



# Central Institute of Post Harvest Engineering & Technology Ludhiana

**OUR SLOGAN: PRODUCE, PROCESS AND PROSPER**

**CIPHET E - Newsletter for March-April, 2012  
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## Director's Column



**Dear All**

**To review progress and achievements of various centers of AICRP on Application of Plastics in Agriculture (APA) & Post Harvest Technology (PHT) Quinquennial Review Team (QRT) meetings were held.**

**Two training on 'Processing and Value Addition of Small Millets' sponsored by Department of Agriculture and Cooperation, Government of India were conducted**

**To train three entrepreneurs from Punjab, a hands-on-training for preparing milk and tofu from soybean was conducted.**

**Under the NAIP sub-project, a ten days training programme on "Fermentation and downstream processing techniques for production and purification of cellulolytic enzymes" was organized.**

**I congratulate Dr. Suresh Devatkal, Sr Scientist, for getting cutting edge research enhancement and scientific training (CREST) fellowship from the department of biotechnology, Govt of India.**

**A NABARD sponsored five day post harvest training under the Farmers' Technology Transfer Fund (FTTF) programme was also organized.**

**With best regards**

**U. S. Shivhare  
Director**

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### **Dr. U. S. Shivhare Took Over As Director, CIPHET**

Dr. U.S. Shivhare joined as Director on March 23, 2012. He did his B.Tech. (Agri Engg) from JNKVV (Jabalpur); M.Tech. (Process & Food Engg) from GBPUA&T (Pantnagar); and, PhD & PDF (Food Engg) from McGill University (Canada). He has served as faculty member in GBPUA&T (Pantnagar); SLIET (Longowal); GNDU (Amritsar); Panjab University (Chandigarh); including short-term adhoc assignment at CIPHET. He has also been a visiting scientist to McGill University (Canada) in 2002 and 2007

Dr. Shivhare has been actively involved in research on shelf-life, thermal processing, rheology, quality control, process and product development. Dr. Shivhare has supervised five PhD thesis and 15 master's thesis in food processing. The results of these studies have been published (90) in reputed national/international journals and books (04). Two patents have been filed in India on development of a pre-treatment method and development of a dehuller for guar seeds. He is a recipient of NN Mohan Memorial Award (1999) by Food Processors Association (India) and received best research paper award on product development published in Journal of Food Science & Technology (2009). His contribution to original research has been reflected in the invitation from Food & Bioprocess Technology (FABT)-An International Journal (Springer, USA) to join as the member of the editorial board. At present, he is the Associate Editor to FABT. His research papers have been widely cited with 926 total citations (h-index=19; source: Google Scholar). In addition, Dr. Shivhare is the professional reviewer to several international journals, including J Food Engg (USA); J Food Sci (USA); Biosystems Engg (UK); LWT (UK); Intern J Food Properties (USA); Drying Technol (USA); J Agric & Food Chemistry (USA); J Textural Studies (USA); J Food Process Engg (USA); and, J Food Science & Technol (India).

### **QRT Meeting of AICRP on Application of Plastic in Agriculture**

The eighth meeting was held on 13<sup>th</sup> and 14<sup>th</sup> March, 2012 at JAU, Junagadh and review of the scheme was organized at Seminar Hall of College of Agricultural Engineering and Technologies. Dr. N.C. Patel, V.C and Dr. C.J. Dangaria, Director of Research and all the important officers of JAU were also present. During his welcome address, Dr. C.J. Dangaria, Director of Research, JAU, Junagadh briefed about the overall achievement of University in Research, Education and Extension spheres. Dr. P.R. Bhatnagar, PC(APA) gave overview of

the Junagadh Centre. Before this, he introduced QRT Chairman and members to the audience of the meeting. Dr. S.R. Singh, Chairman QRT suggested JAU to concentrate research on groundwater, economized water use and sea water intrusion in view of prevailing situation in Gujarat. He also advised to develop technologies for better control of environment for both above the surface and sub surface drip irrigation, animal and fish production. Dr. N.C. Patel, V.C. informed that JAU centre started during 2004 and investigated on soil solarization, poly house, modified atmosphere packaging (MAP), mulching of onion, micro irrigation, drying of vegetables and fish under poly house. He expressed concern about shortage of manpower in Junagadh centre. In view of substantial coastal area, he felt that research is necessary in marine fish cultivation. He viewed that APA can also coordinate with AICRP on UAE on development of need based technologies. Er. R.M. Satasiya presented the progress of Junagadh centre on green house, mulching and drip irrigation. Dr. D.K. Antala presented the progress on development of MAP system for sapota and mango. He also presented on foldable plastic box for packaging of horticulture commodities.



