 6.5-7 kg/h, drum speed (20 rpm) and drum inclination (3°), respectively. The destalking efficiency of 85-87% along with 5-10 % unstalked chillies was observed while the machine was operated on the optimized parameters. The machine performance depends



Fig. 1. Red chilli destalking and packaging machine

significantly on the moisture content of chilli, speed and inclination of the rotating drum, feed rate and variety of chilli, however the spatial dimensions of chillies didn't affect the efficiency of the machine.

### Development of fermentation bin for experimental production of traditional fermented fish SHIDAL

-A U Muzaddadi & Dhritiman Saha

In Northeast states of India, small fish (*Puntius* spp.) are traditionally fermented in earthen vats, locally called *Mutkas* without applying any food additives like salt, carbohydrates etc. for preparation of *shidal*, a fermented solid product. These vats are specially made for shidal preparation which is subsequently processed following different steps including continual smearing the vats with fish or vegetable oil on both inner and outer sides and drying under sunlight for stabilization. This process takes a long time that may be about 15-20 days if broad sunlight is available. Further, these *mutkas* are fragile in nature, thus requires utmost care during packing and handling. Keeping this in view, a cylindrical container with the lid was fabricated in ICAR-CIPHET workshop by using stainless steel sheets with grade 304. This container was designed primarily to conduct different experiments so that the sampling process becomes easy and scientific. For this purpose three sampling apertures were kept along the length of the



**Fig. 2. (A) SS made Fermenting container and (B) Traditional Fermenting container (*mutka*)**

**Table 1. Different measurements and specifications of stainless steel container developed**

Measurements/specifications	Value
Height (cm)	50.8
Body diameter (cm)	23.44
Lid diameter (cm)	24.65
Cylinder circumference (cm)	73.65
Lid circumference (outer)	77.45
Weight (g)	4480
SS sheet thickness (cm)	0.12
Base area of cylinder (cm <sup>2</sup> )	431.5
Lateral area of cylinder (cm <sup>2</sup> )	3741
Total surface area (cm <sup>2</sup> )	4603.91
Volume (cm <sup>3</sup> )	21921

container at different heights with an objective to facilitate easy collection of the samples during storing for fermentation. The apertures were made in such a way that the sampling could be done without disturbing the internal environment of the container and after sampling the aperture could be closed almost airtight. However, this container will be further modified and refined for standardized fermentation

process and packing of fish under second objective of the project (Fig. 2). The measurements/ specifications of the newly designed steel container are given Table 1.

### Noodles supplemented with sprouted bengal gram and mint

- Swati Sethi & Mridula D.

Convenient food products, preferred by urban population, are generally high in starch but low in dietary fiber, minerals, vitamins, phenolic compounds, etc. Therefore, there is a need to formulate nutritionally balanced, energy- dense, easily digestible foods with functional benefits. Germinated cereals and legumes are receiving increasing attention due to their enhanced palatability and flavor, better nutritional qualities (due to increased bioavailability), reduction in antinutritional factors (through the breakdown of certain antinutrients, such as phytate, and flatulence factors) and increased digestibility. Germination along with other processing technologies such as extrusion would result in a convenient food product with advantages of both types of technologies. Sprouted bengal gram, wheat flour and mint were utilized for preparation of pasta, a convenient food. Optimization of noodles with different combinations of wheat flour (70-80g), sprouted bengal gram flour (20-30g) and mint paste (10-20g) using box behnken design of response surface methodology was carried out. Wheat flour supplemented with sprouted bengal gram in varied ratio were sieved together, optimum



**Fig. 3. Optimized noodles a) Raw, b) Cooked**



quantity of water and mint paste was added and then mixed for 10 minutes to achieve uniform mixing and distribution of water throughout the flour particles. The moist flour aggregate was then extruded in a pasta extruder. Noodle samples were dried at 50°C for about 4–5 h to attain a M.C. of 5%. The samples were packaged in LDPE pouches for subsequent quality analysis. Prepared combinations of noodle samples were analysed for nutritional value, free fatty acids, in-vitro protein digestibility, cooking quality, color profile, DPPH radical scavenging activity and sensory characteristics. The optimized product prepared with combination of traditional germination/sprouting technology with popular extrusion processing could present as a great medium for satisfying both the objectives of nutrition and convenience required by present population. Noodles with combination of wheat flour: sprouted bengal gram: mint paste in a ratio of 65:21:14 was found to be of optimum acceptance on the basis of nutritional parameters, water absorption, cooking quality, in-vitro protein digestibility, free fatty acid, DPPH activity and sensory parameters. Nutritional composition of optimized noodles: Protein- 12 %, Fat-1.9%, Ash - 1.5%, in-vitro protein digestibility- 70%, DPPH – 29% with a sensory score of 7.4 on 9 point hedonic scale.

