



# Central Institute of Post Harvest Engineering and Technology, Ludhiana

Our Slogan: Produce, Process and Prosper

## CIPHET E – Newsletter for October 2006 Vol. I No. 4

### Events:

#### 1. Visit of Director and CIPHET Scientists to Ambala

Dr. R.T. Patil, Director, Dr. R.K. Gupta, Dr. R.K. Goyal and Dr. S.K. Tyagi, Sr scientists visited Ambala to have interaction with agro-based industries for commercialization of technologies developed by CIPHET scientists. Following three industries namely M/s. Vaiseshika Electron Devices, M/s. Nu-Tech Dairy Engineering (P). Ltd. and M/s. Osaw Agro Industries (P), Ltd. were visited on 27<sup>th</sup> October 2006.

The purpose of the visit was also to explore the possibility of collaborative/contract research with these industries and to know the feed back for researchable issues in the area of post harvest engineering and related subjects. During visit exhaustive discussion was carried out with Dr. Anil Jain, President, Vaiseshika Electron Devices, Mr. S.C. Malik, Nu –Tech Dairy Engineering (P), Ltd. And Mr. Sanjeev Sagar, M.D. Osaw agro Industries (P), Limited. Infrastructure and capabilities of these industries were also seen during visit. The following areas have been identified for collaborative/contract research with the following firms:

#### I Collaboration with M/s Vaiseshika Electron Devices

- (a) Following instruments will be calibrated and test reports / results will be generated;
  - (i) Digital cereal / grain Analyser
  - (ii) Digital Iodine value meter
  - (iii) Digital oil spectrophotometer
- (b) Collaborative/contract research will be under taken in the area of Agri-Electronics. The facilities and manpower will be shared as per the norms agreed by both the organizations. The Central Scientific and Industrial Organization (CSIO) will also be collaborated in these endeavors.

#### II Collaboration with M/s Nu-Tech Dairy Engineering (P). LTD

- (a) Evaporator will be installed by the firm in Drying laboratory of CIPHET for demonstration and training purposes. Later on, this equipment will be the part of the four pilot plants starting with mustard flour preparation plant to be established in CIPHET with concept and design of CIPHET, and fabrication and further commercialization by the firm. A letter of understanding in this regard will be signed by both organizations.

- (b) Aonla processing equipments such as grader, pricking machine, segment separator and shredder will be manufactured by the firm as per concept and design by CIPHET as per agreement by both organizations.
- (c) The equipment like sunflower dehulling mill, equipments for preparation of sunflower based confectionery products such as heat jacketed mixer for ingredients, sheeting machine/ roller, cutter and packaging machine will be developed as per concept and design by CIPHET by the firm after agreement by both the organizations.

### **III Collaboration with M/s Osaw agro Industries (P) Ltd.**

- a) The Groundnut pod decorticator developed at CIPHET was given to firm for commercial production. The firm gave their feed back positively and informed that already three pieces of machine have been sold and machine is working satisfactory.
- b) New design of tomato grader developed by CIPHET will be taken up by the firm for specific refinement in the machine and its commercialization.
- c) Sesame dehuller will be developed by CIPHET as it is required by the firm after proper agreement.
- d) This firm has shown keen interest in manufacturing Sunflower dehulling Machine designed by CIPHET for commercial production.

Besides, it was felt that these industries may be involved from the beginning of development of technology/prototype so that it could meet requirement of industry and would facilitate effective commercialization and transfer of technologies.

## **2. Post harvest technology of seed spices**

India is global leader in production of seed spices. At present the India is exporting only 10% of its total production of 5.7 lakh tonnes. The quality seed at production level needs to be improved for enhancing export. The exporter, farmers, research institutes need to establish linkages and should join hands to improve the quality. Dr Vinod K Bhargav, scientist visited NRC on seed spices, Ajmer to explore the post harvest processing and value addition of seed spices. It was found that the spices sector is lacking with the post harvest technologies. The farmers are following traditional post harvest practices during the production of seed spices. NRC on Seed Spices has installed a seed processing plant consisting of cleaner grader and other machinery for demonstration purpose. The NRC on Seed Spices has agreed to join hands with the CIPHET Ludhiana for the development of post harvest package of practices in seed spices to improve the quality.



**Fennel crop in the field**



**Cleaning /grading equipment of seed spices**

### **3. Visit of Er. A. R. P.Kingsly, Scientist to US**

Er. Kingsly, scientist visited Ohio State University, Columbus, Ohio, USA under the Borlaug fellowship program sponsored by INDO-US Agricultural Knowledge Initiative and supported by ICAR and US Department of Agriculture (USDA). At the Ohio State University, he worked with Dr. Balasubramaniam, Associate Professor, Food Science and Technology. The objective of his visit was to learn about advanced techniques such as high pressure processing for preservation of processed fruit.