QRT visited APA laboratory to see the different packaging crates such as foldable, gunny bags and eggs crates. MAP system was also demonstrated by Dr. D.K. Antala. Dr. P.M. Chauhan explained about the research on nutrient composition for cultivation of tomatoes in the soil-less medium under the poly house with fan pad cooling system. QRT also inspected capsicum cultivation under poly house and visited bio-control laboratories, food testing laboratory and exhibition hall.



Mr. Chhagan bhai Javiya in Village Vadla is having around 15 acres of land cultivating groundnut, garlic, onion, bitter guard and watermelon. On his farm, he has mulched groundnut, watermelon and bitter gourd and adopted the drip irrigation system. He also achieved about 40% water saving and 50% fertilizer saving due to drip irrigation and fertigation. Then, QRT moved to Vadal Village to visit the farm of a young educated farmer Mr. Sandip Bhai Patel. He has organized the entire farm using recommended package of practices with animal husbandry, apiary and organic farming. He has adopted drip irrigation and mulching. He has also constructed 512m<sup>2</sup> natural ventilated green house with a dimension of 32 x 16 x 5.5 m at a cost of Rs. 4.00 lakh with support from APA team of Junagadh centre. He was advised by QRT to use insect net in place of shade/screen nets on the sides of the polyhouse. QRT also advised to give attention on East-West ventilation and North-South direction of the poly house along the length.



The ninth meeting was held on 16<sup>th</sup> and 17<sup>th</sup> March, 2012 at MPUAT, Udaipur. The team visited Livestock farm of MPUAT at Department of Livestock Production Management, Rajasthan College of Agriculture. This livestock farm is running an experiment on evaluation of shade net for animal comfort. Dr. S.R.Bhakar, Research Engineer made detailed presentation on the progress made by the Udaipur Centre since April, 2009. He made presentation on the investigations in the area of shade net for animal comfort system, polyhouse construction, mulching and gravity fed drip irrigation system. He also made presentation on packaging of custard apples. QRT members suggested the use of foldable plastic crates with partition developed at JAU, Junagadh for custard apple packaging. Then QRT Chairman and Member met Dr. S.S. Chahal, V.C. and discussed about the progress of the APA scheme. He briefed the overall activities of university and this scheme. He promised the QRT to look into the problems of shortage of scientific and technical manpower in the scheme. Thereafter, the QRT visited naturally ventilated polyhouse and gravity fed drip irrigation system constructed on experimental field.

The tenth meeting was held on 9<sup>th</sup> and 10<sup>th</sup> April, 2012 at VPKAS, Almora. QRT visited Directorate of Cold Water Fisheries Research (DCFR), Bhimtal to review the work done on poly lined fish pond during the last five year plan. Dr.P.R.Bhatnagar, PC (APA) introduced the QRT members to Dr. P. C. Mahanta, Director, DCFR and gave the overview of APA activities of the centre. QRT visited various laboratories and facilities of DCFR. The team was shown the process of fish culture in cement concrete channel shaped hatchery. Dr. N. N. Pandey, Senior Scientist and associate of this scheme explained the fish rearing in LDPE lined fish ponds. Thereafter, the team visited VPKAS, Almora and met Dr. J. C. Bhatt, Director of the institute. Dr. P.R. Bhatnagar, PC-APA, introduced Chairman and members to the director. Dr J C Bhatt explained the overall research and extension activities of the institute. After this, QRT visited Hawalbagh farm and exhibition hall. A detailed presentation on salient research achievements of the APA scheme at VPKAS centre was organised with a welcome address by Dr J C Bhatt, Director. Dr. P.R. Bhatnagar gave the overview on development of APA scheme at the centre since its inception (May, 1988). Dr. D. C. Sahoo, PI made detailed presentation. On 10/04/12 QRT went for field visit at VPKAS Hawalbhag. The team visited 46m<sup>3</sup> capacity LDPE lined tank, gravity based micro irrigation system having arrangement of irrigating four plants from one lateral line having 96% uniformity operating on 0.5 kg pressure. Another site shown to QRT was a poly house of 50mX8mX3.3m size with side open up to 1.3m. Team also saw the multi cut wheat experiment at the farm. Thereafter, QRT visited Doonagiri area and saw the silpaulin lined fish pond of Sh. Rajender Singh Kera along with the poly hou. Dr. N.N. Pandey of Bheemtal centre explained all the details. Lastly, team went to the village Todhra (Dudholi Kisan Club, Doonagiri) where Sh. Jeet Singh Bajni, an innovated award winner farmer, welcomed the team along with the other farmers. Then the team visited his poly house and a pond which is being constructed as fish pond having poly house on it. There are 60 poly tanks and 30 poly houses in the village. Here, 10 self-help groups are in operation. On 11/04/12, the team