### Refinements of roller flaking machine

-Dhritiman Saha & Swati Sethi

An aspirator was fitted in the machine to separate the husk from the paddy. Several testing of the blower fitted in the machine with MTU-1010 paddy variety was conducted and it was found that instead of sucking the air, blowing of air for removing husk was found to be most appropriate. The efficiency of the aspirator was found to be 85.75% with MTU-1010 paddy variety. The machine was fitted with stainless steel square sieve with the following dimensions: 4mm X 4mm to separate the flaked rice from the un-flaked paddy. The efficiency of the screen was found to be 75% which is being further improved by increasing the length of travel of the paddy.

### Cryogenic grinding of curry leaves (*Murraya koenigii*)

- Pankaj Kumar & Manju Bala

Curry leaves (*Murraya koenigii*) is a highly valuable plant for its characteristics aroma and medicinal value. It has essential oil and heat labile compounds, which are partially lost during ambient grinding however, cryogenic grinding may prevent the losses. In this study, a comparison has been done between ambient grinding and cryogenic grinding of curry leaves in term of colour, particle size, fineness modulus, specific energy consumption and essential oil content. The initial moisture content of curry leaves was found to be 75 % (wb). The parameters, moisture content (2-12 % wb), conveyor speed (2-10 rpm) and grinder speed (4000-12000 rpm) were optimized for grinding operation. Using optimized parameters, the curry leaves were ground with cryogenic grinder (lab

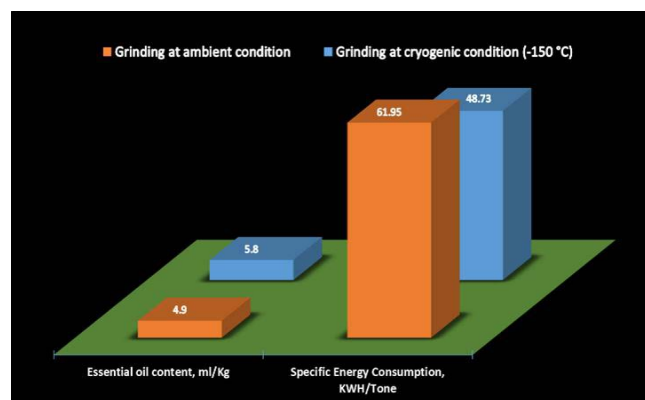


Fig. 4. Quantity parameters for curry leaves grown in ambient & cryogenic condition

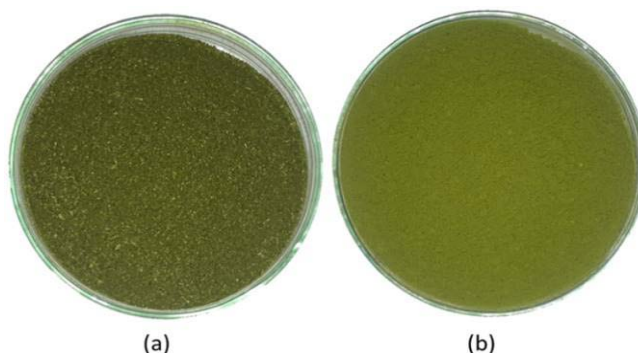


Fig. 5. Curry leaves ground at a) ambient temp. b) cryogenic temp.

model) at ambient and cryogenic conditions. Particle size, fineness modulus, specific energy consumption, colour and essential oil content of ground powder were determined for the ground samples. Results clearly depicted in following figures 4 & 5 revealed

that the cryogenically ground powder is superior than ambient ground powder in terms of finer particle size, lesser fineness modulus, high volatile compounds, lighter colour and lesser specific energy consumption (Fig. 4 & 5).

## Patents

### Patent granted

S. No.	Title	Patent Application No.	Patent No.	Inventors	Date of grant
1	Process for dehulling guar seed for refined guar gum split production	1283/DEL/2007	302861	Dr. R. K. Vishwakarma Dr. S. K. Nanda Dr. U. S. Shivhare	02.11.2018

### Patent filed

Patent entitled 'Mechanical system for removing stalks of dry red chillies (*Capsicum annum* L.) has filed with application number: TEMP/E-1/48657/2018-DEL on 28.11.2018.

