

# Central Institute of Post Harvest Engineering and Technology,

Ludhiana

Our Slogan: Produce, Process and Prosper



**CIPHET E – Newsletter for July, 2007**  
Vol. 2 No. 7

## Director's Column



Dear All,

This month was a special month in which celebration for establishment of Indian Council of Agricultural Research (ICAR) was held nationwide. The ICAR, which was earlier called Imperial Council of Agricultural Research, has been responsible for the sustained growth of Indian economy. The ICAR was established in year 1929 at Pusa in Bihar and later was renamed as Indian Council of Agricultural Research with HQ at New Delhi. The sapling planted in year 1929 has now become a big tree with vast network that includes Institutes, Bureaux, National Research Centres and Project Directorates and has manpower of about 30,000 personnel out of which nearly 7000 are engaged in active research and its management. Thirty-eight Agricultural Universities (SAUs) employ about 26,000 scientists for teaching, research and extension education; of these over 6000 scientists are employed in the ICAR supported coordinated projects. The CIPHET and its staff humbly paid the tribute to our forefathers for their vision in establishing ICAR and celebrated its foundation day on July 16, 2007 with open house for the farmers, students and debate competition for students on the topic "Effect of global climactic changes on agriculture".

To improve the economic condition of the farmers and to motivate them for crop diversification it is essential that post harvest management and value addition infrastructure be created in the catchment areas. Government alone cannot do this but greater partnership of private sector is required. The corporates are coming in big way in helping out but we need to promote smaller entrepreneurs too so that economic benefits of this new wave are equally distributed. In this direction CIPHET arranged two one week duration EDPs based on the research results of CIPHET scientists. One was on minimal processing and modified atmosphere packaging of fruits and vegetable. The technology package developed at CIPHET for rural level enterprise costing Rs. 1 lac approx. includes the washing of vegetables, basket centrifuging to remove the surface water, hygienic cutting and PP packaging. The vegetables processed this way can be stored longer and as they are minimally processed and also offer ready to cook advantage. Another important crop commodities of every day use are onion, garlic and ginger where processing immediately after harvest rather than storing can be the most effective of way reducing the losses and increasing the profitability in rural areas. Over the period of storage of one year the losses are bound to take place in these commodities and hence low cost dehydration techniques developed at CIPHET can be a solution to produce dehydrated garlic flakes and powder, ginger powder and dehydrated onion flakes and powder. Similarly for perishable fruit like pineapple simple osmo dehydration technique can be highly useful, which not only avoids the storage problem but also improves the quality of sour and less sweet pineapples. 11 participants attended this programme and we hope this way slow but steady we can make the difference in post harvest scenario of Indian agriculture.

With best regards

**R.T. Patil**  
Director

## **Hightech Agriculture and Agro Processing at JISL**

The Jain Irrigation Systems Ltd. Located at Jalgaon in Maharashtra is a renowned name in drip irrigation system. The drip irrigation saves water up to 70%, fertilizer use 30% and increases the yield by 230%. The crops with drip irrigation system grow consistently healthier and mature fast. The under productive area, sandy and hilly land can also be brought under cultivation by this system. Similar to our experience at CIPHET to give hands on training to entrepreneurs on pilot scale system, the Jain Irrigation Systems Ltd. also has installed the drip irrigation on their farm for commercial production for many crops like apple, grapes, banana, sugarcane, tea, coffee, cotton, teak-wood, mango, vegetables and flowers. The Food Processing Division of Jain Irrigation Systems Ltd. started with production of banana puree and its aseptic packaging. Now they are processing various fruits like mango, guava, pomegranate into pulp and juice and pack its aseptically for export. They also have IQF system where they process diced mango for export. The onion processing system is for dehydration of onion in the form of flakes and powder for export. The white onion under contract farming with the known cultural practices is processed for export. The contract farming started by Jain Irrigation Systems Ltd. has become sustainable due to, reasonable buy-back price, guaranteed and assured purchase at the market price (50 paise / kg less than market price), if the onion price in the open market becomes very high. 'Farm – Fresh' is a registered Trade Mark of Jain Irrigation Systems Ltd. in Europe & USA and stands for GMP, QMS, QA, SPC, Food Safety, Stringent Sanitation and Hygiene and similar modern practices. The processing plant has been accredited with ISO-9001-2000 & HACCP accreditation by RWTUV, Germany. The salient features of their enterprise are “Farm-Fresh” products: No preservatives are added, long shelf life, Approved by Kosher & Pareve audits and Meet ADOGA & other international standards. Since, CIPHET is promoting food processing at all levels of operations and striving to introduce modern and emerging technology and world class food safety and quality standards in Indian food processing industry, the interaction between Jain Irrigation Systems Ltd. and CIPHET from time to time will help in effective R&D and transfer of technology.

