



# Central Institute of Post Harvest Engineering & Technology Ludhiana

*Our Slogan: Produce, Process and Prosper*

**CIPHET E – Newsletter for May, 2010  
Vol. 5 No. 5**

## Director's Column



Dear All

This month the most important activity CIPHET hosted was a Brain Storming Meeting on Post-Harvest Technology and Value Addition of Agricultural Produce: Scenario, Issues and Strategy. The galaxy of top agricultural scientists at CIPHET including Hon'ble Secretary DARE and DG ICAR Dr S Ayyappan discussing post harvest issues for two days was the most memorable event for us and we are highly thankful to Hon DG for this gesture. He sensitized the delegates and participants about the need of the hour in the area of post harvest engineering and technology. He expressed happiness over the good work being done by CIPHET and expected CIPHET to play a bigger role and asked to constitute a committee at national level to co-ordinate the activities on post harvest technology in various institutes of ICAR with CIPHET, Ludhiana. The DDG (Engg.) will be Chairman and Director, CIPHET will serve as Member Secretary of this committee along with eight important ICAR institutes as members.

Communication is the key for ensuring that technologies developed by different agro institutions reach end users. For this CIPHET has entered into an agreement with a private sector, Delhi-based company, INEXT Bureau. They will create awareness among farmers/entrepreneurs linked with them about technologies developed by CIPHET.

This is a mango season hence the technology flashed is about the shrink wrap packaging of mangoes. Prolonged shelf life of mango is very important for domestic as well as export marketing. Presently it is mainly achieved by refrigerated storage which is quite expensive and is not within the reach of common growers. Hence film wrapping has been standardized at CIPHET for extending the shelf life of mango by retarding fungal decay and metabolic activity. Individual wrapped mango had a shelf life of 32 days as against 20 days of control under refrigerated storage. However, the extent of benefit from shrink-wrap packaging depends upon the variety, its physiological maturity and film permeability. The commercial unit comprises of a shrink wrapping machine, impulse sealer and heat shrinkable film. The machine having output capacity of 80-100 kg fruits per hour costs Rs. 1.25 lakh and cost of packaging comes to Rs 1.00-1.25 per kg of mango depending upon fruit size and films to be used for wrapping. Introduction of such packaging technology at production catchment will not only revolutionize the handling, distribution and presentation of mango but also help in reducing the post harvest losses to a substantial extent by marketing it over a longer period of time.

**With best regards**

**R.T. Patil  
Director**

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## Brain Storming Meeting on Post-Harvest Technology and Value Addition of Agricultural Produce: Scenario, Issues and Strategy

Brain storming meeting to review the present scenario of the post-harvest technology research in India and to identify critical gaps and formulate future strategy for research in post-harvest technology, including partnership among R & D institutions was organized at Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana during May 1-2, 2010. The meeting was chaired by Hon'ble Dr S Ayyappan, Secretary DARE and D.G. (ICAR), New Delhi. Dr M. M. Pandey, DDG (Engg.) ICAR; Dr Arvind Kumar, DDG (Edu. & Fisheries) ICAR; Dr H. P. Singh, DDG (Horticulture) ICAR; Dr Bangali Baboo, National Director, NAIP; Dr R. P. Kachru, Ex-ADG (PE) ICAR; Dr Pitam Chandra, Director, CIAE; Dr C. S. Prasad, ADG (ANP), ICAR; Dr K. K. Singh, ADG (PE), ICAR; Prof Satish Bal, Ex-Head of the Dept., IIT Kharagpur and Dr N P S Sirohi, ADG (Engg.), ICAR chaired and co-chaired the important sessions. The brain storming meeting was organised in following six sessions:

