



Central Institute of Post Harvest Engineering and Technology,

Ludhiana

Our Slogan: Produce, Process and Prosper

CIPHET E – Newsletter for November 2007

Vol. 2 No. 11

Director's Column



Dear All,

The month of November was very fruitful to CIPHET as we got the opportunity to work in all mandated areas simultaneously. The successful completion of winter school on bioprocessing technologies in utilization of crop residues for production of enzymes and bio-fuel was an important event. This not only gave opportunity for many young researchers to get initiated in this important area but also was an opportunity to get experts in this area from all over the country visit CIPHET and get associated with us actively. The eminent scientists who visited CIPHET as Guest faculty included Dr. Alok Adholeya, TERI, New Delhi, Dr. RC Kuhad, University of Delhi, Professor GP Aggarwal, IIT, Delhi, Professor VK Joshi, Dr YSPUHF, Solan and Dr. C. Balagopalan from Thiruvalla, Kerala.

The CIPHET has a mandate to help spread the message of catchment area processing of fruits and vegetables so that farmers get the remunerative price. For this we helped Bihar Industries Association by participating in two events namely Cold Chain Development and Post-harvest Management in Horticultural Crops and Seminar-cum-Training programme on opportunities in Food Processing Sector in Bihar and also participated in Regional Agriculture Fair, Areraj, Motihari, East Champaram (Bihar) during Nov 3-5, 2007. The progressive farmers who have strength to take up food processing as a diversified agro based activity are being convinced and motivated by CIPHET and for this our scientists are identifying and visiting them personally and visit to Sh Harpal Singh Village Ram Diwali was one such effort.

At CIPHET, based on the technology packages developed at the institute and due expertise of its scientists, services of trainings are offered nationally and internationally. The training was organized for officials of Uttarakhand and scientists from Myanmar and Egypt. Similarly to keep pace with advances in science and technology the CIPHET scientists participated in national and international conferences viz. "Radiation Processing of Agri-Foods-Domestic and Export Potential" at Tirupati, International Conference on Tradition Dairy Foods at NDRI Karnal, International Conference on "New Horizons in Biotechnology", Trivendrum, "Food security and safety-central to health security" conference by NIN at Hyderabad and "Bharatiya Vigyan Sammelan" at Bhopal.

The new technology flashed this month is about the ways and means of processing beetroot for its use in health foods. Beetroots (*Beta vulgaris*) have been utilized for their medicinal properties since ancient times. Beetroot has long been considered beneficial to the blood, the heart, and the digestive system. It has been regarded as a laxative; a cure for bad breathes, coughs and headaches; and even as an aphrodisiac. More recently, it has been advocated as a cancer preventative and as a means of bolstering the immune system. Beetroot is rich in many important minerals, micronutrients and with many health-giving properties. Hence simple and easy to adopt processing technology being developed at CIPHET will help provide better returns to the beetroot growers.

With best regards

R.T. Patil,
Director

Winter school on bioprocessing technologies in utilization of crop residues for production of enzymes and bio-fuel concludes

A winter school on “Bioprocessing technologies in utilization of crop residues for production of enzymes and bio-fuels” organized at CIPHET, Ludhiana from October 16 was concluded on November 5, 2007. Dr. S.S. Marwaha, Director, Biotechnology, Punjab State Council of Science and Technology and CEO, Punjab Biotechnology Incubator, Chandigarh, was the chief guest for the occasion. He gave examples of Institutions in USA and Canada where they have established synergies and worked together to achieve a common goal of developing technologies for good crop residue management. He also called upon the participants to translate the concepts learned during the 21 days training programme into technologies for meeting the energy needs of the country. He gladly agreed to the suggestion of the CIPHET to form consortium of the food laboratories in Punjab so that we can jointly solve the problem related complete mapping of quality of raw material as well as finished products for the benefit of this growing industry. The eminent scientists who visited CIPHET as Guest faculty included Dr. Alok Adholeya, TERI, New Delhi, Dr. RC Kuhad, University of Delhi, Professor GP Aggarwal, IIT, Delhi, Professor VK Joshi, Dr YSPUHF, Solan and Dr. C. Balagopalan from Thiruvalla, Kerala.



Participants of winter school on utilization of crop residues for production of enzymes and bio-fuels

Radiation Processing of Agri-Foods-Domestic and Export Potential

Radiation is a promising technology for insect free storage of raw as well as finished products. A two days National Seminar on ‘Radiation Processing of Agri-Foods-Domestic and Export Potential’ was attended by Dr. K.K. Singh, Head, FG&OP Division. The seminar was jointly organized by Department of Home Science, Sri Padmavathi Mahila University & Sri Venkateswara University, Tirupati in collaboration with Board of Research in Nuclear Sciences & Bhabha Atomic Research Centre, Mumbai during November 1-2, 2007 at Sri Venkateswara University, Tirupati. There were seven technical sessions, viz. Trends of Radiation Processing, Irradiation Plants: Regulatory Aspects & Applications, Low Dose Radiation Processing, Radiation Processing of Animal Foods, Nutritional Quality, Innovative Applications and Pannel Discussion. The scientists of different organizations, viz. BARC, DRDO, CFTRI, SPMVV, SVU, ANGRAU etc, presented the research and technical

papers. The participants of the seminar were scientists' representative of industry, farmers, APEDA, NABARD, etc.