The Director CIPHET, Dr. R. T. Patil visited Jain Irrigation Systems Ltd at Jalgaon Maharashtra and had discussion with Dr. K.B. Patil, Head, Banana Tissue Culture, Dr. Sane, Quality Control Scientist and other scientists of Quality Control Lab, Dr. D.N. Kulkarni, Head, Food Processing Division, Mr. Amit Jain and Sh. Bhavarlalji Jain founder of Jain Irrigation Systems Ltd. Sh. Bhavarlalji Jain is a farmer turned entrepreneur having valuable hands on farming experience. *Sh. Bhavarlalji Jain believed that agriculture is backbone of the Indian economy and feels that adopting modern science and technology for progress in agriculture can only bring about sustainable, self-reliance and all around growth. He is of the opinion that advances in other sectors, however phenomenal cannot substitute agricultural development.*

## **CIPHET Celebrates 78<sup>th</sup> ICAR Foundation Day**

The 78<sup>th</sup> foundation day of the Indian Council of Agricultural Research (ICAR) was celebrated at the Central Institute of Post Harvest Engineering and Technology (CIPHET) on July 16, 2007. Former Vice-Chancellor of PAU, Dr. Khem Singh Gill was the chief guest. Farmers from Gurdaspur, Ludhiana and Assam also attended the programme along with schoolchildren of BCM Arya Model Senior Secondary School, Ludhiana and scientists and staff of the institute. Mathew Prasad, Head, Technology Transfer Division, CIPHET, welcomed the guests. Dr. S.K. Nanda, officiating director, CIPHET, briefed the guests about achievements of the ICAR and the CIPHET. Mr. Gaurav and Miss Purna, both students of

BCM Arya Model Senior Secondary School, took part in elocution competition on the topic "Effect of global climactic changes on agriculture". The students sensitized the gathering on the factors affecting the climate and its deteriorating effects on the production of food and human health.



**Chief guest former Vice-Chancellor of PAU Dr. Khem Singh Gill addressing the gathering on the occasion of ICAR foundation day celebrations**

### **Entrepreneurship Development Program in Post Harvest Technology**

A one-week entrepreneurship development program on dehydration of fruits and vegetables was conducted at CIPHET during 4 – 10 July 2007. Eleven participants attended the EDP. The topics such as chemical composition structure and maturity; theory of dehydration (psychrometrics, mechanism of drying, calculation of drying rate, principle of freeze drying); process of dehydration with emphasis on suitability and pre-treatments; principles, constructional features & operation of drying equipment; osmotic dehydration and practicals on selected fruits and vegetables were covered. The processing of fruits and vegetables into value added products (processes, methods, equipment, quality / safety standards, and packaging); preparation of project profiles and F.P.O. (Fruit Product Order) - terms and conditions of licensing were explained to the participants. Important products covered under this course were ginger powder, garlic slices and powder, onion flakes and powder, osmo-dehydration of banana and pineapple.



