

ISO 9001-9015 Organization

ICAR-CIPHET NEWS



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FROM DIRECTOR'S DESK



Welcome to the 2nd issue of quarterly newsletter of ICAR-CIPHET for the year 2019. In this quarter, efforts made in the area of postharvest research led to the development of hermetically sealed storage structure of 1 Tonne capacity for pulses, designing and

development of smart solar dryer. Other developments in product and process technology includes the study on adsorption kinetics of curcumin on alkali treated corn cob, process optimization for starch isolation from mango seed kernels, study on microbiological safety of breads fortified with black carrot color and black carrot pomace powder, and development of curcumin-prebiotic based Nano-emulsions for the preparation of microcapsules. Beside research, a number of activities and programmes were also organized. Five short term trainings on different aspects for farmers and budding entrepreneurs from different part of the country were conducted, students from 22 colleges of different universities were trained on post-harvest technologies. Three technologies were transferred and licensed to different parties and firms.

29th Institute Research Council (IRC) was also organized during this quarter during 28-29th May, 2019 at ICAR-CIPHET, Ludhiana under the Chairmanship of Dr. RK Singh, Director, ICAR-CIPHET. Dr. SM Ilyas, Former Director ICAR-NAARM, Hyderabad and Dr SN Jha, ADG (PE) were the invited experts. Four new project proposals targeting various concerns of post-harvest processing were approved in the IRC meeting.

Dr. RK Singh

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RESEARCH HIGHLIGHTS

- Design and development of smart solar dryer:** Conceptual design of different part of solar dryer viz. tray holding unit, drying chamber and Phase change material (PCM) chamber under divisional activity entitled “Design and development of smart solar dryer” have been completed (Fig.1). The dimensions of the tray holding unit is (72 x 50 x 65) cm; PCM chamber has (72 x 60 x 6) cm and overall drying chamber has (77 x 65 x 96) cm in front side whereas (77 x 65 x 121) cm in back side.

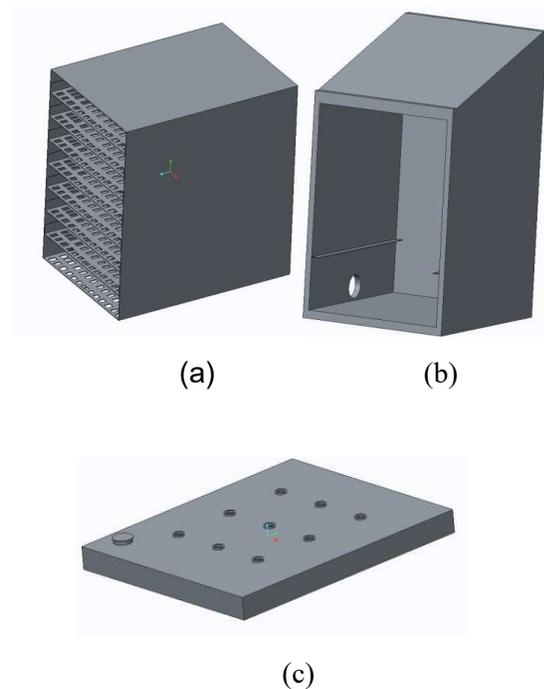


Fig.1: (a) Tray holding unit (b) Drying chamber (c) Phase change material (PCM) chamber

- Adsorption kinetics of curcumin on alkali treated corn cob:**

The corn cobs were dried at 75 °C for 48 h and grounded into powder. Alkali treatment of corn cob was done by using 0.25% NaOH for 4 hours at 40 °C in incubator shaker at 140 rpm. After treatment it was washed thoroughly with distilled water and pH neutralized. It was kept in oven at 40 °C for 48 hours.

Then it was kept in zip-lock bags for further experimentation. Cellulose, hemicellulose and lignin content of both native and alkali treated corn cob was determined by AOAC method. The cellulose content of native corn cob was 32% whereas of alkali treated corn cob was 50%. The hemicellulose content of native corn cob was 27% whereas of alkali treated corn cob was 35%. The lignin content of native corn cob was 12% whereas that of alkali treated corn cob was 8%. Effect of temperature, initial concentration of curcumin and adsorbent dosage were studied experimentally for alkali treated corn cob.