Session I	Food Grains & Oilseeds Processing	Chairman: Dr Bangali Baboo, National Director, NAIP. Co-Chairman: Dr Pitam Chandra, Director, CIAE
Session II	Animal Housing and Livestock Products Processing	Chairman: Dr Arvind Kumar, DDG (Fisheries) ICAR Co-Chairman: Dr C S Prasad, ADG (ANP), ICAR
Session III	Fish Processing	Chairman: Dr Arvind Kumar, DDG (Fisheries) ICAR Co-Chairman: Dr K K Singh, ADG (PE), ICAR
Session IV	Processing of Horticultural and Cash Crops	Chairman: Dr H P Singh, DDG (Horticulture) ICAR Co-Chairman: Prof Satish Bal, Ex-Head of the Dept., IIT Kharagpur
Session V	Crop Residues Utilization and Natural Fibre Processing	Chairman: Dr M M Pandey, DDG (Engg.) ICAR Co-Chairman: Dr N P S Sirohi, ADG (Engg.), ICAR
Session VI	Plenary Session	Chairman: Dr S Ayyappan, Secretary DARE and D.G. (ICAR), New Delhi Co-Chairman: Dr R P Kachru, Ex-ADG (PE) ICAR



**Dr. Ayyappan addressing the participants of brain storming session**

Dr S Ayyappan, Secretary DARE and D.G. (ICAR), New Delhi sensitized the delegates and participants about the need of the hour in the area of post harvest engineering and technology. Dr Ayyappan mentioned that reduction in post harvest losses should be given immediate attention as it will make available more food. In addition to this Dr Ayyappan suggested the following few important issues for consideration during the brain storming session:

- i. The content of post harvest research in ICAR for food and non-food crops may be decided.
- ii. Prioritize few commodities for next five years, keeping in mind the huge clientele in India which prefers fresh material.
- iii. Establish visible enterprises.
- iv. Evaluate existing technologies in terms of efficiency, economy, performance, and handling.
- v. Identify 3-4 core areas in which we have strength.
- vi. Establish high tech agri-processing facilities in most relevant areas.
- vii. Feedback to the breeders on processing characteristics is an important issue and should be addressed.
- viii. Facilities for testing of food safety and quality may be established.
- ix. Interaction with industry representatives should be taken up to refine our planning.
- x. Wherever required the concept of reverse engineering may be utilized, for downsizing important equipments.
- xi. Annual meeting of all post harvest scientists from ICAR institutes may be organized for sharing their work.
- xii. CIPHET should act as a repository for all post harvest technologies.
- xiii. New centres may be proposed for establishment during 12<sup>th</sup> five year plan.

Dr. Ayyappan expressed happiness on two day's deliberations and the good work being done by CIPHET and asked to constitute a committee at national level to co-ordinate the activities on post harvest technology in various institutes of ICAR with CIPHET. For this DDG (Engg.)



will be Chairman and Director, CIPHET will serve as Member Secretary and committee will have eight important ICAR institutes involved in research on post-harvest technology as its members. DDG (Engg.) expressed happiness on

deliberations and expressed that close liaison with commodity institutes, complementarity's between CIPHET and AICRP's, selection of new projects based on need assessment, market survey for clientele, users and processors and techno-economic analysis should be given due importance.

## **National Conference on “Horticultural Bio-diversity for Livelihood, Economic Development and Health Care”**

Dr R T Patil Director CIPHET attended 2<sup>nd</sup> Swadesh Prem Jagriti Sangosthi and also the National Conference on “Horticultural Bio-diversity for Livelihood, Economic Development and Health Care” held at University of Horticultural Sciences, Bangalore organized by Lt. Amit Singh Memorial Foundation on May 29-30, 2010. The lead presentation by Dr Patil was on “Appropriate post harvest management techniques and equipment for horticultural crops in production catchments”.

The presentation evoked great interest among participants, farmers, entrepreneurs and exhibitors and they wanted the technologies developed by CIPHET for production catchments.

The following two points were suggested:

1. The food should be handled and transported safely. The spoilage of food due to mishandling & unhygienic transport can be avoided if blue or green color code is implemented for food transportation vehicle. This will help to respect handling of food (fruits & vegetables, food grains).
2. The processing and value addition of fruits & vegetables is a simple science and can be adopted easily in production catchments to increase profitability of farmers. However, to prove this point and convince the entrepreneur the NGOs, KVKs, Universities and institutions having their own farm should have their own agro processing centre which will help in increasing the revenue as well as serve as training, demonstration and incubation centre for interested entrepreneurs.