**Faculty and participants of EDP programme on dehydration of fruits and vegetables for preservation and value addition**

### **Strengthening Post harvest activity in North Eastern States**

A one-week entrepreneurship development program on **Post Harvest Technology** was organized for fifteen farmers from Assam during **16<sup>th</sup> July to 21<sup>st</sup> July 2007**. This program was sponsored by SIRD, Assam. The training programme on post-harvest technology of foodgrain, oilseeds, spices, pulses, fruits and vegetables was organised at the Central Institute of Post-Harvest Engineering and Technology (CIPHET) for 15 participants from Chirang in Assam. Dr. R.T.Patill, Director, Dr. Mathew Prasad, Head, Technology Transfer Division, and Dr. S.K. Nanda of CIPHET appealed the farmers to take up processing and value addition of the local produce for higher income and more employment. The training programme was coordinated by Dr. D. Dhingra and faculty members drawn from CIPHET conducted lectures and practical. The trainees learnt cleaning, grading and de-stoning of foodgrains, milling of foodgrains, pulses and oilseeds and processing of fruits and vegetables. The training concluded with a visit to Markfed canneries, Jalandhar, and Nijjer Agro Foods Ltd. Amritsar.



**Valedictory session of one-week entrepreneurship development program on Post Harvest Technology was organized for fifteen farmers from Assam during 16<sup>th</sup> July to 21<sup>st</sup> July 2007**

## **Entrepreneurship Development Programme on Modified Atmosphere Packaging of Fresh and Minimally Processed Vegetables**

An entrepreneurship development programme on modified atmosphere packaging (MAP) of fresh and minimally processed vegetables was held at Central Institute of Post Harvest Engineering and Technology, Ludhiana during July 24-30, 2007. The aim of the programme was to familiarize the participants with the modified atmosphere technology, explain its potential benefits for its dissemination and application either through the KVK staff or through direct contact with the prospective entrepreneur. Two participants from the KVKs of Tamil Nadu Agricultural University, Coimbatore and one from farmer's organization at Nasik, Maharashtra attended the programme. The participants were exposed to the MAP technology through lectures on harvesting, pre-cooling, on-farm storage, assessment of respiration rates of fresh and minimally processed vegetables, assessment of gas permeability of packaging films, instrumentation, qualitative analysis, design of MAP, minimal processing, hands-on practicals and visit to the commercial users of this technology. The participants felt satisfied with the programme and were enthusiastic for its further use and dissemination for post-harvest loss reduction and shelf-life enhancement of fruits and vegetables.



**Valedictory session of one-week entrepreneurship development program on modified atmosphere packaging (MAP) of fresh and minimally processed vegetables during July 24-30, 2007**

### **Dr. Digvir Jayas, a distinguished scientist from Canada visits CIPHET**

Dr. Jayas is the Associate Vice-President (Research) at the University of Manitoba, Canada and Canada Research Chair in stored-grain ecosystems. Dr. Jayas is internationally recognized as a leader in his field. His research has resulted in improved grain storage and drying systems in countries around the world, and is contributing to the automation of grain handling and processing systems across Canada. Dr. Jayas is recipient of Dr. Anand Prakash Award from the Applied Zoologists Research Association

(AZRA) of India, in recognition of his research achievements in the field of grain storage, the Maple Leaf Award which is Canadian Society for Bioengineering's highest honour. Over his career at the University of Manitoba, Jayas has also trained more than 70 researchers and visiting scientists at the masters, doctoral and postdoctoral levels, and has authored or co-authored over 500 technical articles, conference proceedings, book chapters and books. He visited the CIPHET on 10.07.2007 and appreciated the efforts of CIPHET in food processing research and its EDP programmes for effective and quick transfer of technology to end users.



