ICAR-CIPHET
सीफेट समाचार News

Produce Process Prosper

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FROM THE DIRECTOR'S DESK

The most awaited study report on "Assessment of harvest and post-harvest losses of major crops and commodities in India" conducted by AICRP on PHET, ICAR-CIPHET, Ludhiana has been finally published and as per the study report, overall losses in food grains (cereals, pulses and oilseeds), fruits & vegetables range between 3.24-9.96% and 4.58-15.88%, respectively, approximating worth Rs 93,000 crores . These losses can be reduced by proper management practices, improvement of scientific warehousing & other infrastructural and transport facilities, improvement of farm operations, proper processing, value addition/storage of market surplus and proper training to farmers/ stake holders. Committed and continuous efforts from both policy makers and research institutions working in the area of post-harvest technology are required for minimization of these losses. In this direction, ICAR-CIPHET has joined hands with MOFPI-NIFTEM for collaborative research work in the area of post-harvest engineering and technology as well as food quality and safety by signing a MOU on June 18, 2015.

During the quarter, Institute has developed Attenuated Total Reflectance Fourier Transform Infrared spectroscopy based methods for the detection of fungal toxins in fruit juices and milk. Whey protein fortified mango based RTS beverage, protein enriched expanded snack food, reduced fat yoghurt and impedance based portable device for determination of fish freshness were also developed in this quarter. ICAR-CIPHET developed process technology for "groundnut flavoured beverage, curd and paneer" was licensed to one entrepreneur from Delhi. Apart from contribution in research activities, the institute was also engaged in the training of human resource specifically farmers, entrepreneurs, agricultural officers, scientists and students in the area of food processing. ICAR-CIPHET has imparted training to 26 students and a five days training on "Post-Harvest Management" was also organized for 19 agricultural officers from Vasantrao Naik State Agricultural Extension Management Training Institute (VANAMATI), Nagpur, Maharashtra during April 14-18, 2015. Two scientists (AS&PE) also joined the Institute in this quarter. I congratulate and welcome them to ICAR-CIPHET family.

(R. K. Gupta)

IN THIS ISSUE

SECTORAL NEWS

Food Processing: The Engine of Growth

The current size of Indian packaged food industry is about $30 billion and likely to touch $50 billion by 2017, growing at a compound annual growth rate (CAGR) of about 30% (ASSOCHAM, 2015). Freezer space in India has grown at a CAGR of 16% during 2008-14 which may have played an important role in the growth of packaged food storage. Ministry of Food Processing Industry, under the visionary guidance of Hon'ble Prime Minister, is focusing on boosting the Food Processing sector for exponential growth of agriculture sector. The Ministry has identified creation of modern infrastructure for food processing as a focus area and encouraging private investment. A total of 138 projects are under the implementation by the Government of India, out of which 108 projects are under the implementation by the MoFPI. Seventeen new Mega Food Parks and 30 Cold Chain projects have been recently sanctioned by MoFPI, which cost about Rs. 3077 crore in the creation of infrastructure in food processing sector (http://pib.nic.in/newsite/ PrintRelease.aspx?relid=121833). Under the cold chain, value addition and preservation infrastructure scheme, MoFPI provides financial assistance of up to Rs. 10 crore for entrepreneurs (www.mofpi.nic.in/ writereaddata/ revised_guidelines_coldchain.pdf). Fifty two projects have already been completed by MoFPI and commenced to commercial operation. The capacity created by these 52 projects is 2.6 lakh MT of cold storage/ controlled atmosphere/deep freezer, 80.3 lakh litres/day of milk processing, 38.5 MT/h of individual Quick Freeze and 271 of Reefer Transport. It is expected that operationalization of all 108 projects under MoFPI would create capacity of 3.64 lakh MT of cold storage, controlled atmosphere/modified atmosphere storage, deep freezer and 90 MT/h of individual quick freezing, 106.95 lakh liters/day of milk processing and storage and 601 number of reefer carriers.