## **Mechanization of Production and Processing of Litchi**

Er.V. Eyarkai Nambi, Scientist, CIPHET, Abohar participated in the meeting which was held at NRC, Litchi during 24-26<sup>th</sup> May 2010 to discuss the different operations which needs mechanization in Litchi production and processing. Besides him the scientists from Central Institute of Agricultural Engineering, Bhopal, Indian Institute of Horticultural Research, Bangalore and NRC Litchi, Muzaffarpur participated in the meeting under the Chairmanship of the Director, NRC Litchi. Mr. Sudhanshu Kumar, Progressive farmer and RAC member of NRC, Litchi was also present in the meeting. The following machinery/ technologies were identified to be adopted or developed by the participating Institutes in collaboration with NRC Litchi for better productivity, processing and value addition of Litchi fruits;

- a. Adoption of IIHR nursery machinery viz. media sieve, media mixer, poly bag filler
- b. Adoption of CIAE Pit hole digger and weeder for litchi fruit
- c. Adoption of commercially available pruner for litchi fruit
- d. Adoption of IIHR tractor drawn hydraulically operated harvesting platform
- e. Development of Grader, peeler, de-seeder and pulper for litchi processing
- f. Development of Modified atmospheric Packaging and Storage system for litchi fruit
- g. Development of Pre-cooling system for freshly harvested litchi
- h. Development of value added products from fruit and by-products from peel and seeds.

Based on the discussion a comprehensive project proposal has been developed and submitted to the Council by NRC on Litchi.

## **National Meet on Technological Innovations in Agriculture**

The two-day meet was organized by the National Agricultural Innovation Project (NAIP). While inaugurating the meet Dr. K. Kasturirangan, Member, Planning commission stated that Market-driven agricultural research is the need of the hour to ensure livelihood security in rural areas which requires optimization, efficiency and transparency in the operational system. Dr. Kasturirangan said that agricultural research should be viewed in continuum for making available technologies for production, protection, post-harvest management of produce, with emphasis on input use efficiency, sustainability, diversification, quality assurance, favourable policy framework, marketing and trade. He suggested that an operational system should be devised and regularly updated and upgraded to develop and support secondary agriculture in the country for moving towards holistic development.

Dr. S. Ayyappan, Secretary, Department of Agricultural Research and Education and Director General, Indian Council for Agricultural Research (ICAR ) in his address apprised of the challenges being faced to maintain sustainable food and nutritional security for the nation. He emphasized that poverty, productivity and profitability are our key areas to focus upon.

Dr S N Jha and Dr. S. Balasubramanian participated in the annual workshop of the National Agricultural Innovation Programme (NAIP) component-4 scheduled during 7-8 May 2010 at Central Institute of Agricultural Engineering, Bhopal. This was chaired by Dr. P. Chandra, Director (CIAE, Bhopal), Co-chaired by Dr. Bandopadhyay, NC (C-4) and the program was convened by Er. Tiwari CIAE, Bhopal. Dr. S. Balasubramanian, Senior Scientist & CPI presented the progress of project entitled 'Studies on cryogenic grinding for retention of flavour and medicinal properties of some important Indian spices'. In his presentations, the physicochemical, mechanical and thermal properties, and profile on flavouring components, medicinal properties and volatile oil losses of selected spices were discussed. The plan of work for grinding kinetics, particle size distribution, energy requirement were also presented. There were total of 16 presentations of different projects of Comp-4 including broad area of research viz., Non-destructive evaluation, high pressure processing, biosensors, ethnic fermented foods, wireless sensor net work, rubber dam design, bioengineering aspect of bamboo, low cost sensors for precision farming, nano-cellulose, bio-safety of nano-pesticides etc.

## **Food Security through Novel Grain Storage Practices**

The workshop on "Accomplishing food security of stored grains through novel storage practices" was organized on May 27, 2010 at PAU Ludhiana. The organizers of the workshop were Assocom-India, KANSAS State University USA and PAU Ludhiana. Dr R T Patil, Director CIPHET and Dr Vinod K Bhargav Scientist(SS) attended this work shop as guest faculty and participant, respectively.

Dr Manjit Singh Kang, Vice Chancellor, PAU Ludhiana in his welcome address presented India's situation in agriculture and storage. He stressed that the storage infrastructure in India is not sufficient enough to tackle present production of food grain. India has to produce about 400 MT of food grain by 2050 to feed its growing population. So, how the country will manage storage of this production is a big question? This workshop therefore is at the right time to give enough attention on storage of food grain and reduction of post-harvest losses.

