

**Central Institute of Post Harvest Engineering and Technology,  
Ludhiana**  
**Our Slogan: Produce, Process and Prosper**

**CIPHET E – Newsletter for March, 2007**  
**Vol. II No.3**

**Director's Column**



Dear All,

One of the main reasons why we have so much of the losses in agricultural produce is the lack of post harvest infrastructure. That means the facilities to process raw produce are almost non existent in production catchment. Hence farmer is helpless and has to sale his produce at throwaway price. The post harvest infrastructure is as important for growth and sustainability of agriculture as roads and health care for positive growth of the society as a whole. The post harvest infrastructure can be grouped into two, one is for preservation of raw produce like cold stores, warehouses and transport facilities etc and another are for their value addition. The capital investment is higher in the first one and its responsibility totally rests on government policy, schemes and incentives. However the second one i.e. value addition can be possible at reasonably low investment based on capacity of production. Best examples is restaurants, they come in all categories right from thela, dhaba to five star hotel based on the status of frequenting population. Similarly ketchup, jam, jellies can be produced at cottage scale using domestic appliances as well as at factory level with standard commercial equipment. This can also be done even at cottage level in catchment area or in large plants of multi nationals. Since the value added produce has comparatively longer shelf life than raw produce it can be taken to the urban markets to get better price. The promotion and motivation of entrepreneurs for food processing industries is therefore a very effective route to build up this much-needed infrastructure.

The entrepreneurs can be motivated if they get the exposure to the food factory and get hands-on experience in all aspects of value addition, quality control, food safety and preservation. We at CIPHET in last month conducted three such programmes namely Tomato puree & powder making, Guava processing and Advisory consultancy for dry processing of maize. Similar facility of pilot plants for processing of horticulture crops and millets is being established at UAS Bangalore by CIPHET funding for over 1 crores so that entrepreneurs in southern India get modern facilities (factory level) similar to CIPHET for training, demonstration and incubation.

This month was very busy for all of us as it was terminating year of the plan and there was immense pressure to meet the expenditure target. However I am glad that with the sincere efforts of CIPHET staff we could achieve 99% expenditure target allotted to us.

With best regards.

## Events:

### CIPHET-UAS Bangalore join to establish modern agro processing cluster

Director CIPHET visited AICRP on PHT center at UAS Bangalore in connection with establishing a cluster for agro processing and had a meeting with Hon Vice Chancellor Dr. M.N. Sheelavantar, UAS, Bangalore who assured his full cooperation and support for this joint project and assured that any activity jointly taken up in the area of post harvest technology will be whole heartedly supported by UAS Bangalore. The progress of building construction and its location was discussed with Dr. B. Ranganna, Research Engineer, PHTS center at Bangalore and PI of this project. The building will house both horticultural as well as millets processing facility in addition to a lecture hall, laboratories and offices for process engineer and technologists. The location of building is very near to the main gate of the university and easily approachable. Bangalore CPWD will construct the building. Director CIPHET also visited Bangalore center of PHT. Bangalore center has developed many useful post harvest technologies. A unique equipment is a small capacity hand operated 3-in-1 machine for decorticating groundnut, dehulling maize and threshing of sunflowers. The equipment is very useful and incorporates novel concepts to make it multipurpose. He also had a meeting with Project Coordinator, AICRP on Small Millets, UAS, Dr. KT Krishna Gowda and Dr. Sitharam an emeritus scientist and promised them the help of CIPHET in developing suitable millet mill. The samples of various millets were collected and preliminary trials were conducted at CIPHET to identify the pretreatment as well as mechanisms required for effective dehulling. The results obtained are very encouraging and efforts are being made to patent this technology and to collaborate with the pulse milling machinery manufacturer in Kanpur to fabricate a composite mini millet mill.



### Need of the hour - Linking Markets and Farmers

Director CIPHET attended an International Conference on “Linking Markets and Farmers” during 12-13 March 2007 at New Delhi. The purpose of this conference was to explore innovative approaches and new business models for linking domestic and international consumer markets with rural entrepreneurs and communities. Using a unique set of instrumental case studies of innovative business practices from across the world, the conference provided a forum for discussion and debate of how to best organize agri-food supply chains so that they contribute directly to increasing farm income, rural employment and sustainable development.