The government has also set up a fund of Rs. 2000 crores under National Bank of Agricultural and Rural Development (NABARD) for extending affordable credit to entrepreneurs for designated food parks and for setting up of food processing units in the designated food parks. NABARD and Small Industries Development Bank of India (SIDBI) have joined hands with CSIR-CFTRI to identify potential food entrepreneurs seeking funds for technology transfer. The key objective of such initiative is to provide a revolving fund. There is provision for soft loans with an interest rate of 5 per cent to enable micro, small, medium enterprises (MSMEs) set up businesses and grow. In an interview with Agriculture World, Dr. Alagusundaram, ICAR-Deputy Director General (Agricultural Engineering) also stated that processed food would play a major role in future and soon "Kitchen-less homes" are going to be a reality. India has to see the creation of as many food processing industries in rural India so that a minimum of 50% of our produce are processed and value added on the farm sites. In addition to the rural food processing industries, large scale urban food industries should also come into play. These large scale urban industries may take the minimally processed foods from rural industries as their raw material for further processing.

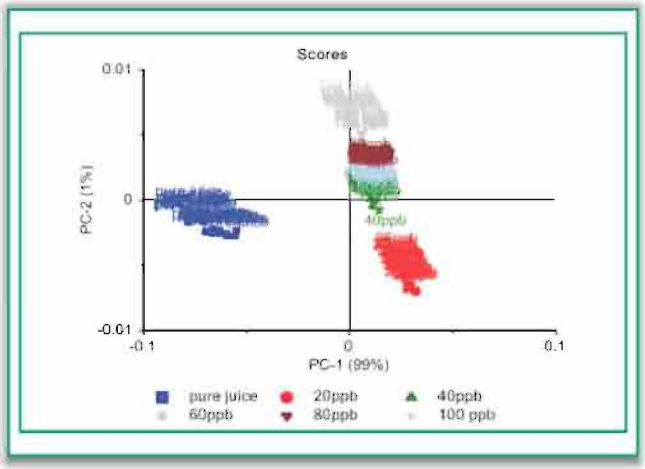
INSTITUTE NEWS

RESEARCH HIGHLIGHTS

Detection of patulin in apple juice

Attenuated Total Reflectance Fourier Transform Infrared spectroscopy with chemometrics was used in this study for detection and quantification of patulin in apple juice. FTIR spectra of apple juice spiked with known patulin concentrations (viz. 20, 40, 60, 80 and 100 ppb) were acquired, which revealed differences in absorption between pure and contaminated juices, specifically in the wavenumber range of 1900 - 950 cm^{-1}. This spectral window included smaller spectral ranges corresponding to absorption frequency of specific bonding pattern found in patulin. Principal component analysis showed clustering of samples based on level of patulin in apple juice at 5% level of significance. Based on the data, models were developed which are able to successfully classify contaminated and

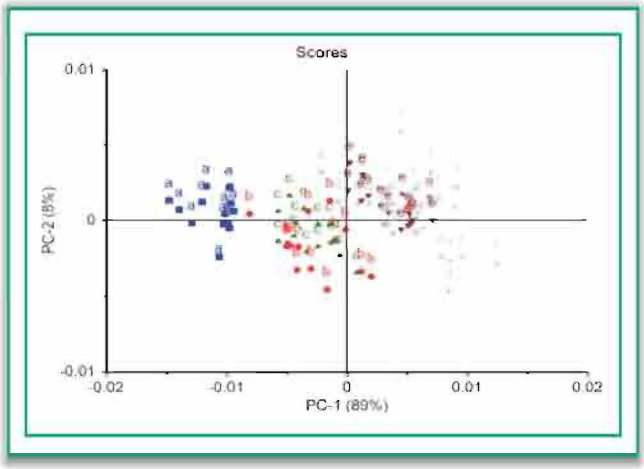
non-contaminated juice into their respective classes using Soft Independent Modeling of Class Analogy. Patulin content in apple juice was best predicted in the spectral range of 1225 - 950 cm^{-1} using partial least square and multiple linear regressions with coefficient of determination of 0.96, 0.96 and 0.99, 0.80 for calibration and validation respectively.