Mr Puneet presented the bulk storage infrastructure created by Adani Agri Logistics corporation at Moga, Punjab and Kaithal, Haryana. The Adani group developed state of art bulk storage (SILO) facility for *Bulk Foodgrain project of FCI* under National Policy on handling storage and transportation of food grain with Built Own Operate scheme. The bulk

storage facilities of 200,000 metric tonnes capacity were developed each at Moga, Punjab and Kaithal, Haryana. M/s RITES was the consultant from FCI side. The Adani group is providing supply chain management solution to FCI under an MOU for this facility for 20 years. Under this facility, food grain stock is also accepted from the farmers. Under supply chain management, stocks of food grain is accepted, handled and stored in bulk. It is then transported to different field depot of FCI in different parts of the country under PDS system. For transportation, the special wagons have been developed by the Adani group. The bulk storage facility is equipped with automated tracking, weighing, loading, unloading, treatment and other unit operation. Machineries such as cleaners, material handling, fumigation etc are imported from Germany, Italy and USA. Phosphine gas generators especially designed for the purpose are used for fumigation. The FCI allowed 2.5% transit loss for managing this supply chain.

Dr Maier described about the quality grain management strategy. He proposed Grain Management through SLAM i.e. Sanitation, Loading, Aeration and Monitoring (SLAM). He presented one case study conducted at Bulk Storage facility of M/s Adani Agri Logistics on the aeration requirement during storage. He suggested various aeration strategies for bulk storage structure (SILO) based on the analysis of five year weather data. The distribution of moisture content, dry matter loss, carbon dioxide and aeration requirement over period of time were also predicted under this study. He has established possible aeration strategy and predicted five year grain temperature and moisture content.

Dr R T Patil, Director CIPHET in his presentation compared the bulk storage structure with godown storage system for foodgrain. He emphasized that the bulk storage structure is cheaper than the godown storage structure in terms of storage cost per unit of foodgrain besides better quality and minimum losses during storage. He also mentioned detail cost economics of bulk storage system. He briefed about the materials and methods of construction of GI silo and firm providing the silo construction service in India. He stressed that the availability for silo construction is limited in India. Hence more entrepreneurs/firms are needed to fabricate the silo at production catchments. He concluded that the bulk storage system has several advantages and they should be promoted in production catchments.

Dr I C Chadda, Dy Manager, CWC New Delhi stressed on the existing storage facilities. He told that only 30 % of total food grain production is handled by organized sector for storage management. He also presented the fumigation protocol for bagged storage and strength of CWC in respect of storage and handling of food grain.

Dr Subramanyam presented the storage insect and pest and their prevention. He described various storage insect/pest and their damage potential. He also touched upon non chemical prevention practices such as grain drying, heat treatment, grain chilling, physical exclusion, use of ozone, and nitrogen. He told that heat treatment of food grain at 55 °C for 30 min can reduce the grain infestation significantly. He also emphasized the threat imposed by insect resistance developed by using chemical treatment.

Dr Maier shared his experiences of China in the area of storage management of food grain under international grain management program. He quoted that “no other country in the world currently store and preserve grain long term any better than China”. China is using sealed warehouse for storage of wheat. According to him India is adopting more responsive than preventive treatment of food grain during storage. He also described vacuum technology, modified atmosphere technology, heat treatment and fumigation of food grain during storage as preventive treatment. He also described the potential of infrared radiation, flameless infrared radiation for preventive treatment of food grain. He stressed that the pest management should be based on sampling information. Better sampling better will be management.

In the last presentation Dr Subramanyam provided the information on new chemicals and growth regulators for insect control. He described about Spinosad (Newly developed broad spectrum pesticides) and admixture of pesticide for preventive treatment of food grain. Dr Chadda raised the issue on the use of admixture of pesticide in India for storage treatment as the admixture of pesticides is not permitted in India.

In the closing remarks, Dr Subramanyam emphasized that bulk storage has several advantages over bagged storage structure. Research based management of bulk storage of food grain should be adopted for food safety. They are ready to provide any technical support required for bulk storage system.