## Celebrations

- **30<sup>th</sup> Foundation Day** of ICAR-CIPHET was celebrated on December 29, 2018. The foundation day was graced by Dr. Balraj Singh, Hon'ble Vice-Chancellor, Agricultural University, Jhodpur; Chief Guest, Dr. Sujoy Rakshit, Director, ICAR-IIMR and Dr. Rajbir Singh, Director, ICAR-ATARI, Zone 1 was the Guest of Honours. During this occasion, Best Employee Awards in different categories were awarded to the employees of the Institute.



## Events

- **"Mahila Kisan Divas"** was celebrated in ICAR-CIPHET at both Ludhiana and at KVK ICAR-CIPHET, Abohar on October 15, 2018 and all the staffs of the institute participated. Mrs. Gurdeep Kaur, a progressive farmer and agripreneur from Ayali Khurd was also facilitated on this occasion.



- HCP Division ICAR-CIPHET, Abohar organized farmers awareness programme on crop residue management under KVK on October 24, 2018 at village, Mammu Khera, Abohar, Dist. Fazilika. HCP Division scientific staff delivered talks on CRM during the program





- Vigilance awareness week-2018** has been organized at ICAR-CIPHET, Ludhiana and Abohar during Oct 29- Nov 3, 2018. Various activities such as e-pledge and pledge taking ceremony by officers and officials of the institute were taken as per the guidelines. On November 1, 2018 a debate competition on “Corruption free India: A utopian dream or a possible vision” was organized at the institute. On November 2, 2018 a sensitization lecture on “Corruption free India” was delivered by Dr. Ramesh Kumar, I/c Head, ICAR-CIPHET, Abohar to the students of Govt. Sr.



Sec School, Abohar. Dr. Ashok Kumar, Assistant Director of Research, PAU, Ludhiana gave the expert lecture on the topic “Possible ways of combating corruption in society” on November 3, 2018 to sensitize the staffs of the Institute about the different aspects of vigilance.

- A team of scientist from HCP Division, Abohar visited villages Modikhera, Mahirana and Kala Tibba under *Mera Gaon Mera Gaurav* scheme on December 22, 2018.



- Dr. Swati Sethi, Dr. Pankaj Kumar, Dr. Chandrasekhar and Mr. Bhajan Singh visited village Singapura on November 30, 2018 under *Mera Gaon Mera Gaurav* scheme and interacted with villagers about ICAR-CIPHET developed technologies and provided leaflets of developed processes, products and machinaries for future training of villagers on post-harvest technologies.



- **Kisan Divas** was celebrated by KVK, ICAR-CIPHET Abohar in collaboration with AICRP on PET on December 23, 2018. Eighteen farmers and other civil society members from Abohar and other villages participated in the program. Dr Sunil Kumar gave an overview of National Kisan Diwas, organic farming, crop residue management, and processing and value addition of farm produce for more income of farmers. Dr. Sakharam elaborated the importance of plastic use in agriculture.
- Staffs of ICAR-CIPHET, observed Swachhta Pakhwada under "Swachhta Hi Sewa" mission. Campus/premises cleanliness activities were undertaken during December 15-31, 2018.



- **World Soil Day** was organized on December 5, 2018 by KVK, ICAR-CIPHET, Abohar in collaboration with HCP Division. About 43 students and 16 farmers participated in the function.



## Extension Activities

### Training /workshop/EDP organized

#### Entrepreneurship Development Programmes (EDP)

- An EDP was organized on "Packaging of fresh and processed food products" during November 26-28, 2018 in AS&EC Division. Nine participants attended the EDP and they were trained in the area of modern packaging techniques for fresh and processed food products.
- Five days Entrepreneurship Development Program on 'Nutritive flour and Health Foods' under ATMA Scheme of Kangra District was organized during October 22-26, 2018 at ICAR-CIPHET, Ludhiana.
- Five days Entrepreneurship Development Program on 'Nutritive flour and Health Foods' under ATMA Scheme of Kangra District was organized during October 29-November 02, 2018 at ICAR-CIPHET, Ludhiana.
- EDP on operation of makhana processing plant was conducted during December 26-29, 2018 for farmers from Saharasa (Bihar).
- Entrepreneurship Development Program on "Soyabean milk and milk products" was organized for two farmers during November 19-20, 2018.
- Entrepreneurship Development Program on "Milling of wheat, pulses and spices" was organized for three farmers during November 19-20, 2018.
- Four days EDP program on application of mulching in horticulture production on "Plastic mulches and effects on soil properties, soil microbial community and soil ecosystems" at HCP division at ICAR- CIPHET, Abohar.



