



Central Institute of Post Harvest Engineering and Technology, Ludhiana

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Our Slogan: Produce, Process and Prosper

CIPHET E – Newsletter for December 2006

Vol. I No. 6

Events:

1. Participation of CIPHET scientists in CII Conference:

CIPHET scientists participated in the International Food and Agricultural Conferences organized by Confederation of Indian Industries (CII) at Chandigarh during Dec 1-4, 2006

- i.** Dr. DB Singh, Dr. RK Gupta, Dr. D.R. Rai, Dr. ARP Kingsley, Dr. S.K. Tyagi participated in session on Integrating Food Value Chain on 2nd December 2006
- ii.** Dr. Davinder Dhingra participated in session on Public Private Partnership in Agril Infrastructure on 3rd December 2006.
- iii.** Dr. H.S.Oberoi, Dr. K. Narsaiah participated in session on Biotechnology on 4th December 2006.

- 2. Dr. G.S.V. Raghavan**, James McGill Professor, Department of Bio-resource Engineering, McGill University, Canada, and Prof. U. S. Shivahare, Professor at Punjab University, Chandigarh visited the institute on 14.12.2006 and addressed the scientists. He mainly focused on recent and innovative techniques being used in drying, storage and marketing of perishable produce. He advocated the concept of high pressure processing and also emphasized the use of solar dryers. He was also shown institute facilities and technologies developed.



Figure 1. Prof. Raghavan addressing CIPHET scientists

3. Dr. R.P. Kachru addressed CIPHET scientists

Dr. R.P.Kachru, Former ADG (PE), ICAR and honorable member of CIPHET, RAC visited the institute on 16.12.06 and interacted with the scientists. He addressed the gathering of scientists & emphasized following points: -

- Market intelligence component should be a part of each research project.
- Need to redefine definition of primary, secondary, tertiary & minimal processing.
- Proper problem identification in consultation with the end users.
- Along with technology developed, the information on technology-transferred should also be included to impress upon new upcoming entrepreneurs about viability of the technology.
- CIPHET should work to identify quantum of post harvest losses as well as source of losses for agricultural commodities.
- Institute should have information on Loss Analysis & Critical Control Points (LACCP)

Director informed that most of the points suggested by him are being taken care of while formulating new project proposals. CIPHET has licensed many technologies and that information is given to upcoming enterprenurs also to confirm the commercial viability. The exhaustive work on determination of loss points and extent of losses is being conducted under AICRP on PHT through all its 33 centers, two year data will be available soon to specify Loss Analysis & Critical Control Points (LACCP).

4. 26th Workshop of AICRP on PHT

The 26th Workshop of AICRP on PHT was held at OUAT, Bhubaneswar during December 6-9, 2006. The inaugural session was chaired by Dr. Nawab Ali, DDG (Engg.), ICAR, New Delhi with Dr. B. Senapati, Vice-Chancellor, OUAT, Bhubaneswar as the Co-chairman. Dr. Srijukta Surendranath Naik, Hon'ble Agriculture Minister, Govt. of Orissa graced the occasion as the Chief Guest while Dr. S.M. Ilyas, Vice-Chancellor, NDU&T, Faizabad and Dr. Pitam Chandra ADG (PE) were Guests of Honour. From CIPHET the team consisting of Director, PC(PHTS), Head, AS&EC, Head TOT, Incharge Abohar center attended the meeting. Er. A. R. Kingsley presented the progress of the adhoc project on Anola processing during the session on A. P. Cess Funded Ad-hoc Projects. During the workshop a special session on sensitization on Food Processing under Indo-US Knowledge Initiative in Agriculture was also organized. The salient feature of this workshop was special session on Agro-Processing Centre (APC) established at all centers. The scheme during its 26 years of existence has introduced this novel concept of APC, which is now being appreciated, by policy makers, planners and being replicated by other R&D organizations and NGO's to take forward the revolution of agro processing in catchment areas.

4. Institute organized Staff Research Council Meeting

Institute organized its Staff Research Council Meeting during December 21-23, 2006 under the Chairmanship of Dr. R.T.Patil, Director. It began with welcome address by Dr. R.K.Goyal, Member Secretary, SRC followed with remarks of the Chairman. He said that each research project should have focused objectives along with time bound technical programme. Scientists should make use of market intelligent while submitting new proposals. He further added that scientists should identify client to whom outcome of project would be applicable. He stressed to develop hardwares, which can be adopted easily. Lastly, he said the scientists should work in team spirit and dedicate themselves to research. In the SRC, eight RPF-III, 25 RPF-II and 26 RPF-I were presented and approved.