visited village Bhagartola (Block Jageshwar, Distt. Almora), where poly houses with bamboo frames have been constructed on a large scale in the farmers' fields with participatory approach i.e. frame and labour provided by the farmers while the cladding material was provided under HTM project under technical guidance of the APA team.

The eleventh meeting was held on 13<sup>th</sup> and 14<sup>th</sup> April, 2012 at SKUAST-K, Srinagar. QRT was welcomed by Dr. Shafiq A. Wani, Director of Research, SKUAST-K, Srinagar and informed about the University and its different activities having many campuses. Thereafter, Dr. Tej Partap, Vice Chancellor, SKUAST-K, Srinagar described the main research achievement of the APA scheme and its impact on the farmers. He appreciated the



contribution made by the APA team and scientists involved in grafting of wall nut in the poly house and construction of poly houses under the APA scheme. Thereafter, Prof. Rohitash Kumar presented the progress of APA scheme for the period 2007-12. He mentioned about the progress of the above programmes and told that all poly houses in the Valley are being constructed with the help of a motorised G.I. pipe bending machine developed by the APA Srinagar centre. The QRT Chairman and all members appreciated the efforts made by the scientist of the Srinagar Centre.

QRT visited Agricultural Engineering Division and workshop to see the pipe bending machine, pedal operated maize seller, solar tunnels dryers, walnut cracker, etc. QRT also visited various poly houses, shade net house, gravity fed drip irrigation system for almond tree, low tunnels houses for strawberry cultivation, etc. QRT also visited the village Bugan of Budgaon district to visit the farm house of Haji Gulam Bhat. The farmers of Bugan village were very much satisfied with the intervention of the scientist in constructing poly houses for vegetable cultivation and they are ready to adopt the plasticulture technology.

## Trainings conducted

- Three-day training programmes on 'Processing and Value Addition of Small Millets' sponsored by Department of Agriculture and Cooperation, Government of India was conducted during 19-21 March 2012 and 29-31 March 2012. Many farmers, Subject Matter Specialist (SMS), Agricultural Development Officers (ADOs), Government and Non-government officials and entrepreneurs from Uttar Pradesh, Haryana, Gujarat and MP took part in the training programmes. The training consisted of lectures, hands-on practicals and field visits.



During inaugural, Dr U.S Shivhare, Director, CIPHET, said that few years back entire emphasis was given on utilization and consumption of wheat only. People are now

realizing the benefit of millets and its nutritional value. He added that with the help of CIPHET developed processing technologies, millets could be better processed. Dr. Shivhare appealed the agriculture officials to disseminate technology in their respective areas and thus to bring change at ground level.

Dr. Deepak Raj Rai, Head, ToT Division said that CIPHET has also developed cutting edge technologies in oilseeds, meat processing, extrusion, cryogenic grinding and now it is focusing on human resource development in processing technologies. Dr M.R Manikantan, course director of training programme, informed that government of India is going to establish 280 clusters for millet processing across the country. Each cluster would be having machinery worth Rs 4 lakh and would provide processing facilities to farmers.

- Training on soybean processing and value addition was conducted during March 26-27, 2012 for the participants from Bhatinda, Punjab. Three participants took part in the programme. They were given hands-on-training in preparation of milk and tofu from soybean. Dr D R Rai, Head (ToT Division) said that soybean processing could become a high potential business due to increased demand in the market. The milk and tofu from soybean contains high protein and vitamins and health conscious people prefer this over cow/buffalo milk. Good quality soymilk could be prepared with help of standardized process by the institute. He assured them for all kind of help in setting up of soy processing plants. The training programme included practicals on soybean milk and tofu.