Principal component scores plot of pure and patulin spiked apple juice in the wavenumber range of 1141–1020 cm^{-1}

Detection of Aflatoxin B1 in milk

Fourier Transform Infrared Spectroscopy coupled with multivariate analysis was developed to detect and quantify the contamination of AFB1 in pure milk. FTIR spectra of milk spiked with known AFB1 concentrations (viz. 10, 20, 30, 40 and 50 ppb) were acquired which revealed differences in absorption between pure and contaminated milk samples, specifically in the wavenumber range of 1800-1331 cm^{-1}. Principal component analysis showed distinct segregation and clustering of AFB1 contaminated milk samples at 5% level of significance. Soft independent modelling by class analogies was used to assess the feasibility of detecting AFB1 in pure milk, and developed models could successfully classify contaminated with the pure milk samples. AFB1 concentration in milk was best predicted in the spectral range of 1484 - 1423 cm^{-1} using partial least square and multiple linear regression regressions with coefficient of determination of 0.92, 0.97 and 0.90, 0.92 for calibration and validation, respectively.



Principal component scores plot of pure and AFB1 spiked milk in the wave number range of 1800–1706 cm^{-1}

Whey protein fortified mango RTS beverage

Fruit juices are the nature's perfect fast food for modern lifestyle. It is more frequently consumed as refreshing and thirst quenching drink beyond basic nutrients like vitamins, minerals, carbohydrates and antioxidants. However, almost all fruits/fruit drinks lack the protein as a nutritional component. The major challenge to the protein fortification of fruit drinks is to stabilize the protein in the acidic and ionic environment. The most fruit drinks are formulated to pH range of 3.0 to 4.0, where the iso-electric pH of the most of food proteins lies, due to which the protein gets precipitated and leads to unacceptable beverage. An effort was made by ICAR-CIPHET to stabilize whey protein in mango based RTS beverage. The whey protein was hydrolysed with

Mango RTS beverage containing 3.75% whey protein hydrolysate

papain in order to improve its stability at lower pH. Hydrolysed and native whey protein was used at 2, 3 and 4 % levels for fortification. The water holding capacity of whey protein increased about two times (3.14 to 6.69 g water/g protein) after hydrolysis. Native whey protein precipitated in mango based RTS beverage, however, hydrolysed one did not. The RTS beverage with hydrolysed whey protein beyond 2% level imparted slightly bitter taste, which could be masked by incorporating suitable bitterness masker agents (with in regulatory guidelines). The mango RTS beverage with 3.0% protein was successfully developed, which had good sensory appeal and stability during thermal processing as well storage in glass bottles.