Figure 2. The SRC in progress at CIPHET

5. CIPHET celebrates 17th Foundation Day

The Institute was established at PAU Campus Ludhiana on 29th December 1989. To bridge the gap in R&D related to engineering and technology suitable for establishing the agricultural and food processing industries in catchment areas. The institute has so far developed many appropriate technologies for this purpose, assembled pilot plants for entrepreneurship training, established industrial liaison for technology transfer and developed national and international cooperation to meet the national needs. To celebrate 17th foundation day a programme was organized. Dr. S.S. Chahal, Dean (PG), PAU was

the chief guest. The function was presided by Dr. R.T. Patil, Director of the Institute. Dr. R.K. Gupta, Chairman, organizing committee of foundation day welcomed the chief guest and other dignitaries on this occasion. Dr. R.T. Patil, Director CIPHET emphasizes the importance of post harvest technology for value addition of food crops and its role in employment generation and in national economy. He advocated that diversification in agriculture is more sustainable by incorporating post harvest and value addition technologies. Further, ha also brief about the achievement of CIPHET in the area of processing and value addition. Dr. S.S. Chahal, Chief Guest gave away awards to the staff members of the Institutes who had completed 10 years or more service to the institute and also to the popular staff member selected by popular vote in each category i.e. Scientific, Administrative, technical and Supporting. In his address chief guest Dr. Chahal said that second green revolution will be successful mainly through employing appropriate post harvest technologies at farm level. Further, he appreciated the contribution made by CIPHET in the area post harvest processing of crops.

Technology of the month

Low Cost Basket Centrifuge for Minimal processing

Accumulation of surface water on the fresh and minimally processed vegetables is a matter of concern as it helps in growth of pathogens and microorganisms. A Basket centrifuge consisting of a detachable perforated cylinder, rotating at 500 RPM was fabricated to remove surface water from the minimally processed vegetables. The centrifuge was tested with minimally processed spinach and mustard leaves. It was observed that for minimally processed spinach and mustard, no leave injury was observable till 10 s. whereas, centrifugation of these vegetables beyond a period of 10 s. led to surface injury.



Project Profile of the Month – Soymilk

1. INTRODUCTION

Soybean is a protein rich oilseed crop. The protein content is about 40% and oil content is 18-22%. The production of soybean in India was 6.00 million metric tons in the year 2004-05, and the average yield was 857.1 kg/hectare. The minimum support price of soybean for 2002-03 was Rs.8850 per ton for the yellow variety and Rs. 7950 per ton for the black variety. According to American Soybean Association (ASA) the domestic consumption of soy meal in India has increased from 1 million ton in 1997-98 to 1.7 million tons in 2001-02. Out of 1.7 million tons 1.55 million tons were used as feed and 0.15 million tons was consumed as human food in the form of soya flour, soya granules and nuggets.

Soybean is mainly cultivated as an oilseed crop. Soy oil is extracted from the seeds and used as a cooking medium and the soy meal is used as feed and food. Foods such as soy flour, soy dal, soymilk, soy *paneer*, soy nuggets and granules and tofu are examples of soy food.

Soymilk production facility can be taken up with a total capital investment of approx. 3.36 lakh rupees. The unit is expected to make an annual profit of Rs. 75,000, with a break-even point of 45.62% and benefit cost ratio (BCR) of 1.14. The details of the project are outlined as under.