The initial concentrations of curcumin taken were 0.1478 µg/ml, 0.3164 µg/ml, 0.5332 µg/ml, 0.7812 µg/ml and 0.9327 µg/ml. A 0.6 grams of oven dried alkali treated corn cob was put in each of the above concentrations of curcumin, shaken in orbital shaker incubator at 140 rpm and supernatant was taken at regular time intervals for nearly one hour. After the experiment, the supernatant samples were micro centrifuged and their absorbance was taken at UV-Visible Spectrophotometer at 419 nm. The same experiment was conducted in triplicates and at 5 different temperature of 20°C, 25°C, 30°C, 35°C, 40°C and 45°C.

The adsorption reached equilibrium in 45 minutes as compared to native corn cob which reached equilibrium in 60 minutes and maximum adsorption % was more than that of native corn cob. It was 65.12 % whereas in case of native corn cob it was 52.17%. Percent adsorption and sorption capacities were plotted against time by using data of 0.5332 µg/ml of initial curcumin concentration, 0.6 grams adsorbent dosage and 30 °C. These conditions were taken because maximum % adsorption that is 65.12% was seen to be obtained at these conditions. Kinetic models were fitted to time and sorption capacity data. First order and pseudo second order were fitted and data was in agreement with pseudo second order model. Five different adsorbent dosages were taken 0.2 grams, 0.4 grams, 0.6 grams, 0.8 grams and 1 gram. Initial concentration of curcumin solution was taken to be 0.5332 micrograms per ml and experiments for effect of adsorbent dosage on % adsorption was conducted in triplicates at 30°C. Maximum % adsorption value was obtained for 0.6 grams of adsorbent dosage.

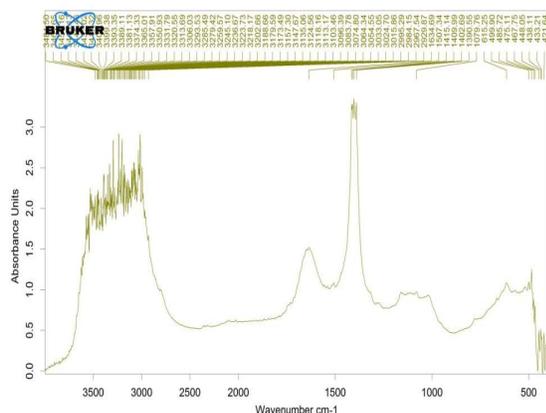


Fig. 2: FTIR spectra of Curcumin

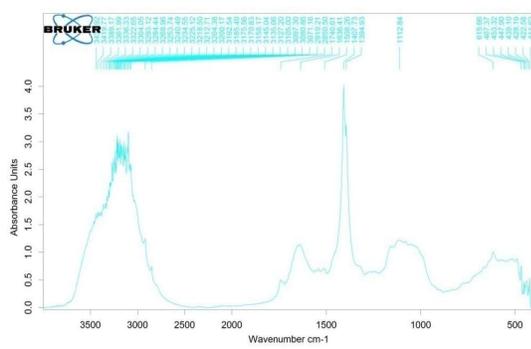


Fig.3: FTIR spectra of native corn cob

- **Production of Bioactive ingredients from mango seed kernels**

Response surface methodology to optimize conditions for starch isolation: Experiments were carried out according to experimental plan prepared (RSM- Box-Behnken Design) with following significant factors obtained by PBD *i.e.* A: particle size (0.6 mm-1.0 mm), B: soaking time (10 min-50 min), C: soaking temperature (20 °C-60 °C) and D: mixing solid-liquid ratio (1:2 g/ml-1:6 g/ml) with three central points. Optimized factors for mango seed kernel starch isolation were determined. Statistical analysis showed the p-value of the model was less than 0.0012, which indicated that the regression model was statistically significant. The model revealed that the linear terms particle size, soaking time, soaking temperature, mixing solid-liquid ratio and interaction effect between particle size and soaking temperature showed

significant effect on starch yield. The optimum conditions for maximum starch yield were as follows: particle size 0.6 mm, soaking time 41.27 min, soaking temperature 30.60 °C and mixing solid-liquid ratio 1:5.98 g/ml. The interaction effects of particle size (A) and soaking temperature (C) on starch yield is shown in Fig.1. The elliptical counter lines indicated that the interaction of these two factors on starch yield was significant.