Reduced fat yoghurt

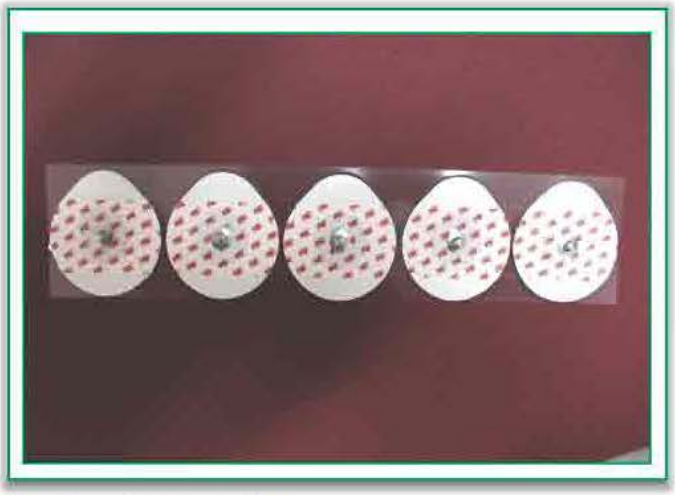
Reduced fat yoghurt was prepared by adding OSA (octenyl succinic anhydride) modified (Degree of substitution= 0.0208) pearl millet starch in double toned milk, 1.5% fat) at four levels viz. 0.5, 1.0, 1.5 and 2.0% and NCDC-144 culture @ 2%. Syneresis significantly ($p<0.05$) decreased as the level of modified starch increased in the yoghurt samples. The sample containing 1.5% OSA-starch had 26.34% syneresis, while control double toned milk (DTM) and standardized milk yoghurt (4.5% fat) had 48.1 and 27.55%, respectively. Lactic acid bacteria count increased significantly ($p<0.05$) with the increasing concentration of OSA-modified starch in the yoghurt samples from 5.8 to 7.5 log10 cfu/mL. The total descriptive sensory score of yoghurt samples (double toned milk) containing OSA starch ranged from 85.3 to 95.0, while that for control yoghurt (double toned milk), it was 81.1. On the basis of improved product firmness, consistency, rheological (structural strength, G'), syneresis and overall sensory acceptability over control, the addition of 1.5% OSA modified pearl millet starch was found optimum to prepare reduced fat yoghurt.

Double toned milk yoghurt containing OSA modified starch and (b) control (double toned milk yoghurt)

Impedance based portable instrument for determination of fish freshness

It is important to handle fish safely in order to reduce the risk of food borne illness, called "food poisoning". Freshness of fish is very important in this concern. A quality ensured (passed) fish not only fetches good price but also ensure good health. Traditionally, assessment of fish freshness methods has relied on sensory evaluation panels to classify products as fresh, bad or spoiled. Although fast, simple and usually accurate sensory analysis is sometimes perceived to be inherently subjective. Methods using chromatographic and chemical techniques are precise and objective, but also time consuming, and expensive. There are very few non destructive instruments available for fish freshness measurement in the market. No indigenous device is available for such quality assessment of fish and other seafood products.

A portable impedance analyzer for detection of freshness of fish using non-invasive electrodes has been developed at ICAR-CIPHET. Electrodes connected in the instrument (3M ECG, round) to detect freshness of fish, consist of base lining material, conductive gel, and electrode buckle. It is a transducer that senses ion distribution on the surface of tissue, and converts the ion current to electron



Non-Invasive electrodes

current. One side of the electrode is sticky that comes into contact with tissue, while the other side consists of conductive metal attached to a lead wire connected to the instrument. Graphical User Interface has been developed for testing fish at different start and delta frequencies (few Hz to Several MHz). Developed Software is able to display the recorded reading in graphs for analysis and further display the result on LCD touch panel. The instrument is useful in fish grading and sorting operations in fish processing industry and fish markets.

Portable impedance analyzer

Protein and minerals rich expanded snack food

Protein and minerals rich expanded snack food utilizing maize, defatted soy flour and spinach powder were developed and evaluated for different quality parameters. Extrusion parameters were optimized using RSM. Optimized process parameters/ingredient composition is: 14% feed moisture, 120°C die head temperature, 345rpm screw speed, 74% maize, 15% DSF, 5% sesame seeds, 6% dried spinach. The samples prepared using optimized parameters and selected ingredient composition had 18.4% protein, 3.3% total minerals and >8.0 overall sensory acceptability score.

Mechanization of value chain of walnut processing (AICRP on PHET, Srinagar centre)

AICRP on PHET, Srinagar centre has developed walnut bleacher-cum-washer. The features of the machine include provision for recycling bleaching solutions, which saves time, cost and energy as well. The impurities can also be removed using a removable sieve located above the trough (containing bleaching solution). Further, provision has also been made for disposing off the recycled bleaching solution. In order to make the machine portable, handle and wheel arrangements have been provided.