### Winter School

- ICAR sponsored 21 days Winter School on 'Recent engineering interventions in food and by-product processing for sustainable growth and profitability' was organized during October 5-25, 2018 at ICAR-CIPHET, Ludhiana.



### Workshop cum Training

- Workshop cum training on Agri-business Opportunities was organized at Pratap Singh Wala, Ludhiana for budding women entrepreneurs on November 16, 2018 under ABI Project (31 participants)
- Workshop cum training on Agri-business Opportunities was organized at RSETI, Ayali Khurd Ludhiana for budding women entrepreneurs on November 17, 2018 under ABI Project (28 participants)



- KVK, Fazilka conducted 5 days vocational training on "Value addition of fruits and vegetables" during December 3-7, 2018 for 25 Aanganwadi workers of Khuiyan Sarwar block as KVK in-charge.



- TOT Division of ICAR-CIPHET organized farmers training on "Post-Harvest Management of Agricultural Produce" during October 1-3, 2018 for 31 farmers of Maharashtra. The training sponsored by ATMA, Akola, Maharashtra was coordinated by Dr. Sandeep Mann and Er. Yogesh Kalnar.



- TOT Division of ICAR-CIPHET organized farmers training on "Post-Harvest Technology of Fruits,







Farmers approaching ICAR-CIPHET stall at PAU Kisan Mela

Vegetables and Grains” during October 29-31, 2018 for 30 farmers of Maharashtra. The ATMA sponsored training was coordinated by Dr. Sandeep Mann and Dr. Renu Balakrishnan.

## Exhibition/ Mela

Exhibition/ Mela	Date	Venue
Krishi Kumbh	26-28 October, 2018	ICAR- IISR, Lucknow
Food Industry and Craft Mela	30 October, 2018	P.A.U, Ludhiana
13th edition of Agro Tech India 2018	01-04 December, 2018	Parade Ground, Sector 17, Chandigarh
National Eat Right Mela	14-16 December, 2018	IGNCA, New Delhi

## Participation in Conference/ Seminar/ Meeting

- Dr. Ramesh Kumar Pr. Scientist visited N.P. Fresh Food Pvt. Ltd, Humbara to address the problem of entrepreneur on October 17-18, 2018.
- Dr. Ramesh Kumar attended meeting chaired by D.C. Fazilka on crop residue burning issues held on October 16, 2018.
- Dr. Bhupendra M Ghodki visited Paras Spices Pvt. Ltd, Moga for prospective collaboration related to certain projects/problems of the Industry on October 05, 2018.
- Dr. Sakharam Kale and Dr. Pankaj Kannaujia had constructed four low-cost polyhouse structures at farmer’s field.
- Dr. Sunil Kumar, Pr. Scientist and other KVK Staffs assisted in documentary making on residue burning and mechanization of agriculture under in situ crop residue management on November 19-20, 2018 at village KeraKhera as per directives of Director, ICAR-CIPHET, Ludhiana
- Mr. Vikas Kumar, Scientist (FPT) delivered radio talk on Fish Processing Technology on December 10, 2018 which was broadcasted in Kheti Khoj Program at 100.1mhz.



- Swati Sethi, Manju Bala and S K Nanda (2018). Effect of microwave and ultrasonic assisted pre-treatment on extraction of anthocyanins from black rice bran. Conference souvenir: 8<sup>th</sup> International food Convention on Holistic approaches for Start-ups, Human Resource Training for Agriculture and Food Industry Gemmation held during December 12-15, 2018 at CSIR-CFTRI, Mysore (Abstract No. CPBC-019).

- Dhritiman Saha, Arun Kumar T V, Swati Sethi (2018). Mathematical modelling of water absorption characteristics of paddy, brown rice and husk during soaking. Paper presented in International Conference on Food Security: Challenges and Opportunities during December 07-08, 2018 at Thapar Institute of Engineering & Technology, Patiala, Punjab (Abstract id: ICFS18/0011).

## Capacity building

- Er. Hemasankari attended 21 days winter school on “Recent Engineering Interventions in food and by-product processing for sustainability growth and profitability” during October 05-25, 2018 at ICAR-CIPHET, Ludhaiana.
- Khwairakpam Bembem, Scientist participated 21 days ICAR Sponsored Winter School on “Technological advances to minimize wastage of horticultural produce” starting from November 1-21, 2018 to at Punjab Agricultural University, Ludhiana
- Dr. Bhupendra M Ghodki attended the online course entitled “Functional Foods: Concept Technology and Health Benefits” (October 8 – November 19 2018) organized by Center for Development of Technical Education, IIT Kanpur and Commonwealth of Learning (COL), Canada.

