



Central Institute of Post Harvest Engineering & Technology Ludhiana

Our Slogan: Produce, Process and Prosper

**CIPHET E – Newsletter for October 2010
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Director's Column



Dear All

Climate change is a great concern now a day. The effect of rising temperature is not only seen on decreased productivity but also on the quality of produce and their perishability. In grains it is either discoloration where as in fruits it is the thickness of the skin which protects the fruits. The result may also be on the composition and quality. Hence scientists world over are deliberating on the strategies to combat this challenge. However the race between the climate change and human efforts to mitigate it is never ending and only post Harvest Engineering Technologies can help in providing the solution to prevent the losses suitable for rapid changing climatic factors by controlling the physical processes of handling and management. The physical methods of proper handling, short term storage, improved transportation along with production catchment value addition is practical solution to face climate change effects on horticulture produce.

Another important issue which was dealt this month by CIPHET was a workshop for quality and safety of our traditional sweets. Our sweets are mostly based on milk and legumes, hence are most nutritious food and are part of our rich heritage. CIPHET has taken unique initiative to educate and support sweet manufacturers in producing hygienic products to bring confidence in our traditional sweets as against modern day junk food for the benefit of consumers. Around 50 sweet manufacturers from across the state participated in the workshop.

Unique addition to the research facility at CIPHET is cryo-grinder we got from Germany. It is a most advanced technology for ensuring flavour and medicinal values and aroma of the spices with fine grinding at low temperature.

CIPHET also organized an exhibition on showcasing of technologies under NAIP Mass Media Project on October 20 where Indian Council of Agricultural Research institute's and State Agricultural Universities from northern region participated.

Availability of good quality seeds is a main constraint for Indian farmers, hence involvement of the farmers in seed growing and also its processing is essential. CIPHET has opened up the seed processing facility at its Abohar campus on custom hire basis @ Rs. 50/quintal and farmers are enthusiastically using this facility. Annually they process about 2500 quintals of seed at CIPHET facility.

This month we have flashed a micro-encapsulator technology for encapsulation of probiotic and prebiotic ingredients, which is being researched at CIPHET and opened it up for training of human resource in this concept at a fee of Rs. 25, 000 per participant.

With best regards

**R.T. Patil
Director**

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Accelerated use of plastics in agriculture

Dr. P. R. Bhatnagar PC (APA) visited Barapani during Oct 4-7, 2010 and observed the different activities such as construction of polyhouse, crop production for off-season vegetables, flower production, seed production, planting material development, nursery etc. At Barapani under the project water management activities in relation to rainwater harvesting and drip irrigation are being taken up at farm level. At Umroi-Madan village farmers experienced a problem for the pond which was lined with polythene but lifting of polythene is taking place due to underflow of water from overland surfaces. The farmers were suggested to dig a trench in upstream side and put polythene to break the streamline of flow, so that the uplift pressure may be diverted and lifting of polythene can be protected. Use of polythene lined small pond, for fishery, poultry and irrigation was found to be getting popular in this region.

National Seminar on Impact of Climate Change on Fruit Crops

National Seminar on Impact of Climate Change on Fruit Crops held at PAU Ludhiana during Oct 6-8, 2010. Director Dr R.T Patil chaired a session on post harvest technology and delivered a lead lecture on Post-harvest handling technologies to meet the changing environmental conditions. He opined that a race between the climate change and human efforts to mitigate it, is never ending and only post Harvest Engineering Technologies can help in checking losses.” Dr Patil said that the climate change is having effects like shorter storability of horticulture crops under ambient conditions and in some cases results in total loss if it rains during harvest season. “Due to their perishable nature losses are heavy in high value crops. The efforts are on for increasing productivity however little attention is paid on post harvest engineering technologies for reduction in post harvest losses under adverse climatic conditions,” he added.

Elaborating on possible way outs, Dr Patil said that physical methods of proper handling, short term storage, improved transportation alongwith production catchment value addition

is practical solution to face climate change effects on horticulture produce. He explained various technologies developed by CIPHET to delegates from different parts of the country attending this 3 day seminar.