## Trainings Organized Under NAIP Sub-Project

- Ten days training programme on “Fermentation and downstream processing techniques for production and purification of cellulolytic enzymes” was organized under the NAIP sub-project on “Novel biotechnological processes for production of high value products from rice straw and bagasse” during 02-12 March, 2012 at CIPHET, Ludhiana. The training was organized with an aim to upgrade the knowledge and skills of the researchers/ students working in the area of cellulolytic



enzyme production, characterization and purification so that the knowledge gained could be translated to entrepreneurship and human resource development. Ten participants from different parts of the country participated in the training. The theory and practical classes were conducted by the experienced resource personnel. The course content covered basic aspects such as fermentation techniques employed for production of cellulolytic enzymes, screening techniques for microbes producing cellulolytic enzymes, enzyme assays for cellulases; applied aspects such as, application of membrane technology for concentration of cellulases and feed evaluation studies of the residues after enzyme extraction and the frontier areas like metagenomics and bioinformatics.

## Technologies Developed

- **Preparation of Thermostable Cellulase Using Microbial Isolates:** Cellulase enzymes produced by the four fungal isolates, isolated from different habitats were evaluated for thermostable characteristics by varying temperatures between 50-80 °C. The enzyme produced by above isolates showed stable enzyme titres at 60 °C until 16 h. The crude

enzymes produced by the four fungal strains showed stability at 60 °C and good hydrolytic efficiency in production of sugars from cellulosic biomass.

- **Development of Microbe Based Ripening Agent For Banana:**

Microbial ripening agent for banana has been developed in the form of starter culture. The unripe bananas were treated with 7 days grown microbial culture extract for two hours. The total soluble solids content of the treated bananas was 13-18% higher than the untreated samples (control). Firmness of the treated fruits was 10-12% lower than the control samples and the pulp of treated fruits was also found to be softer than untreated ones (10-15%). Treated bananas can ripen in 6 days (two days earlier than untreated bananas) at room temperature ( $25 \pm 2$  °C) without any additional chemical treatment, thereby eliminating the adverse effects caused by chemical ripening agent such as calcium carbide.



## Scientist Awarded DBT Crest Fellowship

Department of Biotechnology, GoI, has awarded cutting edge research enhancement and scientific training (CREST) fellowship to Dr. Suresh Devatkal, Sr. Scientist, AS&EC Division. Under this programme, Dr.S.Devatkal will undergo one year advanced research training in the field of non-thermal food processing technologies at Food Safety and Engineering Department of Ohio State University, Columbus, USA. He will conduct the specialized experiments to develop shelf stable meat and food products using high pressure and pulse electric field as processing methods. This training will be utilized for further developing these processing technologies in CIPHET for applications in food and biotechnology industries.



## CIPHET Attended Farmers Fair

Kisan mela was attended during March 19-20, 2012 at SKUAS&T, Jammu. The CIPHET stall was visited by dignitaries and they appreciated the technologies developed by CIPHET. Farmers showed keen interest in the CIPHET developed technologies. Some of them underlined the need of pomegranate aril extractor for processing of the wild pomegranate which is available in plenty in the state which otherwise remains unutilized and wasted as such on plants. The technology of the EC room was also appreciated by the farmers. Young visitors were very much interested in the training programmes on various agro processing activities being organized at CIPHET.



Another kisan mela during March 21-22, 2012 organized by PAU, Ludhiana was attended. The visitors took keen interest in CIPHET technologies like banana comb cutter, hand held pomegranate aril extractor, groundnut decorticator, maize cob sheller, extruded and ready-to-eat products from pearl millet and barely etc.

## Participation in Global Conference

Indian Council of Agricultural Research and Asia-Pacific Association of Agricultural Research Institutions (APAARI) with support from GFAR under Gender in Agriculture Partnership (GAP) organized a global conference on Women in Agriculture during 13-15 March 2012. During inaugural, welcome address was given by Dr. S. Ayyappan, Director General, Indian Council of Agricultural Research. Other dignitaries were Dr. Raj Paroda, Executive Secretary APAARI, Monty Jones, Chairman, GFAR, Dr. M.S. Swaminathan, Member of Parliament and Smt. Margaret Alva, Governor, Uttarakhand. Smt. Sheila Dikshit, Chief Minister of Delhi was the chief guest of the programme. The goal of the conference was empowering women for inclusive growth in agriculture and the main objectives were to develop a framework for action; to integrate and empower women for inclusive growth and development through an enduring global partnership program on gender in agriculture. From CIPHET, Dr. Indu Karki attended the conference and presented a poster paper on post harvest technologies for drudgery reduction.