## Awards and Recognitions

- Dr. Tanbir Ahmad, Scientist (SS), Livestock Products Technology, ICAR-CIPHET, Ludhiana has been awarded for two best Ph.D awards. He was selected as Best Ph.D Student by the Faculty of Agriculture, Universiti Putra Malaysia (UPM), Serdang, Selangor, Malaysia for his outstanding performance in Doctor of Philosophy. He was also given Doctor of Philosophy Award by the Department of Animal Science, Faculty of Agriculture, UPM, Malaysia for his outstanding performance in Doctor of Philosophy in Animal Science. The title of his Ph.D thesis was “Improving

gelatin extraction from hide using plant enzyme assisted process”. He availed ICAR-International Fellowship to pursue Ph.D. for three years at UPM, Malaysia.



- Dr. Th. Bidalakshmi Devi was awarded with best woman athlete in ICAR North Zone Staff tournament, 2018 held at Hisar.
- Mr. Vikas Kumar was awarded with 2<sup>nd</sup> prize in ‘Hindi Kavya Path Pratiyogita’ held at Chief Commissioner of Income Tax Office, Ludhiana on 11 October, 2018.
- Dr. Tanbir Ahmad got ‘Best Employee Award 2018’ given by ICAR-CIPHET in the category of ‘Best in Publication’ on the occasion of ‘30<sup>th</sup> Foundation Day’ of the Institute.
- Dr. K. Narsaiah got ‘Best Employee Award 2018’ given by ICAR-CIPHET in the category of ‘Best in Publication’ on the occasion of ‘30<sup>th</sup> Foundation Day’ of the Institute.
- Dr. Yogesh Kumar has participated and presented poster paper has been awarded 1<sup>st</sup> prize in the International conference on rural livelihood improvement for enhancing farmers’ income through sustainable innovative agri and allied enterprises during 30<sup>th</sup> October-01<sup>st</sup> November, 2018 at BIT, Mersa (Patna) for his paper entitled “Pediocin and Murraya Koenigii Berry extract: Antisterial, antimicrobial and antioxidant effects in refrigerated (4±1 °C) goat meat”.



- Dr. Yogesh Kumar has participated and presented oral paper has been awarded 1<sup>st</sup> in the International conference on rural livelihood improvement for enhancing farmers' income through sustainable innovative agri and allied enterprises during 30<sup>th</sup> October-01<sup>st</sup> November, 2018 at BIT, Mesra (Patna) for his paper entitled "Effect of w1/o/w2 emulsion, aloe gel and pea pod fibres as an edible fat replacer on quality attributes of low fat meat batter".
- Er. Akhoon Asrar Bashir has participated and presented oral paper has been awarded 3<sup>rd</sup> in the International conference on rural livelihood improvement for enhancing farmers' income through sustainable innovative agri and allied enterprises during 30<sup>th</sup> October-01<sup>st</sup> November, 2018 at BIT, Mesra (Patna) for his paper entitled "Effect of Carbon dioxide modified atmosphere storage on insect mortality and quality of green gram".
- Indore Navnath, Akhoon AB, D Saha, Malathi A and R K Singh received best poster award for the paper "Low cost poly-tunnel dryer technology for farm households in International Conference on Rural Livelihood Improvement by Enhancing Farmers Income through Sustainable Innovative Agri and Allied Enterprises during Oct 30- Nov 1, 2018 at BIT, Patna, Bihar.
- Bibwe B., Mishra I. M., Kar A., Samuel D. V. K., and Iquebal M. A (2018). Optimization of oil loading and starch-protein ratio for encapsulation of flaxseed oil using response surface methodology. *Journal of Agricultural Engineering* (NAAS: 5.59, accepted)
- Ghodki, B. M., and Goswami, T.K. (2018). Modeling of granular heat transfer in cryogenic grinding system: Black pepper seeds. *Chemical Engineering Research and Design*. <https://doi.org/10.1016/j.cherd.2018.11.008> (First online: 14 Nov 2018; Impact Factor: 2.795.
- Jalgaonkar K, Jha SK, Mahawar MK (2018). Influence of die size and drying temperature on quality of pearl millet based pasta. *International Journal of Chemical Studies* 6(6): 979-984. (NAAS rating: 5.31)
- Jalgaonkar K, Jha SK, Mahawar MK (2018). Quality evaluation of pearl millet based pasta as affected by depigmentation. *Current Science* 115(6): 1191-1195. (NAAS rating: 6.84)