Walnut bleacher-cum-washer (AICRP on PHET, Srinagar centre)

Ozone based farm level storage bin for managing insects in stored grain (AICRP on PHET, Coimbatore centre)

Rice grains were placed into the lab scale fumigation bin and ozone toxicity of *Tribolium castaneum* adults collected from Food Corporation of India (Coimbatore) and Central Warehousing Corporation (Trichy) was assessed. The ozone gas generated by ozone generator and passed through the inlet of the fumigation bin. The fumigation bin outlet was connected to the ozone analyzer to monitor the concentration of the ozone. From the analyzer, it was connected to the ozone destructor, where the ozone gas gets destructed into oxygen. *Tribolium castaneum* adults suffered 100% mortality after 480, 390, 270, 210 and 180 min exposure to ozone concentration of 500, 750, 1000, 1250 and 1500 ppmv, respectively. As none of the *Tribolium castaneum* adults showed resistance to ozone, it is a potential alternative for phosphine resistance management in the insect species.

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CONSULTANCY/ LICENSING OF TECHNOLOGY

- Agreement of licensing of 'Groundnut flavoured beverage, curd and paneer' was signed with Mr. Dinesh Soni, s/o Sh. Satish Kumar Soni, D-26, DDA Flats MIG, Saket, New Delhi – 110 017 on June 16, 2015.

PROGRAMMES ORGANIZED

- **Research Advisory Committee Meeting**

  The first meeting of newly constituted (for the period 2015-17) Research Advisory Committee (RAC) was held during May 7-8, 2015 at CIPHET, Ludhiana under the chairmanship of Dr B S Bisht, Former Vice-Chancellor, G B Pant University of Agriculture & Technology Pantnagar, and Director, Birla Institute of Applied Sciences, Bhimtal. Members of RAC are Dr B Ranganna, Professor Emeritus, University of Agricultural Sciences, Bangalore; Prof Susanta Kumar Das, Professor, Agricultural & Food Engineering, IIT, Kharagpur; Dr Pitam Chandra, Professor & Head, Department of Food Engineering, NIFTEM, Kundli,

Haryana; Dr Ashok Kumar, Associate Director Research (Food Science, Nutrition and Engineering), Punjab Agricultural University, Ludhiana; Dr Sanjod Kumar Mendiratta, Head, Livestock Products Technology Division, Indian Veterinary Research Institute, Izatnagar; Dr R K Gupta, Director, ICAR-CIPHET, Ludhiana and Dr D M Kadam, Sr Scientist & Member Secretary, RAC. All the scientific staff of the institute attended the RAC meeting.

Dr B S Bisht, Chairman RAC, stated that during last 25 years of existence, ICAR-CIPHET has made its presence felt at the national and international level. Post harvest losses to food grains that were estimated to be about 10% during 1960s have been reported to be reduced to about 4-6% by 2012. This has happened on account of the efforts and awareness created on post-harvest processing and value addition by many agencies in the country including ICAR-CIPHET. The amount and value of food grains saved in post-harvest phase and channelized into the national pool runs into multi crore of rupees (Rs. 25,000 – 30,000 crore) thus justifying the national efforts and investment on ICAR-CIPHET and similar institutions. However, much more is needed to be done with greater speed to realize the benefits percolating down and visible impact made on improving the quality of life particularly in rural areas.

RAC was with the view that ICAR-CIPHET should act as repository and leading disseminator of information for post-harvest sector, coordinate the national efforts to address its mandate and evolve business models for speedy adaptation of the results. They also advocated the integration of advancements in contemporary sciences and technology in PHT. The RAC appreciated the strong R&D infrastructure created at ICAR-CIPHET. Report/salient achievements of completed research projects (total 13) after previous RAC meeting were also presented and discussed during the meeting. Apart, 14 new project concepts were discussed. On new proposals, RAC made valauble observations/suggestions/recommendations for betterment and to convert those in the form of future projects of the institute.