CIPHET Organizes Workshop for Sweet Manufacturers on Quality and Safety

A workshop for sweet manufacturers was organized at CIPHET, Ludhiana on October 11, 2010. “Sweets are most nutritious food and are part of our rich heritage”. These remarks were made by CIPHET Director Dr R.T Patil, during inaugural of one day workshop for members of Punjab Halwai Association on safety and quality at the Central Institute of Post Harvest Engineering and Technology. CIPHET has taken unique initiative to educate and support sweet manufactures in producing hygienic products to benefit consumers eventually.



One day workshop for members of Punjab Halwai Association in progress at CIPHET

Around 50 sweet manufacturers from across the state participated in the workshop during which they were given practical demonstration for testing quality of raw material and also given presentation to maintain highest quality standards to gain lost trust of consumers. Speaking on the occasion, Dr Patil said that recently indigenous sweet industry had come under trouble due to misinformation campaign raising apprehensions on their quality. He said that sweets were our rich heritage and if steps were not taken it may start disappearing. “Sweet manufacturers are also backbone for farmers and milk producers as they consume a lot of their production, their disappearance may eventually cost country very high,” he added.



Members of Punjab Halwai Association with CIPHET scientists

Saying that there is nothing wrong with sweets, Dr Patil said that there was need to ensure quality and safety to get trust of consumers back. “With help of science we can ensure that consumers get good quality products,” he said, encouraging the sweet manufacturers to come up with more innovative products and packaging. Senior Scientist Dr H.S Oberoi, while delivering lecture on hygiene and sanitation in sweet manufacturing, demonstrated various techniques to check adulteration in milk and other raw material. Dr Deepika Goswami, Scientist, created awareness among sweet manufacturers on good manufacturing practices.

Dr Yogesh, Scientist, gave simple but effective technique for testing adulteration in puree ghee with the help of HCl and sugar. Dr Devinder Dhingra, Senior Scientist, sensitized manufacturers for maintaining hygienic conditions in their production area. While Senior Scientist Dr Sangeeta Chopra gathered feedback from the manufacturers, senior scientist Dr S.K Devatkal gave his valuable tips on testing of adulteration especially in the milk. Head Transfer of Technology Dr. Deepak Raj Rai said that CIPHET has taken this initiative to help both farmers and consumers. “This was just a first step, we are going to organize more such programmes at CIPHET for food manufactures,” he added. Dr R.T Patil distributed

certificates to the participants attending the workshop and assured continuous support from the institute.

Narinder Pal Singh, President of Punjab Halwai Association, assured that they would take every step to ensure hygienic conditions in manufacturing. “We have lost lot of business last year, due to negative propaganda. Even health minister of Punjab accepted that no sample was found using synthetic milk or other material,” he said, adding that support of CIPHET would help them raise their safety and quality standards. “I can assure on behalf of our association that this time consumers would be getting quality sweets,” he added.

CIPHET Acquires a Novel Machine - a Cryogenic Grinder from Germany

In an effort to develop indigenous cryogenic technologies for food processing, Central Institute of Post Harvest Engineering and Technology has acquired a cryogenic grinder from Germany, which is the most advanced technology for ensuring that solid food like spices do not lose flavour and medicinal values and aroma during conventional grinding process. The imported grinder has a cost of more than Rs 46 lakhs.



Cryogenic grinder installed at CIPHET

Notably, cryogenic technology is used for reducing temperature and cryogenic engines are very commonly referred in space rockets for launch of satellites. For last few years the technology has also found its importance in food processing industry.