## Publications

### Publications in Scientific Journals

- Mridula D., Dhritiman Saha, R K Gupta and Sheetal Bhadwal (2018). Oil expelling of dehulled sunflower: optimization of screw pressing parameters. *Journal of Food Processing and Preservation*. doi: 10.1111/jfpp.13852. (NAAS Rating: 6.79)
- Meena VS, Kale S, Mahawar MK, Jalgaonkar K., Bharat B, Bibwe B, Dukare A, (2018) Optimization of button mushroom browning inhibition using response surface methodology. *Indian J. Hort.* 75(3): 470-474 (NAAS Rating: **6.15**)
- Srinivas G, Geeta HP, Mahawar MK, Jalgaonkar K, Champawat PS (2018). Post-harvest management, processing and value addition of Chilli. In Jana JC, Koley TK, Mani A, Karak C, Murmu DK (Part 2), *Advances in post-harvest management, processing and value addition of horticultural crops*. pp. 77-93. Today and Tomorrow's Printers and Publishers, New Delhi
- Jalgaonkar K, Mahawar MK, Bibwe B, Nath P, Girjal S (2018). Nutraceuticals and Functional foods. In *Trends and Prospects in Processing of Horticultural Crops*, edited book by Chakraborty I, Paul PK, Mani A, Tiwary AK, Prasad K,. Today and tomorrow's Printers and Publishers, New Delhi. pp. 231-250
- Mahawar MK, Jalgaonkar K, Bibwe B, Ghodki BM, Kannaujia PK (2018). Papaya processing and value addition. In *Trends and Prospects in Processing of Horticultural Crops*, edited book by Chakraborty I, Paul PK, Mani A, Tiwary AK, Prasad K,. Today and

tomorrow's Printers and Publishers, New Delhi. pp. 519-546.

- Kumar S, Kumar R, Pal A and Chopra DS (2018). Enzymes. In: Postharvest Physiology and Biochemistry of Fruits and Vegetables (Eds. Yahia EM and Carrillo-Lopez A). Woodhead Publishing, Elsevier, UK [ISBN: 978-0-12-813279-1 (online); 978-0-12-813278-4 (print)] pp. 335-358.
- Ghodki BM, Richa R, Shahi NC, Mahawar MK, Jalgaonkar K (2018). Packaging and Storage of Fruits and Vegetables. In Mitra S, Banik AK, Mani A, Kuchi VS, Meena NK Trends & Prospects in Post-Harvest Management of Horticultural Crops. pp. 81-101. Today and Tomorrow's Printers and Publishers, New Delhi

### Compendium Chapters

- Swati Sethi and Dhritiman Saha. (2018). Bioactivities and functional properties of pigmented rice varieties: Processing and product development, winter school on "Recent Engineering Interventions in Food and By-products Processing for Sustainable Growth and Profitability" October 05-25, 2018.
- Swati Sethi and Rahul K Anurag. (2018). Testing of physical properties of different packaging materials. EDP on "Packaging of fresh and processed food products" November 26-28, 2018.
- Deepika Goswami, Mridula D. and Harshad M Mandge (2018) Recent advances in coarse cereals and millets processing and by-product utilization. In: Compendium on Recent engineering interventions in food and by-product processing for sustainable growth and profitability held during October 5-25, 2018. Mridula Devi, Deepika Goswami and Dhritiman Saha (Eds). pp. 39-46.
- Deepika Goswami, Mridula D. and Hradesh Rajput (2018) Quality characteristics of food and food products: analytical methods. In: Compendium on Recent engineering interventions in food and by-product processing for sustainable growth and

profitability held during October 5-25, 2018. Mridula Devi, Deepika Goswami and Dhritiman Saha (Eds). pp. 223-230.

- Mridula D., Deepika Goswami and Chandan Solanki (2018) Multi-food based nutritious products using extrusion techniques. In: Compendium on Recent engineering interventions in food and by-product processing for sustainable growth and profitability held during October 5-25, 2018. Mridula Devi, Deepika Goswami and Dhritiman Saha (Eds). pp. 125-128.
- Chandan Solanki, Mridula D., Dhritiman Saha, Deepika Goswami and R. K. Vishwakarma (2018) Application of microwave treatments in food processing. In: Compendium on Recent engineering interventions in food and by-product processing for sustainable growth and profitability held during October 5-25, 2018. Mridula Devi, Deepika Goswami and Dhritiman Saha (Eds). pp. 118-124.
- Pankaj Kumar, Dhritiman Saha and Sandeep Dawange (2018) Cryo-Grinding: A Novel Technology for Spices. Compendium of ICAR-Winter School on 'Recent engineering interventions in food and by-product processing for sustainable growth and profitability' pp. 82-85, October 05-25, 2018
- Dhritiman Saha, Chandan Solanki and Sandeep Dawange (2018). Application of spray drying in production of powder from non-dairy beverage. Compendium of ICAR-Winter School on 'Recent engineering interventions in food and by-product processing for sustainable growth and profitability'. pp. 82-85, October 05-25, 2018
- Tanbir Ahmad, Yogesh Kumar, RK Anuraag, Vikas Kumar (2018). Packaging of Meat, Poultry and Fishery Products. In: Anuraag, R.K., Kumar, Y. and Bashir, A.A. (Eds). Packaging of fresh and processed food products. Entrepreneurship Development Program (November 26-28, 2018) at ICAR-CIPHET, Ludhiana.