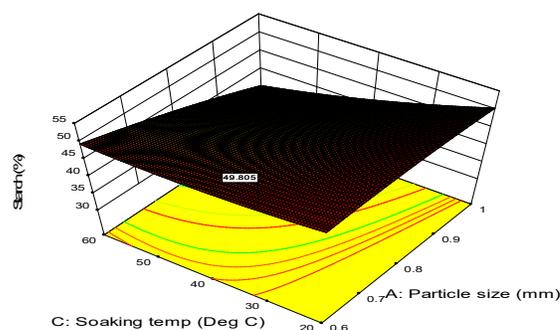


Fig. 4: The interaction effects of particle size and soaking temperature on starch yield

- **Microbiological safety of breads fortified with black carrot colour and black carrot pomace powder:** A week storage studies on freshly prepared wheat breads fortified with colour and pomace powder extracted from black carrot was performed to assess their microbial safety at ambient condition. Different breads were examined for presence of bacteria, *i.e.* total viable count (on plate count agar), yeast (on yeast extract peptone dextrose agar), fungi (on Potato dextrose agar) and food borne human pathogens such as *Salmonella* sp., *Shigella* sp., (on Deoxycholate citrate agar) and *Salmonella typhi* (on Xylose-Lysine Deoxycholate agar) at each 2 days interval of ambient storage (25±2 °C). In all samples, the total viable count ranged from 0 to 90 CFU/g × 10⁵ while yeast population was varied from 27 to 247 CFU/g × 10⁴. In general, there was decrease in population of these organisms during last phases of storage. The population count of fungi and all food borne pathogens were observed as nil (0 CFU/g at 10⁴

dilutions). According to International Commission on Microbiological Specifications for Foods (ICMSF) guidelines, microbial safety and quality of bread sample was satisfactory for general microbial count and it was very good for pathogens count.

- **Development of curcumin-prebiotic based nano-emulsions for the preparation of microcapsules:**

The microcapsules (MCs) were prepared aseptically using an air atomization technique with an in-house developed autoclavable encapsulator. The aqueous solution of sodium alginate-prebiotic containing probiotic bacteria was pumped using a digitally controlled peristaltic pump (MCP, Ismatec, Germany) at controlled flow rate ($1.33 \times 10^{-6} \text{ m}^3/\text{sec}$) into a concentric two fluid glass nozzle and sprayed under pressurized air into a vessel having 0.1 M calcium chloride solution.

The size of orifice of inner nozzle carrying mixture was 1 mm with 1.3 mm annular space between inner and outer nozzle carrying pressurized air. Calcium chloride solution was continuously stirred at 1000 rpm during spraying of mixture and was left for 30 min for hardening of hybrid microcapsules. The hardened hybrid microcapsules were aseptically sieved and washed. Encapsulation of probiotic *Lactobacillus rhamnosus* GG in microcapsules consisting of alginate, alginate- inulin and alginate-FOS showed encapsulation efficiency of 93.87%, 94.90% and 94.30% respectively (Table 1).

Table 1: Microencapsulation efficiency of probiotic bacteria and its viability on storage

S. No.	Hybrid Microcapsules (MCs)	Initial cell load	After release (Log CFU g ⁻¹)	Encapsulation efficiency (%)
1	Alginate MCs	9.78	9.18	93.87
2	Alginate + Inulin hybrid MCs	9.60	9.11	94.90
3	Alginate + FOS hybrid MCs	9.84	9.28	94.30
4	CD (5%)			NS (Non-significant)

- **Processing and value addition of agricultural produce or enhancing farmer's income and Employment in production catchment:** Machineries and equipment were procured for establishing processing unit at the farmer's field. Pulveriser (70-80 kg/h), pulveriser (20-25 kg/h), flour mill (50-60 kg/h), mini flour mill (18-20 kg/h), rice mill (400-500 kg/h), oil expeller (70-80 kg/h), destoner(400-500 kg/h), air screen cleaner cum grader(400 kg/h)and foot operated sealing machine were procured for establishment of Agro Processing Center. Farmers were also trained to process spices using the pulveriser. An Memorandum of Understanding (MoU) was signed with farmers and both the pulverisers were handed over to them for strengthening the APC in Bhartha Khurd village of Nawanshahr on 25 May 2019.