**L to R Dr. Matthew Prasad, Head TOT, Dr. D. S. Jayas and Dr. R. T. Patil, Director, CIPHET**

### **CIPHET banana comb cutter demonstrated to farmers and traders**

The banana crop is not a tree but a high herb that can attain up to 15 meters of height. It is a perennial plant that replaces itself. The time between planting a banana plant and the harvest of the banana bunch goes from 9 to 12 months. Bananas are available all year long. Bananas are the main fruit in international trade and the most popular one in the world. In terms of volume they are the first exported fruit, while they rank second after citrus fruit in terms of value. Banana is a very delicate commodity on economic, social, environmental and political grounds. According to the Food and Agriculture Organization of the United Nations (FAO) Statistics estimations, world total exports of banana accounted for 15.9 million tonnes in 2004. Bananas are harvested green and hard, before they mature. Two types of workers are required to harvest bananas: a "cutter" and a "backer". The cutter cuts down the plant with his machete while the backer waits for the cut stem to settle on a thick cushion on his shoulder. The cutter then chops the stem to enable the daughter plant to take over as the main stalk. The backer carries the banana fruit bunch to the packing shed or market for sale. It can also be transported in carts. In the packing shed it self or in the godown, the bananas are removed by sickle manually skilled worker (one or two persons). The bunches are washed in water and dipped in plant growth regulator before sending to banana ripening rooms, where the optimum temperature is 15-20°C (59-68°F), before they reach the supermarket shelves. Normally bananas are ripened by using ethylene gas. In Indian context major but unattended issue in post-harvest handling technology is a tool for separating

banana-comb/hand from banana bunch. It is being done using knife or sickle that requires especially skilled persons and also requires more energy. The little negligence of the part of the worker very easily damages 10-15 bananas from a bunch and even causes human injury.

At CIPHET efforts were made to solve this problem and replace the traditionally used knife or sickle by “CIPHET Banana-Comb Cutter” for separating banana comb from banana bunch by a simple tool to suit to all sizes of banana bunch stem and putting little pressure from top that is enough for cutting and separating banana comb. CIPHET Banana-Comb Cutter maintains smooth cutting curve of banana-comb, with no fruit damage during cutting (as in case of knife or sickle cutting, some banana-finger getting damaged). With this tool one person performs the banana- comb cutting activity with less stress as compared to the traditional method of cutting. As such no data is available regarding percentage damage of banana-bunch, banana-comb or banana-fingers during cutting by presently used sickle by traders or farmers. Our visits to some traders’ shops, where cutting is done, found that 5 to 8 banana-fingers get damage or injured during cutting of banana bunches having about 150 to 250 banana fingers that makes about 2 to 6 % of losses of fruits, This can be saved by using “CIPHET Banana-comb cutter”. This unit was demonstrated to end users in Karnataka and Maharashtra and their feedback was received for its further improvement.



**Banana comb cutter in use**



**Bunches cut with improved tool**

### **Market Led Extension**

Technologies developed at CIPHET were detailed to the participants of Workshop on Market Led Extension, who visited CIPHET on 19.07.2007 (twenty two participants). Demonstration of processing and packaging equipment was arranged for the participants. The participants were brought by PAMEIT, PAU Ludhiana. The participants took been interest in equipment for processing of grains, fruits and vegetables and evaporatively cooled storage structures. The division of Transfer of Technology interacted with the participants.



**Participants of market led extension program for farmers being shown and demonstrated packaging and processing machinery suitable for catchment area processing operations**

## Technology of the month

### VENDOR'S CABINET

A low-cost cabinet working on the principal of evaporative cooling for easily adoption by a fruit/vegetable vendor at retail level has been developed. The cabinet having overall dimensions of 1280(L) x 610(W) x 1500 (H) mm has been structured of wood, wooden board and plywood. It consists of two parts, namely, storage chamber for horticultural produce and a small enclosure (610(L) x 610(W) x 940(H) mm) for miscellaneous purpose. The storage chamber has been further divided into four compartments (580(L) x 610(W) x 300(H) mm) each, from top to bottom to store the horticultural produce. The small enclosure is surrounded on its two sides by wire mesh screens (mesh no. 12), straw mat pad arrangement on another side and the further side has been kept open. In the storage chamber, two sides of each compartment except the top one are enclosed by straw mat pad arrangement. Front side of the storage chamber has been provided with a transparent acrylic sheet door for a clear view of the stored produce from outside. Each compartment is capable of holding a plastic crate of 22 kg capacity, used commercially for handling the horticultural produce. The straw mat pads are kept wet with the help of an overhead water tank adjusted at a flow rate of 2 liters per hour. The cabinet costs about Rs. 3000/- and can be used for shelf life enhancement of fruits and vegetables by street vendors.



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