2. PROCESS

2.1. Soymilk

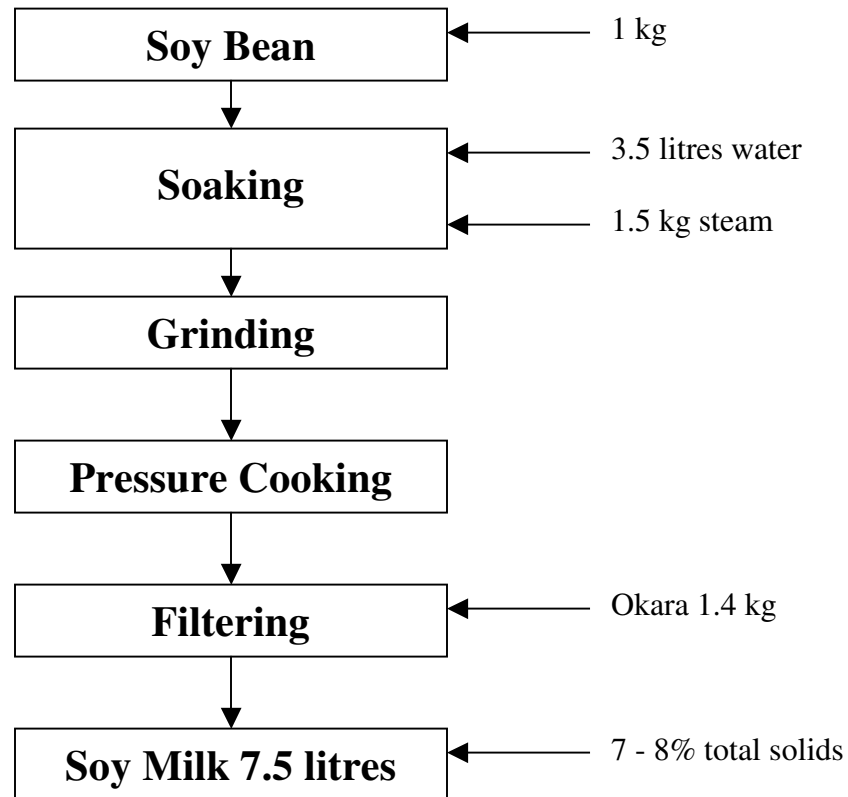
It is creamy, milk like product rich in protein, vitamins and minerals. Soymilk is very economical, lactose free, highly digestible and nutritious. The process of preparing soymilk is outlined in figure. Soymilk can be consumed as such or after sweetening and diluting it. Soymilk can be further converted into curd or *paneer*. The anti nutritional factors are taken care of during processing and make the products suitable for human consumption.

2.2. Soy Paneer

Soy paneer is a tasty and very nutritious product made by coagulating hot soymilk with food grade chemicals such as calcium chloride, magnesium chloride, calcium sulphate, acetic acid and citric acid etc. it is a versatile food and can be converted into a variety of value-added products.

2.3. Okara

This is the un-dissolved residual portion left after extracting soymilk from soybeans during the process of making soymilk.



Process of making soymilk

3. BENEFIT-COST ANALYSIS

3.1. Assumptions

The assumptions for calculations are as under:

- Land and building will be obtained on rent.
- Average capacity of soymilk unit: 4200 litres / month (75 % of the rated capacity; 5600 litres / month)
- Recovery: 14 litres soymilk is obtained from 2 kg soybean
- 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 number of working days in year: 300
- Working hours per day: 8
- Space required: 5-10 m²
- Capacity utilization: 1st year 50%; 2nd year 60%; 3rd year 70%;
4th year 80 %; 5th & subsequent years 90%.

3.2. Fixed Capital

Machinery and Equipment

Cost of soy processing machines including taxes and duties	Rs. 2,10,000-00
Freezer	Rs. 30,000-00
Utensils	Rs. 5,000-00
Weighing & measuring equipment	Rs. 5,000-00
Furniture	Rs. 2,500-00
Cost of electrification	Rs. 5000-00
Total	Rs. 2,57,500-00

3.3. Working Capital

Staff & Labour Cost (per month)

Skilled	One	Rs. 3,000-00
Unskilled	One	Rs. 2,000-00

Raw Material (per month)

Soybean (24 kg/day x 25 days/month x Rs 16/kg) Rs. 9,600-00

Utilities

Cost of electricity 360 kWh/month @ Rs. 4/kwh	Rs. 1,440-00
Fuel-LPG @ 15/ batch (300 batches)	Rs. 4,500-00

Other Expenses

Rent	Rs. 1,000-00
Telephone	Rs. 300-00
Repair & maintenance (1 % cost of machines)	Rs. 2,500-00
Packaging material	Rs. 1,000-00
Transport charges	Rs. 1,000-00
Total	Rs. 26,340-00

Working capital for 3 months = Rs. 26,340 x 3 = Rs. 79,020

3.4. Total Capital Investment

Fixed capital	Rs. 2,57,500-00
Working capital for 3 months	Rs. 79,020-00
Total	Rs. 3,36,520-00