- **Development and Management of National Database on NARES Technologies in Post-Harvest Sector**

Commodity wise information related to various process protocols and value-added products developed in the National Agricultural Research and Extension System were collected and compiled. Information was collected from ICAR institutes, SAU's and also through secondary sources. Technology inventory of around 200 value added products and process protocols were prepared. This includes information about 37 products in cereals, 11 products in pulses, 32 products in horticultural sector, 10 products in plantation sector, 20 products in tubers, 15 products in spices and condiments, 9 products in

sugarcane and 10 products in other sectors like honey. Information about 24 milk products, 6 meat products and 26 fish products and livestock were also collected. A design of the National Database on NARES Technologies in Post-Harvest Sector is developed and a demo of the database is created in PHP software.



Nares database

- **Developing methodology for identifying constraints faced by farmers in processing and value addition of cereals, pulses and oil seeds in Punjab.**

A Likert type summated rating scale was developed for identifying and measuring the major constraints faced by farmers in processing. The scale thoroughly covers and defines the construct under study and identifies different dimensions of the construct under study. Different items in the scale were carefully identified and inspected through item analysis for the reliability and validity of the measuring instrument. The scale encompasses constraints in terms of aspect related to the technical and skill gap, infrastructure, financial and market related.

Testing of Processing Machineries at PHMETC

During this quarter, Combined Rice and Flour Mill Flour Mill (Pulverizer-2 hp), two Pounding machines, Pulveriser (Stainless Steel) and Chilli Masala Pulveriser Machine, Roti-papad making machine and sugarcane crusher machines have been tested and their commercial test report were issued.

PATENTS FILED/GRANTED

A patent on 'Indigenous Pilot Plant for Production of Protein Isolates / Concentrate from De-Oiled Cakes/Meals' with Patent application number 201911021833 under the inventors Dr. D.N. Yadav, Dr. S.K. Nanda and Dr. R.K. Gupta has been filed during this quarter.

EVENTS

- **CGEWCC Sports:** ICAR-CIPHET, Ludhiana organized Central Government Employees Welfare Coordination Committee (CGEWCC) Sports 24-25th Apr. 2019. Central Government Employees from different department took part in different sports activities.
- **Swachhta Bharat:** All the staffs of ICAR-CIPHET, participated in "Swachhta Hi Sewa" mission and campus/premises cleanliness activities lead by different team leaders.
- **Institute Research Council (IRC) Meeting:** The 29th IRC meeting was held during 28-29th May, 2019 at ICAR-CIPHET, Ludhiana under the Chairmanship of Dr. RK Singh, Director (Acting), ICAR-CIPHET. Dr. S.M. Ilyas, Former Director ICAR-NAARM, Hyderabad and Dr SN Jha, ADG (PE) were the invited experts. Member Secretary, IRC presented the Action Taken Report on suggestions/recommendations made during the last IRC held during 28-29th Sep, 2018. All the scientific staffs of the institute participated

enthusiastically in the two days meeting. The experts also visited the laboratories and other facilities of the institute.



Dr. R.K. Singh, Director, ICAR-CIPHET, Dr. S.M. Ilyas, Former Director ICAR-NAARM, Hyderabad and Dr S.N. Jha, ADG (PE) inspecting the machineries purchased under SCSP plan

- **International Yoga Day:** ICAR-CIPHET at both the campuses celebrated International Yoga Day on 21st Jun, 2019. ICAR-CIPHET staffs, family members and student trainees participated the yoga session.



International Yoga Day

- **Inauguration of DOCA funded project:** Inaugural meeting of project titled “Development of protocols for shelf life, safe storage and milling outturn and indicative norms for procurement of major pulses” funded by Department of Consumer Affairs under Ministry of Consumer Affairs, Food & Public Distribution was held on 2 May, 2019 at ICAR-CIPHET, Ludhiana. CC-PIs from institutes collaborating in the project also attended the inaugural meeting.