High pressure processing is an advanced method of pasteurization or sterilization. To retain the colour, flavour and texture, the fruits have to be processed at low temperatures. Keeping this in view, high pressure blanching of peach and pineapple was carried out before dehydration. The fruit samples were processed at different pressures (50 MPa – 700 MPa) at 25 °C and dehydrated at 70 °C. After high pressure processing the change in texture, Poly Phenol Oxidase (PPO) activity and change in moisture was studied. The other parameters like moisture loss during dehydration, colour and rehydration characters were also studied.

As part of Borlaug Scholarship program, he also attended the 20<sup>th</sup> anniversary World Food Prize celebration and Symposium, 2006 (18 – 20, October) and Indo – US Agricultural Knowledge Initiative (17<sup>th</sup> October) meeting at Des Moines, Iowa, USA. During the symposium he met Dr. Norman E. Borlaug, Dr. M.S.Swaminathan and many renowned agricultural scientists from all over the world.



**High pressure processing setup**



**Er Kingsley with Nobel Laureate  
Dr. Norman E. Borlaug**

#### **4. Visit of Dr. H.S. Oberoi to US**

Dr. Oberoi, Scientist(SS) deputed to Auburn University, Alabama, USA on Oct 6, 2006 under the Borlaug fellowship program sponsored by INDO-US Agricultural Knowledge Initiative and supported by ICAR and US Department of Agriculture (USDA). He will be working in the area of bio fuel production technology.

#### **5. Awareness Camp for entrepreneurs**



An entrepreneurship awareness program on “Scheme for Development / Strengthening of Agricultural Marketing Infrastructure, Grading & Standardization” was organized at CIPHET, Ludhiana on October 5, 2006. Thirty participants attended the training program. Sh. R.C. Chopra, Director SISI was the Chief Guest on this occasion. Lectures on salient features of the scheme, importance of agricultural marketing infrastructure, identification of projects, post harvest handling of horticultural crops and financial analysis of the projects were delivered by the faculty from CIPHET and ICAR, Sh. Mohinder Singh and Sh. Inder Mohan Singh narrated their experiences as successful entrepreneurs. National Institute of Agricultural Marketing, Jaipur, sponsored the programme.

#### **6 Visit of American scientists to CIPHET**

Dr. David O. Hansen and Dr. Ken Lee from Ohio State University along with Dr. G. S. Padda, Head department of food science, PAU visited CIPHET on Sept 30, 2006. Director explained them vision and mandate of CIPHET and Dr. R. K. Gupta showed the laboratory as well as pilot plant facilities. They were interested in having collaboration of Ohio State University with CIPHET as one of our scientists was trained at OSU in the area of High Pressure Processing for Pasteurization of fruit juices.

## Technology of the month: Sorghum Soy blended Biscuits

The acceptable formulation for glucose biscuits, prepared from blend of wheat flour, pearled sorghum flour and fortified with soybean was developed at CIPHET. The product as well formulation is being adopted by M/s Champion Foods (India), Janata Nagar, Gill Road, Ludhiana 141003 for commercial production. The biscuits are rich in protein and dietary fibre. These biscuits provide 47% more proteins, 8.3 times more fibre and 38.98% more minerals than the commercial biscuits available in the market.



## Project Profile of the Month – Wheat Milling

### PROCESS

The production process consists of the following steps:

- i) Cleaning
- ii) Conditioning / tempering of wheat
- iii) Bran removal
- iv) Grinding
- v) Sieving
- vi) Packaging

The wheat is cleaned to remove coarse materials like straw, stones and debris etc. The optimum moisture content for milling of wheat is 14% (w.b.). If the moisture content is more the wheat must be dried before milling. A scouring machine does the removal of

bran. The wheat is passed through the scouring machine either once or twice according to the amount of removal of bran required. During this step the cleaning of wheat also takes place as the dust etc. hidden in the crease of wheat grains is also removed. The wheat is then ground in the stone mill called *chakki*. The wheat flour is then sieved, weighed, packed and marketed.

## BENEFIT COST ANALYSIS

The benefit cost analysis of the project has been done for two different cases of operation of the project. These two cases are:

- I. Procurement sale basis.
- II. Procurement sale basis and custom hiring.

The assumptions for calculations are as under:

- Land and building will be obtained on rent.
- Average capacity of wheat milling unit: 18 metric ton / month (75 % of the rated capacity; 24 metric ton / month)
- Recovery: 93 % whole-wheat flour and 5 % bran.
- Monthly repair and maintenance charges: 1 % of the cost of machines.
- Depreciation on machines and equipment: 10 % p.a.
- Depreciation on furniture and tools: 20 % p.a.
- Rate of interest: 11% p.a.
- No. of working days in a month: 25
- Total no. of working days in year: 300
- Working hours per day: 8
- Capacity utilization: 1st year 50%; 2nd year 60%; 3rd year 70%;  
4th year 80 %; 5th & subsequent years 90%.