3.5. Annual Cost

Total working capital	Rs. 316,080-00
Dep. on machines/equipment	Rs. 25,000-00

Dep. on furniture etc.	Rs. 500-00
Interest on total capital investment	Rs. 37,017-00
Total	Rs. 3,78,597-00

3.6. Total Sales (per annum)

Soymilk (50,400 litres/annum @ Rs 9/liter)	Rs. 4,53,600-00
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3.7. Profitability

Annual profit (Total Sales-Annual Cost)	= Rs. 75,003
Profit on sale	= 16.54%
Return on capital investment	= 22.29 %

3.8. Break Even Point (B.E.P)

Fixed Cost

Interest on Total Capital Investment @ 11% p.a.	Rs. 37,017-00
Dep. on m/c equipment	Rs. 25,000-00
Dep. on furniture	Rs. 500-00
40% of annual wages of workers	Rs. 24,000-00
40% of overheads (incl. utilities)	Rs. 49,152-00
Rent	Rs. 12,000-00
Total	Rs. 1,47,669-00

Variable Cost = Annual Cost – Fixed Cost = 3, 78,597 – 1, 47,669 = Rs. 2, 30,928-00

Average variable cost = 2, 30,928 / 50,400 = Rs. 4.58

Unit sale price = Rs. 9 per litre

Break Even Point = $1, 47,669 / (9.0-4.58) = 33,410$ litres of milk or 66.28%

The benefit cost ratio, internal rate of return and the net present worth of the project are favorable and the project is financially viable. In addition to these indicators the banks also work out the statement of repayment of principal (loan amount: 75% of the total capital investment) and interest. In this statement the net surplus after repayment of principal and interest over the period of the loan is worked out.

4. EQUIPMENT MANUFACTURER

The equipment for manufacture of soymilk on small scale is manufactured and supplied by M/s SSP (Pvt) Limited

13, Mile Stone, Mathura Road, Faridabad – 121 003
India.

CIPHET establishes Institute Technology Management Unit (ITMU) to serve you better

The Institute has established an Institute Technology Management Unit (ITMU). The unit consists of a Technology Management Committee (ITMC) and an in-charge exclusively for consultancy, industrial liaison, and management of intellectual properties generated at this Institute. All work is processed and finalized immediately on priority in this unit.

The institute has expertise in imparting consultancy and is also conducting need based contract research for clients engaged in post-harvest and food processing industries. Farmers, food processors and any entrepreneurs may get register themselves by paying just Rs 1000/- for a year and may get free advisory consultations for solutions of their problem.

The Institute has a core group of expert for making Detailed Project Report (DPR) for establishing any kind of food processing industries and for development of entrepreneurship in this sector. Institute has till now developed more than five such DPRs and have imparted various constancy to private and public enterprises. A nominal charge of about 1 % of investment required in the project is levied as consultancy charges for making such DPR. One may contact for the purpose to the Director, CIPHET, Ludhiana – 141 004.

ANNONCEMENTS

1. Entrepreneurship Development Programme on **Covered Crop Cultivation** will be held during February 5-9, 2007 at CIPHET Abohar.
 2. Entrepreneurship Development Programme on **Fruit and Vegetable Puree and Powder Manufacturing Technology** will be held during March 5-10, March 26-31 and April 16-21,2007 at CIPHET Ludhiana.
 3. Entrepreneurship Development Programme on **Processing of Aonla** will be held during March 5-9, 2007 at CIPHET Abohar.
- Course Fee: Rs 2000/participant excluding lodging and boarding expenses.**

POST HARVEST DATA MSP of Rabi crop announced on 27.10.2006

Crops	Crop year 2005-06 Marketing year 2006-07	Crop year 2006-07 Marketing year 2007-08	Increase
Wheat	650	750	100
Barley	550	565	15
Gram	1435	1445	10
Rapeseed/Mustard	1715	1715	Nil
Sunflower	1565	1565	Nil
Masoor (lentil)	1535	1545	10

Rs./Quintal

India's global ranking in agricultural commodities

Rank	Commodity	Rank
1.	Anise, Badian, Fennel	1
2.	Bananas	1
3.	Beans, Dry	1
4.	Buffalo Milk	1
5.	Castor Beans	1