## NABARD Sponsored Post Harvest Training Programme

CIPHET organized five-days post harvest training programme during 9-13 April 2012. It was sponsored by NABARD under the Farmers' Technology Transfer Fund (FTTF) programme. Around 10 farmers from Ludhiana district underwent the training programme. During inauguration, Dr U.S Shivhare, Director, CIPHET told that there is need to focus on development of low cost post-harvest machinery, so that small and medium size farmers could adopt post harvest technologies. Dr Deepak Raj Rai, Head, Transfer of Technology Division said that farmers often face problem of steep fall in price due to glut. This could be dealt only if they install on-farm processing units and sell processed products instead of raw produce.



Assistant General Manager of NABARD, Sh. Nalin K Rai, apprised the audience that central government would be especially focusing on increasing the farmers income through value addition in 12th five year plan. The bank would like to fund projects on CIPHET developed technologies for small and medium size farmers. He suggested the farmers to form group in villages and set up processing units, which will bring down cost and would help in maximum utilization of farm machinery. He told that NABARD could also provide subsidy to some of the bankable projects. The training programme included hands-on-training on low cost storage of fruits and vegetables, packaging of fresh and minimally processed fruits and vegetables, processing and value addition of soybean, spice grinding technology, chilli processing, preparation of cattle feed from potato waste, value added products from root crops, value added meat products and millet processing technology.

## QRT Meeting of AICRP on Post Harvest Technology

A review meeting of the QRT (AICRP on PHT) was held at Udaipur (MPAUT) centre during March 2-3, 2012 and the progress as well as constraints of four co-operating centres (viz. Udaipur, Jaipur, Jodhpur and Junagadh) were reviewed for the XI Plan period (2007-12) under the the chairmanship of Dr. R.P. Kachru, Ex-ADG (Process Engg), ICAR. QRT chairman along with members Dr. B. Ranganna, Dr. Rakesh Nigam and Dr. J. Sahoo also visited Onga,



a tribal village about 70 km from Udaipur, on 2<sup>nd</sup> March 2012, to witness the aloe vera processing plant in working condition. The plant has been established with the help of Udaipur PHT centre through training the SHG and supplying the Aloe vera gel extractor developed by the centre. The QRT observed all the unit operations of aloe vera juice production i.e. collection of the leaves, cleaning, extraction of gel and bottling of juice.

The next QRT meeting was held during March 16-17, 2012 at Chennai (TANUVAS) centre of AICRP on PHT. Five co-operating centres (viz. Bangalore, Chennai, Coimbatore, Raichur and Trivandrum) participated and presented their progress during XI Plan in this meeting. The QRT chairman, members, secretary and PC (PHT) also visited the modern meat retail shop “Batchabhai Meat Store” at Kilpauk, Chennai. The shop was established with the help of the Chennai (TANUVAS) centre of AICRP on PHT and expressed their happiness with good hygienic practices maintained by the facility, including a refrigerated van for transport of carcass and home delivery of meat products.



**QRT (PHT) visiting aloe vera juice processing plant at tribal village Ongna, Rajasthan**



**Internal view of the Batchabhai Meat Store at Kilpauk, Chennai**

QRT (PHT) also visited Raipur (IGKVV) centre during April 3-4, 2012 and reviewed the progress made during XI Plan for centres of AICRP on PHT. The chairman Dr. R.P. Kachru, members Dr. B. Ranganna, and Dr. J. Sahoo, Dr. D.N. Yadav, Secretary QRT and PC (PHT) Dr. S.K. Nanda met honorable Governor of Chhattisgarh, Mr. Shekhar Datt, on 3rd April at Chhattisgarh Rajbhawan and discussed various issues on post harvest technology pertaining to national needs as well as for Chhattisgarh state in particular.



**QRT (PHT) with Hon'ble Governor of Chhattisgarh, Mr. Shekhar Datt**

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