- Yogesh Kumar, Tanbir Ahmad, Akhoon Asrar Bashir, Rahul K Anurag, Swati Sethi, Vikas Kumar (2018). Food Regulations and Standards. In: Anuraag, R.K., Kumar, Y. and Bashir, A.A. (Eds). Packaging of fresh and processed food products. Entrepreneurship Development Program (November 26-28, 2018) at ICAR-CIPHET, Ludhiana.
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### Popular articles

- Ghodki, B. M. (2018). Numerical modeling of breakage and motion of black pepper in cryo-mill. *Science Trends*. <https://doi.org/10.31988/SciTrends.41054>. (First online 19 Oct 2018; also featured in Google News)
- Mahawar MK, Sharma A, Jalgaonkar K, Bibwe B, Ghodki B, Bhushan B, Meena VS (2018). Mixing of mango and apple pulp for making fruit bar. *Beverage and Food World*. 45 (11): 23-24

### Participation in Conferences/Seminars/ Meetings/ Symposia/Seminars/other forum

- Dr Pankaj Kannaujia presented a Hindi Sangosti on "Chaykamahatvaevamprasansharan" at, ICAR-CIPHET, Abohar on October 31, 2018.
- Dr. A.U. Muzadaddi delivered a lecture on "Fish Processing and Value addition" in training programme conducted by College of Fisheries, GADVASU, Ludhiana on November 13, 2018.

- Dr. Rahul K. Anurag delivered a lecture on the topic “Current approaches for ethylene management of horticultural crops” in ICAR sponsored Winter School on “Technological Advances to minimize wastage of horticultural produce” from November 1-21, 2018.
- Swati Sethi attended 8th international food Convention on Holistic approaches for Start-ups, Human Resource Training for Agriculture and Food Industry Gemmation during December 12-15, 2018 at CSIR-CFTRI, Mysore.
- Dhritiman Saha attended International Conference on Food Security: Challenges and Opportunities during December 07-08, 2018 at Thapar Institute of Engineering & Technology, Patiala, Punjab.
- Manju Bala attended International Conference on Food Security: Challenges and Opportunities during December 07-08, 2018 at Thapar Institute of Engineering & Technology, Patiala, Punjab.
- Dr. Tanbir Ahmad participated in International Conference on “Rural Livelihood Improvement for enhancing farmers’ income through sustainable innovative agri and allied enterprises” held from October 30 to November 1, 2018 at BIT, Patna, Bihar. He presented his research paper on “Effect of zingibain enzyme on extraction yield, physicochemical properties and molecular weight pattern of the extracted gelatin”.
- Ms. Surya Tushir participated in International Conference on “Food Security” held from December 7-8, 2018 at TIET, Patiala, Punjab. She presented oral paper on “Microbial Protein Production from Fermentation of Corn Cob Residue by *Saccharomyces cerevisiae*”.
- Dr. Poonam Choudhary participated in International Conference on “Food Security” held from December 7-8, 2018 at TIET, Patiala, Punjab. She presented oral paper on “Physico-chemical and functional properties of mango seed kernels”.

### Technical Bulletins/ Reports/ Compendium/ Manual

- Mridula D., Deepika Goswami and Chandan Solanki (2018) ATMA, Palampur (Kangra) sponsored Entrepreneurship Development Program on ‘Nutritive flour and Health Foods’. Pp.: 1-99.
- Mridula Devi, Deepika Goswami and Dhritiman Saha (2018) Recent engineering interventions in food and by-product processing for sustainable growth and profitability. pp. 1-264, October 5-25, 2018.
- Sandeep Mann, Renu Balakrishnan and Yogesh Kalnar (2018). Emerging Post-harvest Engineering and Technological Interventions for Enhancing Farmer’s Income. September 4-24, 2018. pp 1-264
- Sandeep Mann, Khwairakpam Bembem and Sandeep P. Dawange (2019). Processing, Value Addition and Entrepreneurship Development in Post-Harvest Sector. January 14-21, 2019 at ICAR-CIPHET, Ludhiana. pp 1-184