## **CIPHET concludes CWC-CIPHET-DRR on collaborative project**

Dr. RT Patil, Dr. DS Uppal, Heat TOT and Dr. Bhargav, Scientist SS attended the group meeting on “Assessment of Losses during Storage of Rice in Warehouses” at Central Warehousing Corporation (CWC), New Delhi on 15<sup>th</sup> March, 2007. This meeting was for presentation of a final report of a project at CIPHET with partial assistance from CWC. Dr. Bhargav gave the presentation on work done in last 2 years and presented results and recommendation. The trend of losses was very much dependant on the agro climate under which the rice was stored. It was the felt that equilibration of the rice bag before staking may help to prevent storage losses because the effect of moisture migration was visible from the observations. The mathematical model describing the storage loss as a function of storage period, initial moisture content and final moisture content was also developed to quantify the losses. Dr. SM Ilyas, Director, NAARM and who had initiated this project at CIPHET also attended this meeting.



**CIPHET-CWC Meeting in progress**

## **CIPHET scientists participate in seminar on food and nutritional security**

Dr. RT Patil, Dr. Dilip Jain, Dr. HS Oberoi, Dr. Bharati, Er. Kingley and Er. VK Garg attended this meeting from CIPHET. The National Conference was titled “Food and Nutrition Security: Food and Biotechnologies Interventions” at Sant Longowal Institute of Engineering & Technology, Longowal, on 22-23 March 2007. Dr. RT Patil as a Chief Guest of Inaugural Function delivered a talk on importance of post harvest management and value addition in ensuring food and nutritional security of India and also delivered a key note talk on “Modern processing techniques for novel value added products from legumes”. Team from CIPHET presented their research findings which were highly appreciated and they had good interaction with food technologists from all over India.

## **Entrepreneurship training on Tomato Purees and Powder Manufacturing Technology**

A need based and skill oriented training programme for up coming entrepreneurs on **Fruits and Vegetables Purees and Powder Manufacturing Technology** was organized at CIPHET from 05 - 10 March 2007. In this training programme, the participants were demonstrated 500 kg per day capacity

tomato puree and powder making plant, followed by practical training on making puree & powder by the trainees. The lectures in simple language on quality control, standard methodology, packaging methods, economics and project preparation were given by the scientists of CIPHET who have developed this pilot plant. The trainees were awarded certificate for this cottage technology based on which they can apply for necessary finance for setting up rural industry.



**Trainees preparing tomato puree at food factory in CIPHET (500 kg/day)**

### **GOLDEN CORNS (INDIA) PRIVATE LIMITED from Himachal Pradesh becomes member of CIPHET, Ludhiana for establishing Maize Processing Plant**

Maize is a major crop of Punjab and Himachal Pradesh. While farmers consume half of it, a surplus is available for processing. The maize can be processed into a variety of products like grits, germs, flour and corn flakes by dry milling on the small scale and such units can be set up anywhere in the country. In addition to this, large-size unit can also be set up to manufacture value-added products like starch.

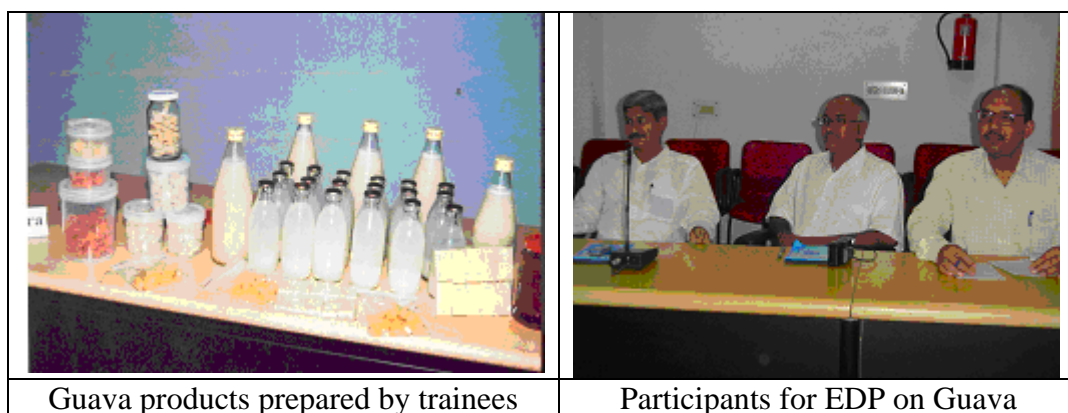
There is an urgent need for maize-based industry in the state in view of a rising surplus, but upcoming entrepreneurs do not get proper guidance and help to set-up new venture. CIPHET Ludhiana helps in such endeavours. M/s. Golden Corns (India) Private Ltd, Kangra, HP has registered with Central Institute of Post-Harvest Engineering & Technology (CIPHET), Ludhiana for establishing maize processing unit. CIPHET will help the firm for scientific storage and setting up of plant in form of advisory consultancy to enhance the productivity and run the processing plant smoothly.