- **Institute Research Council Meeting**

The 24th Institute Research Council Meeting was held during June 6-7, 2015 at ICAR-CIPHET, Ludhiana under the Chairmanship of Dr R K Gupta, Director, ICAR-CIPHET, Ludhiana. Dr Nawab Ali, Former DDG (Engg), ICAR, New Delhi and Dr W S Dhillon, Director, PHPTC, PAU, Ludhiana were the invited experts. Dr Sangita Bansal, OIC, PME Cell was the Member Secretary, IRC. Director, ICAR-CIPHET highlighted the importance and need of inter-

institutional research and informed the house that some of the new projects were framed in collaboration with different crop based ICAR institutes. Dr Nawab Ali, and Dr W S Dhillon, appreciated the scientific, technical and other staff of ICAR-CIPHET for transforming the Institute into a pleasant campus. They expressed their happiness towards the progress of the Institute and said that the Institute has grown enough to take up challenging research in the area of post-harvest engineering and technology.

- ICAR-CIPHET, Abohar organized a *Pakhwada* on "Mass awareness against residue burning" during April 16-30, 2015. The objective of this campaign was to create awareness among wheat growing farmers about the ill effects of residue burning and available interventions for management of residue. The theme of the campaign was '*Vatavaran Ko Bachao, Bhuse Ko Na Jalao*' and '*Khet Ke Avsesh, Khet Main*'. Under this, two seminars were also organized on 29th April, 2015 at cooperative society office and at Maya Devi Public School, *Kera Khera* (Abohar).

- One month training was organized for 11 B Tech (Agril Engg) students of Chhattisgarh Agricultural University during March 17 – April 16, 2015.
- One month training was organized for 5 B Tech (Agril Engg) students of Kelappaji College of Agri. Engg. & Technology, Tavanur, Kerala during May 1 -31, 2015.
- ICAR-CIPHET, Abohar organized a "*Rozgar Mela*" on food processing in collaboration with Employment Generation and Training Dept. Punjab on May 8, 2015 to create awareness about various Central and State Govt. self-employment schemes.
- One month training was organized for 10 B Tech (Agril Engg) students from College of Agril. Engg. & Post Harvest Technology, Ranipool, Gangtok; 4 B Tech (Agril. Engg.) students from Dr. Budhajirao Mulik College of Agricultural Engineering & Technology, Mandki, Palvan, Ratnagiri, Maharashtra and 5 B Tech (Agril. Engg.) students from K. K Wagh College of Agril. Engg. & Technology, Saraswati Nagar, Panchvati, Nasik, Maharashtra during June1-30, 2015.
- "*Hindi Sangosti*" was organized by HCP division, Abohar. Scientific staff of Abohar campus delivered seminar lecture related to post-harvest technology in Hindi.

- संस्थान में हिंदी कार्यशाला का आयोजन

  सीफेट, लुधियाना में 25 जून 2015 को हिंदी कार्यशाला का आयोजन किया गया। इस कार्यशाला में डॉ. हरदीप सिंह, प्रोफेसर (हिंदी), सतीश चंदर धवन गवर्मेंट कॉलेज, लुधियाना ने "राजभाषा हिंदीः कार्यशाला से लेकर सदभावना तक" विषय पर अपनी प्रस्तुति देकर संस्थान के सभी अधिकारियों एवं कर्मचारियों को लाभान्वित किया।

- Five days training on "Post-Harvest Management" was organized for 19 Agricultural officers from Vasantrao Naik State Agricultural Extension Management Training Institute (VANAMATI), Nagpur, Maharashtra at CIPHET, Ludhiana during April 14-18, 2015. This training program was sponsored by Agriculture Technology Management Agency (ATMA).