### **Research Advisory Committee Meeting of CIPHET, Ludhiana**

The Research Advisory Committee (RAC) meeting for CIPHET was held under the Chairmanship of Prof. Satish Bal, IIT Kharagpur on May 4, 2010. The other members of RAC who participated in the meeting were, Dr. Kanta K. Sharma, Dr. K. K. Singh, ADG (PE), ICAR New Delhi, Mr. Harinder Singh Lakhmirwala, PO-Sunam Distt. Sangrur, Punjab, Dr. R.T. Patil, Director CIPHET, Ludhiana and Dr. S. N. Jha, Head AS&EC Division, CIPHET Ludhiana and Member Secretary of RAC. Other invitees besides members in this meeting



were: Dr. S.K. Nanda PC (PHT), Dr. P.R. Bhatnagar, PC (APA), Dr. R.K. Gupta, Head (HCP Division) CIPHET Abohar, Dr. D. R. Rai, I/C Head (TOT) Division and Dr. (Mrs) Mridula D. Sr. Scientist looking after day to day work of FG&OP Division.

The meeting began by welcoming the RAC members by Dr. S. N. Jha, member Secretary followed by a welcome address of Dr. R.T. Patil, Director CIPHET. Dr. Patil in his welcome address expressed his desire to find out support systems needed for post-harvest losses in 12<sup>th</sup> plan. He enumerated some infrastructures such as modern bulk storage system for grain, radiation facilities for fruits and vegetables for extending shelf life, modern efficient cold storage structure for fruits and vegetables and energy efficient cold store for livestock products. He also emphasized the need of an auditorium in CIPHET, Ludhiana for organizing national and International seminars. Video conferencing and multimedia systems development for dissemination of CIPHET technology were other infrastructures felt for CIPHET, Ludhiana. Dr. Patil informed the RAC about capacity building programme and trainings undertaken by various scientists cutting edge areas of research. Long term trainings of students in CIPHET and utilization of those in our R&D work was also emphasized. In the light of brain storming session held on May 1-2, 2010, he informed the RAC that ICAR has felt a need to have some more centers of CIPHET. Dr. Patil also informed the RAC that the name of TOT division and its work/project also need to be discussed.

Dr. S. N. Jha, Head AS&EC Division and member-secretary RAC presented the approved agenda note of this meeting. The action taken report (Annexure I) on recommendation of 1<sup>st</sup> RAC meeting held in October 2008 was presented by the member-secretary and the same was accepted after thorough discussion. Prof Satish Bal, Chairman RAC in his opening remarks highlighted the importance of CIPHET in future and said that manpower in the CIPHET is very small as compared to sanctioned post, so scientist should be focused on most needed

work of PHT. Dr. K. K. Singh, ADG (PE) informed the concern of DG about PHT and work to be done in 12<sup>th</sup> Plan. Dr. Kanta Sharma showed her concerned about nutrition in food and how CIPHET can play a vital role in this regard.

## Meat Processing Training for Jail Inmates

Prisoners of the Ludhiana Central Jail tried their hands on 12<sup>th</sup> May on meat processing technologies developed by Central Institute of Post Harvest Engineering and Technology (CIPHET), in the training programme organized in jail premises. Experts from the CIPHET presented live demonstration to the prisoners. Notably, CIPHET has initiated unique training programme in Ludhiana Central Jail for prisoners under which training classes would be held on every month this year. The aim is to train them to earn respectful living after they get released from the jail.



Addressing the prisoners, Dr R.T Patil said that prisoners after their release could also produce meat products like offered by McDonald and KFC. “The value addition in these products is as high as three times and processing of these products could be carried out even at household levels,” he said, adding that most of prisoners after their release face problem of getting rehabilitation. “Food processing could provide them a respectful living,” he said. On the occasion, Senior Scientist Dr Suresh K. Devatkal explained process of making different meat products. Procedures of making chicken nuggets, slices were explained to prisoners through practical demonstration and power point presentation.

Harbans Singh, a prisoner undergoing life imprisonment, said that food processing demonstrated by the CIPHET could prove quite beneficial to them. “I am thinking of setting up small scale food processing industry after release from the jail,” said another prisoner Kuldeep Singh. Dr Deepak Raj Rai, Head ToT, said that they would provide all technical support and training to interested prisoners after their release. Deputy Superintendent Jail Surinder Pal Singh Khanna, Assistant Superintendent Jail Iqbal Singh Dhaliwal were also present on the occasion.