The detailed calculations for each case are presented as under:

### CASE – I (Full capacity utilization by purchase of raw material)

#### Total Capital Investment

Fixed Capital	Rs. 81,200
Working Capital for 45 days	Rs. 2,03,805
<b>Total</b>	<b>Rs. 2,85,005</b>

#### Annual Cost

Total working capital	Rs. 16,30,440
Dep. on m/c & equipment (@ 10% p.a.)	Rs. 6,350
Dep. on furniture (@20% p.a.)	Rs. 1,000
Interest on total capital investment @ 11 %	Rs. 31,350
<b>Total</b>	<b>Rs. 16,69,140</b>

#### Total Sales (per annum)

Wheat Flour, 200.88 tonnes @ 8500/tonne	Rs. 17,07,480
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Bran, 10.80 tonnes @ 4000/tonne

Rs. 43,200

**Total**

**Rs. 17,50,680**

### **Profitability (per annum)**

Annual Profit = Annual Sales – Annual Cost = Rs. 17,50,680 - Rs. 16,69,140 = Rs. 81,540

Profit on sale = 4.65 %

Return on capital investment = 28.6 %

### **Break Even Point (B.E.P.)**

Fixed Cost

(i)	Interest on total capital investment @ 11%	= Rs. 31,350
(ii)	Depreciation	= Rs. 7,350
(iii)	40% of annual wages = $0.4 \times 5000 \times 12$	= Rs. 24,000
(iv)	40% of overheads (incl. utilities) = $0.4 \times 4470 \times 12$	= Rs. 21,456
(v)	Rent	= Rs. 12,000

Fixed cost = (i)+(ii)+(iii)+(iv) = Rs. 96,156

Variable Cost = Annual working capital - Fixed cost = 16,30,440 - 96,156 = Rs. 15,34,284

Average variable cost =  $15,34,284 / 2,16,000$  = Rs. 7.10

Unit Price (Avg. revenue from 1kg raw material) =  $0.93 \times 8.5 + 0.05 \times 4$  = Rs. 8.105

B.E.P (capacity) = Total fixed cost / (Unit price - Avg. variable cost)  
=  $96,156 / (8.105 - 7.10)$  = 95,677.6 kg or 44.3 %

### **LIST OF MACHINERY MANUFACTURERS AND SUPPLIERS**

1. Vishal Machinery Store, GT Road, Opp. Jagraon Bridge, Ludhiana – 141 008.
2. Grewal Agencies, GT Road, Opp. Jagraon Bridge, Ludhiana – 141 008.
3. Kapur Mill Gin Store, Gurudwara Dukh Niwaran Road, Ludhiana – 141 008.
4. Nalanda Agro Works, Nalanda Nagar, Kurji, Patna – 800 010.
5. DP Pulveriser Works, Modi & Modi Building No. 2, II nd Floor, 76 Nagindas Master Road, Fort Mumbai – 400 023.
6. Punjab Engineering Works, Phase IV, Mohali, Punjab.
7. Kaps Engineers, 831, GIDC Makarpura, Vadodra - 390 010, India.
8. Premium Engineers Pvt. Ltd. ,603, Chinubhai Center, Nehru Bridge Corner, Ashram Road, Ahmedabad – 380 009.
9. Argus Industries, K 19, Industrial Estate, Ambattur, Chennai – 600 058.
10. Meakins Agro Products Private Ltd., “MEKINS HOUSE” 6-3-1090/B/2 Rajbhavan Road, Somajiguda, Hyderabad – 500 482.

## Director's Column



**Dear All,**

The conventional agro based industries engaged in food processing and value addition are eagerly awaiting the infusion of new technologies so that they can produce better quality product with greater efficiency. There is also a great enthusiasm among upcoming entrepreneurs for establishing new ventures using cutting edge processing technologies. The R & D for this involves development of technology at laboratory level as well as scaling up the successful protocol to pilot scale level and for commercial production. To meet these objectives active collaboration of CIPHET with industry in the neighborhood is very much essential. The interaction with M/s. Vaiseshika Electron Devices, M/s. Nu-Tech Dairy Engineering (P). Ltd. and M/s. Osaw Agro Industries (P), Ltd located at Ambala and their willingness to cooperate with CIPHET in these efforts was very encouraging.

Another approach, which CIPHET is planning to adopt, is working in collaboration with various commodity based ICAR institutes where engineering scientists are not available. One such area we have explored this month is mechanization of production as well as processing of seed spices. The interaction of CIPHET scientist with scientists at NRC on Seed Spices has given the valuable inputs in his project formulation. During this month two of our scientists got opportunity to visit US under Borlaug fellowship and work in the area of cutting edge technologies. The international cooperation in the area of high pressure processing and bio-tech engineering started with visit of these scientists will help CIPHET to gear up its research and facilities to international standards.

Creating awareness among the entrepreneurs for latest developments has always been work of joy for us. This month an awareness program on "Scheme for Development / Strengthening of Agricultural Marketing Infrastructure, Grading & Standardization" sponsored by National Institute of Agricultural Marketing, Jaipur, was organized at CIPHET to share with them information on importance of agricultural marketing infrastructure, post harvest handling of horticultural crops and identification of projects and their financial analysis.

**With best regards**

**R. T. Patil**  
**Director**

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