PROGRAMMES ATTENDED

- Dr R K Gupta, Director, ICAR-CIPHET Participated in Workshop on "Making Engineering Scientists Contribution More Meaningful to Stakeholders and the Nation" held at NASC Complex, New Delhi on April 13, 2015.
- Dr R K Gupta, Director, ICAR-CIPHET participated in Interactive Meeting of Vice-Chancellors of SAUs and Director's Conference during May 14-16, 2015 at New Delhi.
- Dr R K Gupta, Director, ICAR-CIPHET participated in 20th Meeting of the Board of Management of NIFTEM, Kundli held on May 23, 2015 at NIFTEM Campus, Kundli, Sonepat.
- Dr R K Gupta, Director, ICAR-CIPHET attended Brain Storming Workshop on "Application of Electronics in Agriculture Engineering" on June 8, 2015 at New Delhi.
- Dr R K Gupta, Director, ICAR-CIPHET attended a special meeting regarding "R&D Scheme in MoFPI" at New Delhi on June 9, 2015.
- Dr R K Gupta, Director, ICAR-CIPHET attended Board of Management meeting of PAU, Ludhiana at Chandigarh on June 6, 2015.

- ICAR-CIPHET showcased and demonstrated CIPHET developed technologies in Inter State Horti Fair Sangam-2015 organized by National Horticulture Board, held at Gandhi Maidan, Motihari, Bihar during 10- 12 April, 2015. The exhibition was inaugurated by Hon'ble Union Agriculture Minister Sh. Radha Mohan Singh.

- Dr P C Sharma, Head HCP and In-charge ICAR-CIPHET Abohar, Er Manoj Kumar Scientist (APE) and Sh. Rajesh Kumar STO participated in the PAU *Kissan Mela* organized by PAU-KVK, Bhatinda and exhibited the technology developed by ICAR-CIPHET.

- Dr P C Sharma, Head HCP and In-charge ICAR-CIPHET Abohar along with Er Manoj Kumar, Scientist (APE) and Sh. Rajesh Kumar, STO participated and demonstrated technologies developed by ICAR-CIPHET in an Outreach programme organized by PAU Ludhiana and NIFTEM at Mann Village near Dhabwali. Mrs Harsimrat Kaur Badal, Hon'ble Union Minister for Food Processing Industries inaugurated the outreach programme and showed interest in the activities of CIPHET on Post-Harvest Engineering and Technology.

- Dr R K Gupta, Director, ICAR-CIPHET attended and presented lead paper in 3rd Uttar Pradesh Agricultural Science Congress held during June 14-16, 2015 at Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad.

- Dr R K Gupta, Director, ICAR-CIPHET attended National Conference on "Sustainability Issues in Food Processing Sector" on June 18, 2015 at NIFTEM, Kundli, Sonepat.
- Dr P C Sharma, Head HCP Division and Er Kirti R Jalgaonkar, Scientist attended the workshop on "Making Engineering Scientists contribution more meaningful to stake holders and the Nation" held at NASC Complex, New Delhi during April 13-14, 2015.
- Dr P C Sharma, Head HCP Division attended Institute Management Committee meeting of ICAR-CPRI Shimla on April 27, 2015.
- Dr Ramesh Kumar Sr Scientist attended meeting on "National Skill Development Programme" organized by Agriculture Skill Development Council of India, under the chairmanship of Sh. Parkash Singh Badal, Hon'ble CM Punjab. The Chief Minister stressed to upgrade the skill of farmers, wage workers and entrepreneurs on dairy, fishery, poultry and high value crops like horticultural produce and cold chain management for fresh fruits, on May 16, 2015 at Chief Minister Office, Punjab Bhawan, Chandigarh.
- Dr Sangita Bansal, Ms Monika Sharma, Ms Surya Tushir, Er Manoj Kumar Mahawar and Er Arun Kumar TV attended "AGRI SEARCH – 2050 Meet" organized by ICAR at NASC Complex, New Delhi on May 18, 2015.
- Er Manoj Kumar Mahawar, Scientist, Vijay Singh Meena, Scientist and Rajesh Kumar, STO participated in "*Swarozgaar Mela*" organized at Fazilka on May 30, 2015.
- Farmers (14 no.) from Rajgarh, Madhya Pradesh visited ICAR CIPHET Abohar during May 28-30, 2015 and got demonstration cum training on working of different machinery and equipment on processing of horticultural produce.
- Dr Mridula D, Pr Scientist and Sh Raj Kumar, Sr Administration Officer attended a training programme on 'Stress Management" during June 16-19, 2015 at ICAR-NAARM, Hyderabad.
- Dr Rahul K Anurag and Ms Surya Tushir attended 2 days Workshop on 'Accreditation of Food Testing Laboratories' organized by Agricultural Engineering SMD during June 18-19, 2015 at NASC Complex, New Delhi.
- Sh Manni Lal, AF&AO attended training programme on "Accrual Accounting in Government" at NIFM, Faridabad during June 22-27, 2015.
- Dr Mukund Narayan, Technical Officer participated in 3rd Uttar Pradesh Agricultural Science Congress on "Strategic Governance & Technological Advancement for Sustainable Agriculture" held at SHIATS, Allahabad during June 14 – 16, 2015.
- Dr S K Nanda, In-charge, PC (PET) visited ICAR-CIPHET, Abohar; PAU, Ludhiana and MPUAT, Udaipur centres during this quarter of the year to review the research work and to discuss future action of plan.