## Licensing of Guava Processing Technology

People in Ludhiana and surrounding areas will soon get taste of guava products developed by the Central Institute of Post Harvest Engineering and Technology. The institute has licensed technologies for “Processing of Guava into value added products” to local farmer Paramveer Singh by entering into Memorandum of Understanding (MoU).



The institute has developed unique products from guava including bars, toffee, sweets and various blended products. After signing MOU, Paramveer Singh, who is Canadian born, said that he was very soon going to set up industry on guava based products on the CIPHET technologies. “I see lot of potential of guava based products as value addition is very high.

Initially, I would be producing juices and pulp to provide back up to other industries.” His grandfather Dr K.S Nandpuri, who was formerly Director of Research at Punjab Agricultural University, said that he was by profession a horticulturist. “I see guava as very important crop for value addition and if industry is set up on this, people of Punjab could get lot of benefit out it,” he said, adding that they were setting up industry as a pilot project. “We hope that others would follow the suit if we succeed”.

Dr R.T Patil said that bars and toffees from guava were unique process technologies offered by CIPHET. He said that Sirdi Sansthan from Maharashtra had also shown interest in guava bars and sweets for providing them to devotees. The value addition in the guava products is more than two-three times, he added.

### **Transfer of CIPHET Technologies through Private Partner-INEXT**

Communication is the key for ensuring that technologies developed by different agro institutes reaches end users, said Vice-President of Delhi-Based company INEXT Bureau Dr Sajiv Anand, after signing Memorandum of Understanding (MoU) with Central Institute of Post Harvest Engineering and Technology for creating awareness among farmers/entrepreneurs regarding technologies developed by the CIPHET. “The agro institutes in the country have developed lot of new technologies, which could transform face of Indian agriculture. But, farmers are generally not aware or have no means to access them,” said, Dr Sajiv Anand, adding that they have taken task of developing liaison with farmers and institutes. “We will provide this service free of cost to farmers”. Initially, Delhi based NGO would be creating awareness regarding the banana comb cutter and Evaporative Cooled Room developed by the CIPHET. “Communication need to be strengthened to benefit farmers, otherwise most of technologies would remain confined to laboratories of institutes only,” he added. Dr R.T Patil said that they would provide all support to the NGO for providing information regarding the CIPHET technologies. Many of our technologies could help farmers in increasing their income, he added.



### **Entrepreneurship Development Programme on Garlic, Ginger and Onion Processing**

Due to advancement in packaging technology, now even small entrepreneurs could produce international standard of quality products,” said Dr R.T Patil, Director, Central Institute of Post Harvest Engineering and Technology. He made these remarks after awarding certificate to local youth on completion of his Entrepreneurship Development Programme (EDP) in processing of garlic, ginger, and onion into powder for commercial scale production. Saying that packaging and safety of food holds the



key, Dr. R.T Patil said that various low cost packaging machines have come up in market. “By investing even Rs. 20 thousand on packaging, entrepreneurs could fetch much higher price. This kind of packaging equipment is highly useful for small entrepreneurs. Encouraging farmers to go for processing of food, he said that farmers could increase their income by investing very less amount of money. But, he cautioned that quality and safety of food should never be compromised. “While we provide training to interested farmers/entrepreneurs, they could also use brand name CIPHET for marketing of their products,” Dr. Patil added. Gurpreet Singh, a local entrepreneur, who completed EDP in processing garlic, ginger, and onion said that he was presently engaged in manufacturing of electrical equipments. “But, I find the value addition is quite high in food processing, and would like to set up my own processing plant,” he said, advising others to take benefit of training programmes offered by the CIPHET.