Studies have shown that during conventional grinding of solid foods especially spices lose more than 60 percent of their natural ingredients including aroma, flavor and medicinal value etc. This happens because grinding process increases the temperature to more than 45 degree Celsius, spices start losing their value,” said CIPHET Senior Scientist Dr S. Balasubramanian, adding that only cryogenic grinder ensures retention of all these properties. “In addition to this, commodities grinded through cryogenic grinder have more equal distribution of flavour and medicinal values in food formulations than conventional method.” Saying that only few IIT’s and food processing plants of some MNC’s have this cryogenic grinder in India, Balasubramanian said that CIPHET was only institute in Punjab to get this facility. “In cryogenic grinder the temperature is lowered with the help of liquid nitrogen, the reduction achieved in temperature ensures that natural ingredients remain intact, which otherwise would have lost due to rise in temperature,” he said.

Balasubramanian said that they are working to develop indigenous cryogenic grinder, which would cost less than Rs 20 lakh and with many times increased capacity. “If all goes well, we are hoping to develop it by March next year,” he said, adding so far due to high cost of import very few industries could import them. But, this technology is more useful for high value and low volume commodities like spices due to high cost of processing in comparison to conventional grinding, he added.

“Grinding any commodity to the finest size is essential to make available its nutrients to the body very effectively. Though nano science is emerging but traditional size reduction is the only way for solid foods like spices. To retain the best of the flavours and not to damage the

micro nutrients due to heat generated during grinding the cryogenic grinder from Germany, is a unique facility available at our institute,” said Director CIPHET Dr R.T Patil.

Regional Level Exhibition at CIPHET

Central Institute of Post Harvest Engineering and Technology (CIPHET) organized an exhibition on showcasing of technologies under NAIP Mass Media Project on October 20 at the institute campus.

Indian Council of Agricultural Research institute’s from northern region including National Dairy Research Institute, Karnal, Indian Agricultural Research Institute, New Delhi, National Research Center on Equines, Hisar, state agricultural universities including Punjab Agricultural University and Guru Angad Dev Veterinary and Animal Science University (GADVASU), food processing industry including Kashmir Apiaries and Verka, leading entrepreneurs and women SHG’s displayed their technologies and products on the occasion. Dr V. K. Taneja, Vice-Chancellor GADVASU was the chief guest on the occasion, and Dr D.C Sharma, General Manager NABARD would be guest of honour.

Director CIPHET Dr R.T Patil said that aim of the exhibition is to bring bouquet of technologies from the region to farmers/entrepreneurs under one roof. He hoped that farmers/entrepreneurs would get new ideas eventually helping them in increasing their income. Head Transfer of Technology (ToT) Division, Dr Deepak Raj Rai informed that stalls would be opened for farmers/entrepreneurs/media from 10 am to 5 pm on October 20.

Dr V.K Taneja, Vice Chancellor, Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana remarked that marketing network should be provided to farmers for helping them to come out from present agrarian crises. He added that research in universities and institutes should be carried out keeping in mind the direct benefit of them to farmers/entrepreneurs, Dr Taneja said that farmers should not sell their crops as raw products. “While the cost of production of crops has increased manifolds and profits have shrunk,” he said, adding that only value addition by adopting food processing industries could save the farmers from present crises.

Sh D.C Sharma, General Manager, National Bank for Agriculture and Rural Development (NABARD) said that presently Punjab contributes more than 60 percent to central pool in terms of wheat and paddy. “When other states of country would also start producing these crops where Punjab would go,” he said, adding processing of fruits and vegetables could help farmers in increasing their income level. Showing concerns over increased debt over states, he said, “If all debt is accounted for then every household will be under debt of Rs. 43000.00 in the state of Punjab”.



GADVASU VC Dr V.K Taneja speaking on inaugural of Exhibition at CIPHET



GADVASU VC Dr V.K Taneja showing keen interest at Exhibition in CIPHET



Display of various products developed under the NAIP project at CPHET stall at the exhibition

Dr R. T. Patil Director CIPHET said that while GADVASU and Punjab Agricultural University were primarily focused on production, CIPHET could help in processing of these products. “Punjab is on forefront for everything, people here just need new ideas,” he said, adding that there were lot of technologies developed by CIPHET which could help the farmers. Dr Deepak Raj Rai, Head of Transfer of Technology, said that Indian Council of Agricultural Research initiated NAIP Mass Media Project so that farmers/entrepreneurs could be made aware about technologies by its institutes. Senior Scientist Dr Sangeeta Chopra introduced audience about CIPHET and its objectives.