TRAININGS

- **Entrepreneurship Development Programme (EDP)**
- Food Grains and Oilseeds Processing Division organized an Entrepreneurship Development Programme on ‘Gluten free maize based products’ on 30th Apr, 2019.
- An Entrepreneurship Development Program (EDP) was conducted on ‘Dehydration of onion, garlic and ginger’ -during 11-13th Jun, 2019 for two farmers from Maharashtra and Hyderabad. Dr. Kirti Jalgaonkar and Dr. Manoj Kumar Mahawar coordinated the training.
- Food Grains and Oilseeds Processing Division organized an Entrepreneurship Development Programme on ‘Gluten free maize based products’ on 30th Apr, 2019.

- **Farmers Training**

Training on pulse milling was organized For progressive farmers from Balachaur, Nawanshahar on 11-12th Jun, 2019. The farmers were given hands on training on processing of pulses utilizing the facilities available in Agro Processing Centre of ICAR-CIPHET.



Handing of Certificate to farmer from Balachaur, Nawanshahar after successful completion of hands on training on processing of pulses.

- **Students Training:**
- Eighty-nine UG and PG students from 24 different colleges and universities in India undertook trainings in different aspects of Post-harvest technologies at ICAR-CIPHET for

partial fulfilment of their degrees during this period.



Student trainees with the staffs of TOT Division

• Capacity Building:

- Dr. Poonam attended one day workshop on working of High-Performance Liquid Chromatography organized by Waters India Pvt. Ltd. at Chandigarh.

PARTICIPATION IN CONFERENCE /SEMINAR/MEETING

- Dr. Sandeep Mann, attended National conference on 'Innovative Packaging Techniques for Food Products and its Safety Aspects' on 10 May, 2019 organized by Indian Institute of Packaging, New Delhi.
- Dr. Sandeep Mann and Dr. Sandeep P. Dawange, attended a Brain Storming Session about the project "Status of level of food processing in India" in SMD (Agricultural Engineering) at New Delhi during 22-25 April, 2019.
- Dr. Bibwe Bhushan and Dr. Kirti Jalgaonkar attended the farmer-scientist interaction meeting on 'Safe food' organized by Sampurn Agri-venture Pvt. Ltd., Fazilka on 20 April, 2019 at Nagpal Organic Farm, Abohar.
- Dr. Sandeep Mann, attended meeting of *Pradhan Mantri Krishi Sinchayee Yojana*

(PMKSY) on 5 April, 2019 at NIFTEM, Sonipat, Haryana.

- Dr. Sandeep Mann, Dr. Rahul Kumar Anurag, Dr Renu Balakrishnan and Er. Yogesh Kalnar visited the established Honey processing unit at Nawashahr during 08 May, 2019 for monitoring the functioning of the unit.
- Scientists of the institute attended an interaction meeting with Dr. M.M. Pandey, Former DDG (Agril. Engg.) on 4 June, 2019



Interaction Meeting of ICAR-CIPHET scientist with Dr. MM Pandey, Former DDG (Agril. Engg.)

• TRANSFER OF TECHNOLOGY

- Agreement for technology transfer of 'Live Fish Carrier System System and method of transportation of live fish therein' to Shri Shivam Sharma, S/o Shri Rajkumar Sharma, Proprietor, M/s E-Magic Electric, Nangla Fateh Khan, PO- Patara, Jalandhar (Pb)- 144101 was signed on 16th Apr 2019 with a licensing fee of Rs.3.304 lakh on non-exclusive basis.
- Technology licensed to Shri. Virsa Singh, s/o Sh. Jaswant Singh, Ward No. 2, Garden colony, Patti, Dist- Taran Taran, Punjab -14341 on "Processing of Aonla for manufacturing of value added products".
- Under the Farmer first project PDKV Akola Daal Mill was handed over to farmers of Nawanshahr, Punjab.



'Live Fish Carrier System System and method of transportation of live fish therein'



Handing over of Akola Mini Dal Mill to farmer of Balachour, Nawanshahr

AWARDS AND RECOGNITIONS

Dr. Bhushan Bibwe received '**Best Young Researcher Award**' in the National conference on Identification, Convergence, Implementation & Extension of Science-Tech-Research For Sustainable Development at SVPUA&T, Meerut organized by New Age Mobilization, New Delhi during 20-21 April, 2019.