**Proprietor of Golden corn receiving the membership certificate**

## Entrepreneurship training on Processing of guava in novel value added products

As follow up to the overwhelming response received from the farmers of Maharashtra during National Guava Symposium to the Guava products developed at CIPHET this programme has been developed at CIPHET so that interested entrepreneur can take up guava processing in rural catchment. The training was organized during March 23-29, 2007 on the special request of guava producing progressive farmers from Maharashtra. Three participants from Maharashtra participated in this training programme. The training programme comprised of theory and practical demonstration of various processed products. The participants were given hand on experience for preparation of guava jelly, squash, RTS beverages, carbonated fruit drinks, intermediate moisture fruit, plain and blended guava bar and were exposed to processing units of local area. Information about the machinery and equipment for preparation of various products and the approximate cost of production of processed produce were also provided to the participants.



## CIPHET scientist attends Cold Chain Summit –2007

Dr. S. N. Jha, Sr. Scientist attended the “cold chain Summit – 2007 during 20 –21 March. Existing models and systems of cold chain in different countries were discussed. Speakers were of the opinion that Thailand model may be suitable for replication in India. Some states such as Maharashtra, AP, Tamail Nadu, Bihar, UP west Bengal are resembling in situations like Thailand.

Participants actively discussed the plight of farmers and their need. Speakers and panelist were of the view that farmers first must know the optimum time of harvest for their fruits and importance of pre-cooling before sending to cold stores and markets. Road and electricity are the major problems envisaged during the session. Solar energy was presented as a solution for rural entrepreneurs. Public private partnership is must here to develop the maturity determination techniques and infrastructure for pre-cooling. Role of academic and R & D institutions is the most important for this purpose as technology imported from other countries are very costly and not usable directly in the Indian context. Exhibitions on cold chain, cold stores and logistic support systems were also displayed during the period

Four concurrent technology sessions on “pre-cooling as pre-requisite for good cold chain practices”, “Effective refrigerated retail merchandising”, “Modern pack house Practices and Technologies” and “state-of -the-art in refrigerated transport” were organized. These sessions revealed that refrigerated trucks are available but road and electricity are the major problematic area. Pre-coolers

are not available in India. Some of the foreign companies offering a limited type of pre-cooler but those are very costly and energy intensive. Most of the farmers' representatives were unwilling to adopt them. All were in search of a cheap and simple technology for Indian farmers. During discussion they liked CIPHET Evaporative Cooled Room for pre-cooling of horticultural produce.

Policy group of the workshop recommended that Thailand model might be implemented in first phase in Maharashtra, Bihar, Karnataka Gujarat, A.P and Himachal Pradesh. NHB being a nodal central agency has been nominated for implementation of recommendations and for development of guidelines for participation of logistic companies.

## **PROJECT REPORT ON CULTIVATION OF MENTHA (PEPPERMINT AND SPEARMINT)**

So far about 40 Farmers have taken the benefit of this DPR and started cultivating mentha after harvest of wheat and before sowing paddy with subsidy from National Horticulture Board.

### **Introduction**

Mentha is a well-known perennial herb. Mentha includes the apple mint, curly mint, pennyroyal, peppermint, pineapple mint, spearmint and water or bog mint. Out of these peppermint (*M piperita* L.) and spearmint (*M spicata* L.) are being cultivated commercially in Punjab for extraction of the fragrant oil, which has a great demand in the industry for its flavour and medicinal values. The oil obtained is used by the food and pharmaceutical industry. The oil is used in the manufacture of medicines, mouthwash, toothpaste, chewing gum etc. The mint oil is used historically for numerous health conditions, including common cold symptoms, cramps, headache, indigestion, joint pain and nausea etc.

The mint crop is cultivated during December and June months in Punjab. The oil is obtained through steam distillation of the fresh aboveground parts of the plant. The yield of oil is around 60-80 litres / hectare. The oil is extracted in the plants set-up by the procurement company and the farmer is paid for the oil.