Stalls of various technologies remained center of attraction for farmers and entrepreneurs. While Indian Agricultural Research Institute (IARI), New Delhi demonstrated recently developed PUSA Basant Wheat HD 2985 having 35-40 quintal production per hectare, National Dairy Research Institute showcased its ready to serve Jal Jeera. Little Bee comes out with its honey chilli sauce and honey ginger tea, which does not require sugar to be added for making tea. CIPHET, which was also host institute, exhibited its green chilli, onion, ginger powder and blended meat products technologies. In agro machinery, Sol pack and Teknik Industrial traders displayed their packaging products. Entrepreneurs like Garcha soyabean milk products and Chowdhary Agro Biotech also displayed their products. Stalls of NGO's, self help groups, PAU Kisan Club, NABARD, Verka, GADVASU and National Research Center on Equines also attracted visitors.

At CIPHET stall various products prepared under the NAIP project “A value chain on composite dairy foods with enhanced health attributes” were displayed at the exhibition. These included: Instant Halwa mix, Instant Upma mix, Instant Ladoo mix, multi-grain vermicelli (made from barley, corn, rice). The visitors showed keen interest in the various displayed products and the technologies developed at the Institute.

CIPHET Evaporative Cooled Room & Structure Technology Transferred to KS Bio Foods

Central Institute of Post Harvest Engineering and Technology (CIPHET) licensed the technology of Evaporative Cooled (EC) room & structure to KS Bio Foods of Rajasthan. A

memorandum of understanding has been signed in this regard. While EC room, which is a double walled structure with wet sand in between, could store two tonnes of fruits and vegetables, the cooling padded EC structure has capacity of 5 to 7 tonnes and ideal for bigger storage requirements.

Notably, KS Bio foods has taken number of technologies from CIPHET and recently started production of Amla candy, which was also CIPHET's intervention. Transferring the technology to Manish Chowdhary of KS Bio Foods, Dr R.T Patil, said that farmers had to sell their fruits and vegetables at lower cost due to non availability of storage in fields. "EC room and structure have been developed by CIPHET to provide farmers a cheaper and simple storage solution".

Manish Chowdhary said that today his products gained international acceptance due to food processing technologies of CIPHET only. "I am exporting my products to countries like Japan, United Kingdom, African Continental and Arabian countries," he said, adding that without maintaining quality and highest standards of packaging it would not have happened. "As we also grow fruits and vegetables in our own fields with organic methods, EC room would help us to increase the shelf life," he added.

The higher capacity storage structure has been developed by Dr S.N Jha, Head Agricultural Structures and Environmental Control (AS&EC) and is suitable to maintain moderate low temperatures and sufficiently high relative humidity for short term storage of fresh fruits and vegetables. It has special design of roof, uses wetted pad to maintain lower temperature. The Evaporative Cooled room developed by

Senior Scientist Dr Sangeeta Chopra has capacity of 2 tonne. The cost of the EC room is Rs 50,000 where as EC structure may cost about 1.5 to 2.0 lakh.



Director CIPHET Dr R.T Patil transferring technology to Manish Chowdhary

Dr Deepak Raj Rai, Head of Transfer of Technology (TOT) Division, said that CIPHET also provides technical support after transferring technology. He said that interested farmers/entrepreneurs could contact TOT division in this regard.