6.	Chick- Peas	1
7.	Fruit Fresh	1
8.	Ginger	1
9.	Goat Milk	1
10.	Indigenous Buffalo Meat	1
11.	Jute	1
12.	Jute-Like Fibres	1
13.	Lentils	1
14.	Mangoes	1
15.	Millet	1
16.	Okra	1
17.	Peas, Green	1
18.	Pigeon Peas	1
19.	Pimento, Allspice	1
20.	Pulses	1
21.	Sesame Seed	1
22.	Spices	1
23.	Tea	1
24.	Cabbages	2
25.	Cashew Nuts	2
26.	Cauliflower	2
27.	Cocoons, Reelable	2
28.	Cow Milk, Whole, Fresh	2
29.	Eggplants	2
30.	Frit Tropical Fresh	2
31.	Garlic	2
32.	Groundnuts in Shell	2
33.	Indigenous Goat Meat	2
34.	Lemons and Limes	2
35.	Oil seeds	2
36.	Onions, Day	2
37.	Pumpkins, Squash, Gourds	2
38.	Rice, Paddy	2
39.	Safflower Seed	2
40.	Sugar Cane	2
41.	Vegetables Fresh	2
42.	Wheat	2
43.	Coconuts	3
44.	Cotton Lint	3
45.	Cottonseed	3
46.	Nutmeg, Mace, Cardamoms	3
47.	Potatoes	3
48.	Rapeseed	3
49.	Sorghum	3
50.	Tobacco Leaves	3

51.	Beans, Green	4
52.	Hen Eggs	4
53.	Linseed	4
54.	Natural Rubber	4
55.	Papayas	4
56.	Pepper, White/ Long/Black	4
57.	Pineapples	4
58.	Tomatoes	4
59.	Indigenous Chicken Meat	5
60.	Indigenous Duck Meat	5
61.	Lettuce	5
62.	Oranges	5
63.	Peas, Dry	5
64.	Soybeans	5
65.	Maize	6
66.	Cassava	7
67.	Citrus Fruit	7
68.	Honey	7
69.	Walnuts	7
70.	Wool, Greasy	7
71.	Cantaloupes & Oth Melons	8
72.	Cantaloupes & Pomelos	8
73.	Indigenous Sheep Meat	8
74.	Sunflower Seed	8
75.	Sweet Potatoes	8
76.	Indigenous Cattle Meat	9
77.	Apples	10
78.	Pears	12
79.	Carrots	14
80.	Grapes	14
81.	Mushrooms	14
82.	Figs	15
83.	Cocoa Beans	17
84.	Peaches and Nectarines	17
85.	Plums	19
86.	Barley	21
87.	Berries	23
88.	Indigenous Pig Meat	26
89.	Cherries	31
90.	Watermelons	31
91.	Chillies & Peppers, Green	33
92.	Cucumbers and Gherkins	33
93.	Apricots	34

Source: World Food Day (2006)

Director's Column



Dear All,

India has share of only 2.4% world's cultivable land, but supports 17% human and 15% of livestock population of the world. The efforts of Agricultural Scientists have converted India from importing to exporting country for food grains and Punjab has played a lead role in this transformation. Imagine if other states in our country work like Punjab, we will have so much of the production that only India can feed the world.

Another advantage, which our country has, is its varied agro climate and soil type, hence it can grow almost every crop from spices & condiments to variety of food grains and fruits and vegetables. The crops grown in this blessed land are full of healthy micronutrients and have potential to be used as functional foods as well as nutraceuticals.

However, the postproduction losses are enormous for this farm wealth. About 10% food grains and 25-40% fruits and vegetables are wasted due to improper handling, storage and lack of processing facilities in catchment areas. As saying goes grain saved is grain produced, the attention to post harvest processing is a need of an hour.

Due to rising middle class in the country due to both spouses working and increasing acceptability to processed foods has opened up tremendous opportunities for local youths to take modern agro processing ventures. If opportunity is not used now then due globalization Chinese and Thai processed foods will make inroads in our retail stores and it would be then very difficult to compete with them.

Agro Processing activity can be the only approach to successfully implement the crop diversification in the state like Punjab. The existing cropping system of rice-wheat is depleting the valuable natural resource at alarming rate. The water requirement of 3000 litre water per kg rice may lead us to desert like situation. However if any other alternative is to be provided to farmer, which can yield Rs. 75000/ ha, is not possible without reaping the benefits of value addition of the crops to make them remunerative.

Hence our appeal to young rural/ urban graduates is to explore the agro processing as a profession, which has not only rising domestic market but also tremendous potential for export.

Wishing you all a very happy, peaceful, healthy and productive 2007

With best regards.

R.T. Patil
Director

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