### **BENEFIT-COST ANALYSIS (per hectare basis)**

#### **FIXED CAPITAL**

<b>Land</b>	Owned
<b>Machinery</b>	Owned

#### **WORKING CAPITAL (per hectare basis for complete season of the crop)**

##### **Labour charges**

Cultivation, sowing and other field operations	LS	Rs. 5,000-00
--	----	--------------

Planting material	5 quintal/hectare @Rs 500/quintal	Rs. 2,500-00
Fertilisers		
<b>Urea</b>	290 kg /hectare @ Rs 450/q	Rs. 1,305-00
<b>DAP</b>	100 kg/hectare @ Rs 980/q	Rs. 980-00
<b>Super phosphate</b>	250 kg/hectare @ 480/q	Rs. 1,200-00
<b>Organic manure</b>	30 trolleys @ Rs. 500 / trolley	Rs.15,000-00
Plant Protection		
<b>Insecticide/pesticide</b>	Rogor 750 ml	Rs. 250-00
	Sevin 2.5 kg	Rs. 650-00
<b>Weedicide</b>	Stump 2.5 litre	Rs. 1,000-00
	<b>Total</b>	<b>Rs. 27,885-00</b>

**COST OF PRODUCTION (per hectare)**

Total working capital	Rs. 27,885-00
Interest on working capital (@11% for six months)	Rs. 1,534-00
	<b>Total</b>
	<b>Rs. 29,419-00</b>

**TOTAL SALES, Oil, 70 litre / hectare @ Rs. 600/ litre** **Rs. 42,000-00**

**PROFITABILITY**

**Profit = Sales – Cost = Rs. 12,581-00**

Profit on sales = 29.95 %

## Important Post Harvest Data

### DETAILS OF INVESTMENT IN THE PROCESSED FOOD SECTOR (Since liberalization in July, 1991)

Sector	Industrial Entrepreneur Memoranda (till Dec. 2002)		Industrial Approval (100% export oriented units/industrial licence)(till Nov.2002)		Total		Foreign investment out of total investment (till Nov.2002)
	No.	Invest.	No.	Invest.	No.	Invest.	
Grain milling & grain based products	422	6008	107	1259	529	7267	1207
Fruits & Vegetables Products	1745	3438	422	5180	2167	8618	1090
Meat & Poultry Products	96	456	56	1394	155	1850	267
Fish Processing and Aquaculture	116	463	192	2228	308	2691	549
Fermentation Industry	672	9301	211	2073	883	11374	1094
Consumer Industry Including Softt Drinks/Waters confectionery	869	7523	79	5836	948	13359	4432
Milk & Milk Products	1119	13823	27	1182	1146	15005	1054
Other including food additives, flavours etc.	-	-	75	945	75	945	906
Edible oil/Oil seeds	1675	13416	-	-	1675	13416	-
<b>Total</b>	<b>6714</b>	<b>54428</b>	<b>1172</b>	<b>20097</b>	<b>7886</b>	<b>74525</b>	<b>10599</b>

Source: Annual Report (2002-03), Ministry of Food Processing Industries, Govt. of India.(Rs. In Crore)



## Technology of the month

### CIPHET Evaporative Cooled Storage Structure

Storage of fruits and vegetables, being perishable commodity is of paramount importance in post-harvest management for reducing losses after harvest. Field heat of crop need to be reduced by immediate cooling. Shelf life has to be increased to avoid the disadvantages of price fall during glut in seasons. Cold storage is costly and often available in town/cities. Very low temperature in cold storage also increase the sugar contents in potato and make it unfit for processing besides cold injuries. Cost of storage sometimes is very high and farmers cannot afford. Evaporatively Cooled Structure (ECS) is suitable for them. It maintains a moderate low temperature and sufficiently high relative humidity for short term storage of fresh fruits and vegetables. This system requires no or very minimum level of consumption of electricity, less initial investment and negligible maintenance cost. CIPHET Evapoartively Cooled Structure,



which has special design of roof, orientation and uses wetted pad as cooling medium can achieve 20°C lower temperature than outside temperature and relative humidity as high as 70 – 99 % depending upon the outside temperature. An ECS of about 5 -7 tonne storage capacity may cost about Rs. 1.5 – 1.8 lakh. It can be constructed at any place in farm preferable under the tree for better cooling efficiency.

The developed structure is able to significantly contribute towards retention of post harvest quality by enhancement of shelf life of fruits and vegetables after harvest. It proves to be an effective short-term on-farm storage structure for fruits and vegetables in rural areas to help farmers from distress sell and also supplying produce to processing units over prolonged period by about 2-3 weeks. Increase in sugar content level in potato is very less as compared to that of in cold storage.

© CIPHET reserves all rights to information contained in this publication, which cannot be copied or reprinted by any means without express permission.

#### For further details contact:

Dr. R.T. Patil, Director, or  
Dr. R.K. Goyal, Information Manager  
Central Institute of Post Harvest Engineering and Technology, Ludhiana  
Phone: 91-161-2808669 (O); 91-1612808196 (R)  
Fax: 91-161-2808670  
Email: [ciphet@sify.com](mailto:ciphet@sify.com)  
Web Page: <http://www.icar.org.in/ciphet.html>