World Food Day 2010

The Food and Agriculture Organization of the United Nations celebrates World Food Day each year on 16 October, the day on which the Organization was founded in 1945. With an estimated increase of 105 million hungry people in the year 2009, there are now 1.02 billion malnourished individual across the world, viz. almost one sixth of entire human race is suffering from hunger. Even though hunger is so rampant the food losses are enormous in developed as well as developing country. In developing country they are the post harvest losses before the food reaches to the consumer whereas in developed world they are post processing losses at consumer level after the food reaches to consumer's plate. Poverty and hunger are interlinked and hence attention has to be paid on proper post harvest management and value addition so that post harvest losses are minimized. Dr. R. T. Patil attended the World Food Day celebrations at Department of Food Technology at Guru Jambheshwar University of Science & Technology, Hisar, Haryana. Dr. ML Ranga, Vice Chancellor of Guru Jambheshwar University, Dr. K S Khokar, VC, CCSHAU, Hisar, Dr. Rakesh Tuli, Executive Director, NABI, Chandigarh and Dr. B.S. Khatkar, Head Department of Food

Technology shared their knowledge and experience with students for reducing the food losses and motivated them for putting up united fight against the hunger world wide.

Canadian Delegate Visits CIPHET to Explore Possibilities in Food Processing

Dr Joyce I. Boye, from Agricultural & Agri Food Canada (AAFC), Government of Canada, visited Central Institute of Post Harvest Engineering and Technology (CIPHET) to find collaborative research projects and activities in area of food processing with special emphasis on processing of pulses.



CIPHET Director Dr. R.T Patil and other scientists interacting with Dr Joyce

Notably, the visit was the part of Canada-India Memorandum of Understanding in year 2009 to explore opportunities to increase scientific co-operation between two countries. The objective of visit at CIPHET was to engage in discussions with key scientists in areas of value added food processing.

During her visit at CIPHET, Dr Joyce discussed research ideas on value added food processing, reduction of post harvest losses with Director CIPHET Dr R.T Patil. She also made a presentation on value added processing in Canada focusing on research activities on pulses crops. Two countries could work on various areas of interest in food processing, she added. A film on various achievements of institutes and mandate was also showcased.

CIPHET Director Dr R.T Patil informed Dr Joyce about various technologies developed by CIPHET and commitment for developing food processing industry. Senior Scientist Dr Devinder Dhingra, coordinated visit of Dr Joyce.

CIPHET Grain Cleaning and Grading Plant used by the Farmers



Farmer cleaning and grading wheat

The Grain Cleaning and Grading Plant of 5-6 q/h capacity installed at CIPHET, Abohar was used by the farmers of the region for cleaning and grading of wheat, green gram, Bengal gram, barley, cotton seed, mustard, etc. for seed purposes round the year. During this month two farmers did cleaning and grading of about 65 q of wheat for seed purpose on custom hiring basis. The charges for custom use of the plant are Rs. 50 per quintal and about 2500 quintals of seeds is processed by the farmers with the help of CIPHET this way

Workshop of All India Coordinated Research Project on Post Harvest Technology

CIPHET is a head quarters of AICRP on PHT having 38 centres in the country. The AICRP is also a multi commodity, multi disciplinary approach to solve region specific problem of preservation and processing. The scope of AICRP is to conduct problem solving applied research in Food Grains and Oil Seeds, Horticultural Crops, Live stock



products and Jaggery and Khandasari sectors. The 28th Workshop of AICRP on Post Harvest Technology was held at CIAE Bhopal during October 28-31, 2010. About 90 delegates from 38 centres of AICRP on PHT participated in the workshop. The Workshop was inaugurated by Dr B S Bisht, Vice-Chancellor, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar. It was recommended to promote and extend value added food products and processing machinery developed by Scientists of the country for enhancing employment opportunities in remote parts of India. On this occasion, icecream for diabetics, processed edible “mahua” flower, different products of jaggery (gud) and economical and safe colours for ‘Holi’ festival were also displayed.

The participants of the meet included Dr RP Kachru, Former ADG (PE), ICAR; Dr MM Pandey, DDG (Engg) ICAR; Dr Bangali Baboo, National Director, NAIP, ICAR; Dr KK Singh, ADG (PE), ICAR; Dr RT Patil, Director, CIPHET Ludhiana; Dr SK Nanda, Project Coordinator, AICRP on PHT and Dr. R.K. Gupta, Head, Horticultural Crop Processing Division, CIPHET, Ludhiana.