### **Technologies Licensed to Entrepreneurs during May 2010**

<b>Sr. No.</b>	<b>Name of the technology</b>	<b>Contracting party</b>
1.	Soybean & Groundnut Milk and their products	Mr. Sham Sunder, Near Sanjay Flour Mill, Factory Road, Kotkapura Distt. Faridkot
2.	Consultancy & detailed project profile on guava processing	Paramveer Singh Rai, 104-G, BRS Nagar, Ludhiana
3.	Extrusion technology for snack foods	Mr. T. S. Kumarasamy Christy Friedgram Industy A2&A3 SIDCO Industrial Estate Andipalayam, Tiruchengode-637214 Namakkal Dt., Tamilnadu. Ph.04288-285401/285564,

### **Advisory Consultancy Members Registered during the Month of May 2010**

1. Mr Rohit Kharbanda, Lyallpur Sweets, Main Road Model Town Ludhiana.
2. Mr. Vishawanath Ahuja, Sri Om Krishi Yantra Udyog 115-B/2 Dada Nagar Kanpur,

### **Promotion**

Sh. Sarup Singh has been promoted from Skilled Supporting Staff to the post of T-1 (Lab. Tech) w.e.f. 07/05/2010.

### **Winter School on “Novel Techniques in Food Processing, Co-Product Utilization and Quality Assurance”**

ICAR sponsored Winter School On “Novel Techniques in Food Processing, Co-Product Utilization and Quality Assurance” will be held at CIPHET, Ludhiana during September 1-21, 2010. The Course Director is Dr. Mridula D., Senior Scientist (FG&OP Division). You can contact her on Tel: +91-0161-2313127 (O), 09417538017, Email: [mridulads4@yahoo.co.in](mailto:mridulads4@yahoo.co.in) and Co-Course Director is Dr. M.R. Manikantan, Scientist, SS (AS&PE), FG&OP Division, CIPHET, Ludhiana. Phone: 0161-2313144 (O), E-mail: [maniciphet@yahoo.co.in](mailto:maniciphet@yahoo.co.in).

## **Technology of the month**

### **SHRINK WRAP PACKAGING FOR ENHANCING SHELF LIFE OF MANGO**

Individual wrapping of produce in heat shrinkable or other plastic film is an extension of multi-unit packaging, such as plastic bags and tray over wraps for extending post harvest life of fruits and vegetables. In this packaging, the film is shrink wrapped tightly around each piece of produce to form a tight and smooth package of each fruit. Such packaging increases the resistance to water vapour and reduces transpiration loss from the fruit surface. It also enhances the effectiveness of fungicide by slowing down its dissipation rate when fungicide treated fruits are shrink-wrapped. Individual shrink-wrapping thus produces a micro atmosphere that can be enriched with a suitable volatile fungicide and may act as a fumigation chamber to control decay over a prolonged period even under ambient condition.

Prolonging shelf life of mango is very important for domestic and export marketing. Presently it is mainly achieved by refrigerated storage which is quite expensive and is not within the reach of common growers. Current reports have investigated that sub tropical fruits like mango can not be stored at low temperature due to their greater sensitivity to chilling injury which limits the use of traditional low temperature storage. To overcome this problem, CIPHET, Abohar has developed this novel packaging technique for a number of fruits including mango. Shrink-wrap packaging not only extends the shelf life but also reduces the refrigeration cost. So this technique can be used as an alternative to refrigerated storage. It helps the produce to convenient movement in units and to protect from deterioration of quality and safe handling during marketing. Also it delays the physiological deterioration of fruits some times better than the low temperature storage. Film wrapping extends the shelf life of mango by retarding fungal decay and metabolic activity during prolonged storage. Individually wrapped mango had a shelf life of 32 days as against 20 days for their counterparts under refrigerated storage. The extent of benefit from shrink-wrap packaging depends upon the variety, its physiological maturity and film permeability.

Interest in individual shrink wrapping of fruits and vegetables has greatly increased principally due to improvements made in the plastic film manufacturing processes and equipment. A commercial unit comprises of a shrink wrapping machine, impulse sealer and heat shrinkable film. The machine with window size of 350x200 mm and conveyer speed of 1.25 cm/sec can give an output capacity of 80-100 kg fruits per hour. The packaging cost per tonne of mango works out to be Rs 1000-1250 depending upon fruit size and films to be used for wrapping. The commercial unit requires an initial investment of around Rs 1.25 lakh on machinery. Introduction of shrink wrap packaging of mangoes will reduce the post harvest loss and improve distribution and presentation of mango.



Impulse sealing with film



Individual shrink wrapping of mango through machine



Unwrapped and wrapped mango after storage

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