### Personalia

- Dr. Guru P.N., has joined ICAR-CIPHET on November 9, 2018 as Scientist (Agricultural Entomology). He completed his Bachelor’s (Agriculture) and Master’s (Agricultural Entomology) from University of Agricultural Sciences, Dharwad, Karnataka. He secured his Ph.D in Agricultural Entomology from Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra. He has expertise in Conservation Agriculture, Soil biology, Biopesticides, Insecticide Toxicology, Insecticide Residue Analysis and Phosphine resistance in stored-grain insects.





- Smt. Pragma Singh, Technical Assistant (T-3) joined at ICAR-CIPHET, Ludhiana on October 1, 2018. She has done her M.Sc. in Biotechnology from Bangalore University.



## Tidbits

### Electrifying water droplets can purify water and air

When water droplets are subjected to strong electrical fields, like raindrops through a thundercloud, they tend to burst into fine electrified mists. The stronger the electrical field, the more likely that a water droplet would break apart. Researchers from MIT have presented a simple formula that it can be predicted the exact strength an electric field must be required to burst a certain water droplet. This, they believe, can benefit technologies that rely on electrifying water droplets, including air or water purification, space propulsion, and others.

### Inexpensive plastic lenses can boost solar-powered desalination system

Researchers in Rice's Laboratory for Nanophotonics (LANP) showed that the efficiency of the solar-powered desalination system could be boosted by more than 50% simply by adding inexpensive plastic lenses to concentrate sunlight into "hot spots." The results are available online in the Proceedings of the National Academy of Sciences.

### IGZO brought revolution in the electronics industry

In 1985, Noboru Kimizuka of the National Institute for Research in Inorganic Materials, Japan had pioneered the idea of polycrystalline indium-gallium-zinc oxide (IGZO) ceramics, with the general chemical formula  $(\text{InGaO}_3)_m(\text{ZnO})_n$  ( $m, n = \text{natural number}$ ; hereafter referred to as IGZO-mn). Semiconductors with a large band gap, such as IGZO, can absorb and

transmit light even in the visible light range. This IGZO brought revolution in the electronics industry providing basic operational principle of TFTs (thin-film transistors) including touchable displays.

## Sectoral News

### GST on frozen veg reduced to nil; Sector wants further rationalisation

The GST (Goods and Services Tax) Council meeting, held on December 22, 2018, has decided to bring down the rates for GST for frozen vegetables from five per cent to nil. This apart, there were no other decisions impacting the food sector. All India Food Processors' Association (AIFPA) reiterated that tax on agri-produce processed at a primary level should be exempted or lowered to encourage the processing sector and boost farmers' incomes.

### Imported food demand up in India, prompting farmers to produce locally

India is witnessing an increase in the demand for a number of imported food items, and prompting forward-looking farmers for producing some of these products locally. This exploration of food outside of the traditional repertoire is not only leading to the increase in the demand for imported food items. In fact, the imported quinoa served on the designer plates of Michelin-starred chefs was, within no time, being grown by innovative Indian farmers in progressive states like Andhra Pradesh and Gujarat. The health story of millets and amaranth from India has been absorbed and recreated all across the global food and beverage arena.

### Govt makes jute packaging mandatory for all food grains

The Cabinet Committee on Economic Affairs (CCEA) approved that 100 percent of the food grains and 20 percent of the sugar shall be mandatorily packed in diversified jute bags. The decision was taken at a meeting of the Cabinet Committee on Economic Affairs (CCEA) chaired by Prime Minister Narendra Modi.

### IISR sets up post-harvest processing unit in Kerala

The Indian Institute of Spices Research (IISR) has set up an advanced facility for post-harvest technology at Kozhikode, which is expected to give a significant thrust to research on processing, food safety and value addition in spices. The facility was inaugurated by Dr. Trilochan Mohapatra, Secretary, DARE and Director-General, ICAR.

### Black seed oil (*Nigella sativa*, "black cumin") maintains pomegranate quality in postharvest

Faculty of Agricultural Sciences and Technologies, European University published their findings in the Journal of Agricultural Sciences that applications of 0.5% black seed oil especially when combined with MAP, have found to be effective in preventing weight loss, preventing juice content, controlling gray mould development and decelerate the occurrence of chilling injury.

#### ABOUT THE PUBLICATION

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