PAPERS PUBLISHED/COMPENDIUM /POPULAR ARTICLES

Research Papers:

- Ghodki BM, Dadlani G, Ghodki DM and Chakraborty S (2019). Functional whole wheat breads: Compelling internal architecture. LWT-Food Science and Technology, 108: 301-309.
- Kumar V, Rao PS, Purohit SR, and Kumar Y (2019). Effects of high pressure processing

(HPP) and acid pre-treatment on quality attributes of hilsa (*Tenulosa ilisha*) fillets. LWT-Food Science and Technology, 111:647- 652.

Book/ Book chapter/ Book edited:

- Mahawar MK, Bibwe B, Girjal S, Jalgaonkar K, Meena VS and Bhushan B (2019). Entrepreneurship development through fruit and vegetable processing. In: Agri-Entrepreneurship Challenges and Opportunities. (Eds. Kashyap P, Prusty AK, Panwar AS, Kumar S, Punia P, Ravisankar N, Kumar V) Today and Tomorrow's Printers and Publishers, New Delhi. pp. 113-132.
- Ghodki BM, Richa R, Shahi NC, Mahawar MK and Jalgaonkar K. (2019). Packaging and storage of fruits and vegetables. In, Mitra S, Banik AK, Mani A, Kuchi VS, Meena NK (Eds.), Trends & prospects in post-harvest management of horticultural crops (pp. 81-101). New Delhi: Today and Tomorrow's Printers and Publishers.
- Mahawar MK, Kumar V, Kumar R, Singh J and Kumar (2019). Contaminants in Agriculture and Environment: Health Risks and Remediation (Volume 1 (Pages 283), ISBN: 978-93-5321-003-8 (Print), ISBN: 978-81-942017-0-0 (Online), DOI: 10.26832/AESA-2019-CAE.

Conference Papers/abstract

- Kamat V, Mahawar MK, Jalgaonkar K and Sisodhiya J H (2019). Determination of some physical properties of plum (cv. Kala Amritsari) fruits. In: Souvenir of International Conference on Role of agricultural engineering towards global food security, held at Bengaluru, Karnataka during 11-13 April, 2019. pp. 96.
- Bibwe B, Indra Mani, Kar A and Mahawar M K (2019). Optimization of process variable for development of spray dried microencapsulated flaxseed oil powder. In: Souvenir of National Conference on Identification, convergence, implementation & extension of science-tech-research for sustainable development held at SVPUA & T Meerut during 20-21 April, 2019.

- Bibwe B, Indra Mani, Kar A, and Mahawar M (2019). Optimization of process variable for development of spray dried microencapsulated flaxseed oil powder. In: Souvenir of International Conference on Innovative horticulture and value chain management– Shaping future horticulture, GBPUAT, Pantnagar, Uttarakhand during 28-31 May, 2019. pp. 201.
- Bibwe B, Jalgaonkar K, Mahawar M and Jangra RK (2019). Effect of Loading Orientation on Mechanical Properties of Selected Green Pea Cultivars. In: Souvenir of International Conference on Innovative horticulture and value chain management– Shaping future horticulture, GBPUAT, Pantnagar, Uttarakhand during 28-31 May, 2019. pp. 208.

Popular article:

- Devi TB, Choudhary P, Bembem K and Balakrishnan R (2019). Value addition and product diversification of clove and cinnamon spices. *Agrobios*. XVII(12):69-71
- मनोज कुमार महावर, कीर्ति जलगावकर, भूषण बिबवे, भारत भूषण, विजय सिंह मीणा और भूपेंद्र एम घोडकी (2019). खाद्य पदार्थों की अभियांत्रिकी विशेषताये रक्षा खाद्य विज्ञान पत्रिका 27:21-25.
- Chaudhary P, Bidyalakshmi Th., Bembem K and Balakrishnan R (2019). Chitosan and its multiple roles in plant defence and agriculture. *Agrobios Newsletter*. XVIII(01):14-16.
- Bibwe B, Kannaujia PK, Mahawar MK and Aradwad P (2019). Refrigerated transport systems for fruits and vegetables handling and its future prospect. *Agriculture & Food: e-Newsletter*. 1(5):278-284

Technical Bulletin:

- Sethi S, Nanda SK and Bala M (2019). Pigmented rice varieties of India: Processing and value addition.