In Technical Session-1, annual progress reports of various cooperating centers of AICRP on PHT were presented by the respective research engineer and discussed. Technical programmes/ thrust areas on the Sectors namely Food grains and oilseeds, Horticultural Crop Processing, Livestock Produce Processing, Jaggery& Khandsari were also presented by respective sectoral Principal Investigators of AICRP on Post Harvest Technology. During the presentation made by the sectoral PI, number of suggestions were emerged and cooperating centre were asked to prepare their technical programme based on the discussion for the next CCM where the research work will be finalized for the future for all cooperating centres. Besides, Business Session was also carried out in which the functioning of cooperating centers as well as functional problems of the centers were also discussed and action plan to solve the problem was devised.

Recording of Programmes on All India Radio

Two programmes on harvesting, handling, storage and packaging of fruits and vegetables were recorded by All India Radio, in the local dialect (Punjabi) by Dr. D.R. Rai and Dr. Sangeeta Chopra. The scientists explained the utilization of evaporatively cooled room/ structures, proper harvest and handling techniques as well as way to extend the shelf-life of fruits and vegetables through modified atmosphere packaging. The programmes were aired on 28th Oct, and 8th Nov, 2010 respectively.

Technologies Licensed to Entrepreneurs

1. In the month of October 2010, Soymilk, Paneer and curd technology has been licensed to Mr. Gurdeep Singh Village Kartarpur P/O Lehal Dist. Ludhiana Mob. No. 9417323854.
2. Project profile for Bee Keeping and breeding-In the month of October a Project profile for Bee Keeping and breeding was prepared as consultancy for Mr. Jaswant Singh Tiwana, Tiwana Bee Farm, G. T. Road, Doraha, Ludhiana.

Technology of the Month

Microencapsulator for encapsulation of food ingredients

With the growing urbanization and increasing quality consciousness, the market for processed foods and functional foods is expected to grow more rapidly. Microencapsulation paves way for development innovative functional foods. Microencapsulation is a process in which tiny particles or droplets are surrounded by a coating to give small capsules with many useful properties. The basic principle of the instrument involves the use of high pressure air streams impinge upon the matrix fluid jet emerging from the inner nozzle and break the jet into small droplets in such a way that they fall in the gelling bath. Control of air pressure, air flow rate, flow rate of matrix fluid are critical for getting uniform sized microcapsules. With proper instrumentation such as precision pressure regulator and controlled flow of matrix fluid with variable flow rate peristaltic pump, the production of microcapsules of desired size was achieved. The microencapsulator has been designed for production of wet alginate microcapsules ranging in size from 3 mm down to around 500 μm .

The matrix material used for encapsulation is alginate. The unit is equipped with two connections – one for the hose, which feeds the alginate (or other) solution – the other connection is meant for an air-hose. The alginate (or other) solution may be fed into the droplet generator unit with a peristaltic pump. The droplets from droplet generator are collected in to an aqueous solution containing divalent cations or polycationic substances with resulting gelification yielding microcapsules. A rotating mechanism is placed underneath the gelling bath to keep the beads separated during gelling. Bead size will be dependent of solution viscosity, flow rate of the solution and the air as well as the nozzle diameter. The appropriate bead size is obtained mostly by the adjustment of the airflow rate. After gelling, the capsules need to be hardened for 20 minutes to half an hour in calcium chloride with continuous stirring. The capacity of the system is 3 kg of wet alginate microcapsules per batch. The estimated cost of the system is Rs.3,00,000/-. The products that were encapsulated so far are lactic acid bacteria isolated from curd, aonla juice, ginger extract, stevia extract, yeast, urease. The other applications include microencapsulation of probiotics and prebiotics. CIPHET organizes special training on micro encapsulation technology @ fee of Rs. 25,000 per participant so that human resource is developed in the field of secondary agriculture. For details please contact Dr. K. Narsaiah, Sr. Scientist (knarsan@yahoo.com) and Dr. SN Jha, Head, Division of AS&EC (snjha_cipheth@yahoo.co.in) CIPHET Ludhiana



Microencapsulator

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