AWARDS/HONOURS

- Er Kirti R Jalgaonkar won 'Gold Medal' in Women's Badminton Single event and 'Silver Medal' in 100m Women's race in ICAR Zonal sports meet (North Zone) organized during April 19-21, 2015 at ICAR-IISWC, Dehradun.

TRANSFERS

- Dr S K Devatkal, Sr Scientist, transferred to ICAR-NRC on Meet, Hyderabad on April 10, 2015.
- Dr Indu Karki Rawat, Scientist, transferred to ICAR-Central Soil and Water Conservation Research & Training Institute (CSWCRTI), Dehradun on April 30, 2015.
- Dr Yadav Rahul Subash, Scientist, transferred to ICAR-Directorate of Floricultural Research on May 31, 2015.

JOINING

- Er Akhoon Asrar Bashir, Scientist joined at ICAR-CIPHET, Ludhiana on April 9, 2015.
- Er Indore Navnath Sakharam, Scientist joined at ICAR-CIPHET, Ludhiana on April 10, 2015.

PROMOTIONS

- Dr S K Nanda joined as Head, Food Grains & Oilseeds Processing Division on May 29, 2015.
- Dr Mridula D promoted to Principal Scientist (F&N) with effect from May 26, 2013.

LINKAGES DEVELOPED

- ICAR-CIPHET, Ludhiana has signed a memorandum of understanding (MOU) with National Institute of Food Technology and Entrepreneurship Management (NIFTEM), Kundli on June 18, 2015 during National conference on Sustainability Issues of Food Processing Sector (SIFPROS-2015). This MOU will lead to strengthening, betterment and benefit of both the organizations mutually and will enable the ICAR-CIPHET to jointly organize seminars, conferences, workshops, short-term education programmes on topics of mutual interest, propose and engage in research or training programmes sponsored by funding agencies and to invite each other's faculty to participate therein. Dr K Alagusundaram, Deputy Director General (Agril. Engg.), ICAR, New Delhi; Dr R K Gupta, Director, ICAR-CIPHET, Ludhiana; Mr Ranglal Jamuda, Secretary, MOFPI, New Delhi and Chancellor, NIFTEM; Dr Ajit Kumar, Vice-Chaneellor, NIFTEM; Mr Rakesh Kacker, Director, India Habitat Centre, New Delhi; Dr Ashutosh Upadhyay, Acting Registrar, NIFTEM and other officials of ICAR-CIPHET, Ludhiana and NIFTEM were present on the oecasion.

Director ICAR-CIPHET signing a MoU between ICAR-CIPHET, Ludhiana & NIFTEM, Kundli

Published by : Dr R K Gupta, Director, ICAR-Central Institute of Post-Harvest Engineering and Technology, PO: PAU Campus, Ludhiana 141 004 (Punjab)
Ph: 0161-2308669, Fax: 0161-2308670, www.ciphet.in, E-mail: director.ciphet@icar.gov.in

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