Folder:

- Bala M and Sethi S (2019). Test Kit for Detection of Adulterants in Selected Spices.

PERSONALIA

Promotion:

- Sh. Prithvi Raj, Senior Technical Officer was promoted as Assistant Chief Technical Officer at ICAR-CIPHET, Abohar campus w.e.f. 01 January, 2018 on 21 June, 2019.
- Sh. Rajesh Kumar, Senior Technical Officer as Assistant Chief Technical Officer at ICAR-CIPHET, Abohar campus w.e.f. 01 January, 2018 on 21 June, 2019.
- Smt. Sonia Rani, Technical Assistant was promoted as Senior Technical Assistant at ICAR-CIPHET, Ludhiana campus w.e.f. 10 December, 2017 on 29 June, 2019.
- Sh. Hardeep Singh, Technical Assistant (Turner) was promoted as Senior Technical Assistant w.e.f. 10 January, 2017 on 24 April, 2019.
- Sh. Dalu Ram, Technical Assistant (Fitter) was promoted as Senior Technical Assistant w.e.f. 31 January, 2018 on 24 April, 2019.
- Under the "Modified Assured Career Progression (MACP) Scheme" Sh. Surinder Kumar, SSS; Sh. Manoj Kumar, SSS and Sh. Sukhbir, SSS was granted 2nd up-gradation on 29 April, 2019.

Retirement

- Sh. Raj Kumar, Senior Administrative Officer (retired on superannuation) on 30 April, 2019.



Bidding farewell to Sh. Raj Kumar, Senior Administrative Officer



Student visits at ICAR-CIPHET, Ludhiana

SECTORIAL NEWS

CSIR scientists develop processing technique to ensure crispier fruit

Scientists at the Council of Scientific and Industrial Research (CSIR), Palampur, have developed a fruit processing technique to ensure that the fruits become crispier and can be eaten as snacks. The technique will increase the shelf life of the fruits by four months, and also benefit the fruit growing farmers across the country in various ways. Moreover, it will have no side effects. The processed fruits would have no weight and will be crispy like snacks. Their colour, shape and taste will be the same, but their form will change.

NIH studies link between ultra-processed food, calorie intake, weight gain

People eating ultra-processed foods ate more calories and gained more weight than when they ate a minimally processed diet. These were the findings of a National Institutes of Health (NIH) study, which were published in Cell Metabolism.

Frozen foods market in India projected to grow at CAGR of 16% until 2023

India, as a large producer and consumer of food, is likely to have an overwhelming impact on world demand and supply of food products in the future. Frozen vegetables and frozen snacks contribute to 85% of the market share for frozen foods market in India. Frozen foods market in India is projected to grow at a CAGR of more than 16% during 2018-2023 with a value of US\$153.1 billion by 2023.

FSSAI issues guidelines for collection of cooking oil through agencies

FSSAI has issued guidelines for the collection of the used cooking oil by biodiesel manufacturers from FBOs (food business operators) through authorised collection agencies. According to the guidelines, the biodiesel manufacturers will be responsible to ensure that the used cooking oil collected by the agencies authorised by them does not go back into the food value chain and is

used for the manufacture of biodiesel only, while the country's apex food regulator will maintain a directory of all such collection agencies.

Committee created for agriculture reforms, states Modi at NITI Ayog meeting

Hon. Prime Minister Narendra Modi has announced the creation of a high-powered committee on structural reforms in agriculture. He emphasized the need for undertaking

structural reforms in agriculture, including encouraging corporate investment, strengthening logistics and focusing on food processing. Modi announced this while addressing the fifth governing council meeting of NITI Ayog, the government's policy think-tank, in New Delhi recently, wherein agriculture was listed as one of the main items on the agenda for serious consideration.

About the publication:

ICAR-CIPHET News is an in-house quarterly publication of ICAR-Central Institute of Post-Harvest Engineering and Technology aimed at brief compilation and highlighting of the activities/ information associated with different research, extension and HRD activities taken up by the scientists of the institute, AICRP (PHET), AICRP (PET) and KVK (ICAR-CIPHET), Abohar and also the information regarding other important activities of the institute.

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