Improving productivity of land and water through multiple uses

Dr. P.R.Bhatnagar, PC(APA), CIPHET Ludhiana visited ICAR RCER Patna during 28 November 2007 –2 December 2007 and participated in the inaugural session of winter school on “Improving land, water through multiple uses and energy productivity through micro irrigation system” as guest of honour and delivered a lecture on “Improving productivity of land and water through multiple uses”. He also visited pressurized irrigation and discussed about latest development in micro irrigation research development at ICAR RCER Patna.

Seminar-cum-Training programme on opportunities in Food Processing Sector in Bihar

Dr D Dhingra attended a 2-day Seminar-cum-Training programme on opportunities in Food Processing Sector on 5th & 6th Nov. 2007 at PATNA. The programme was organized by Bihar Industries Association and sponsored by Ministry of Food Processing Industries, Dept. of Industries & Dept. of Agriculture, Govt. of Bihar and BAMETI. The programme was inaugurated by Sh. Gautam Singh, Hon'ble Minister of Industries and Sh. Nitish Mishra, Hon'ble Minister of Sugarcane Dept. It was also attended by Sh. Prem Singh Meena, Director of Industries, Govt. of Bihar and Dr K.M. Singh, Director Bihar Agril. Management Extn. and Training Institute (BAMETI). Dr. Dhingra was invited to speak during the inaugural session and brief the audience about the activities of CIPHET. The research and training activities were briefly highlighted. Sh. Gautam Singh Hon'ble Minister of Industry, Govt. of Bihar was impressed by the activities of CIPHET, and during his inaugural speech he urged his colleagues to discuss the opportunities of training and establishment of model agro-processing units in Bihar. As a follow up, a meeting Dr. Dhingra with Sh. S. Vijay Raghavan, Principal Secretary, Dept. of Industries, Bihar and Sh. Mahesh Prasad, Director (Tech. Dev.) Dept. of Industries Govt. of Bihar was held on 6th Nov. 2007. He apprised the senior officers of the activities of CIPHET. It is expected that the Dept. of Industries will sponsor 20-25 delegates for training at CIPHET and send the request to Director CIPHET. A request for setting up model agro-processing centre for processing of fruits and vegetables in Bihar is also expected. The Dept. of Industries Govt. of Bihar expressed their willingness to fund these activities. Bihar Industries Association also expressed their desire to arrange an exhibition on food processing in Patna, with the help of CIPHET.

Dr. K. M. Singh, Director, BAMETI expressed his willingness to organize field visits to CIPHET for training to trainers. He also requested to send the project profiles. In the technical sessions on 5th and 6th Nov. the showcase of technologies developed at CIPHET and preparation of project profiles for food processing units were presented. Queries from entrepreneurs and farmers for training programmes and project profiles were answered.



Dr. Dhiraj Singh from CIPHET contributing to efforts of improving the status of food processing sector in Bihar

State Level Seminar on “Cold Chain Development and Post-harvest Management in Horticultural Crops” at Patna

Dr. Prasad participated as a Resource Person from CIPHET in a State Level Seminar on “Cold Chain Development and Post-harvest Management in Horticultural Crops” at Patna on an invitation from Directorate of Horticulture, Govt. of Bihar. The one-day Seminar was held on 24.11.07 at Patna. Principal Secretary, Dept. of Agriculture (Govt. of Bihar) was the Chief Guest while Addl. Secretary, Dept. of Agriculture (Govt. of Bihar) presided over the Seminar. Dr M.R. Sharma, Chief consultant, National Horticulture Mission (Govt. of India), Dr. Matthew Prasad and Dr S. Rao from Indian Institute of Horticulture Research (Bangalore) were the key speakers. Secretaries of Primary Agriculture Co-operative Societies, Chairpersons of NGOs, agro-industrialists, Cold Storage & Pack House owners, onion & fruit pulp exporters attended the Seminar.

In the afternoon session, Director Horticulture (Bihar Govt.), G.M., NABARD, Vice-President, Bihar Industry Association, Mission Director, State Horticulture Mission (Govt. of Bihar), Chief Consultant, National Horticulture Mission (Govt. of India) joined in the Panel Discussion with Dr S. Rao and Dr. Matthew Prasad. At the concluding session in the evening, recommendations were prepared. Major recommendations related to post harvest management of horticultural produce included.

- Popularization of Evaporatively Cool Chamber for storage of fruits & vegetables
- Development of Litchi Destoner & Pulper
- Erection of Controlled Atmosphere and Cold Storages at District level
- Popularization of Modified Atmosphere Packaging of fruits & vegetables
- Development of processed products from cauliflower & radish
- Development of onion grading & packaging system.

At the informal interactive session, several queries/requests from entrepreneurs, Pack House Owners and processed food exporters regarding EDPs of CIPHET, preparation of project profiles, processing and storage technologies were entertained.

Visit to farmers field

Dr Matthew Prasad, Head TOT and Dr D Dhingra, Senior Scientist, visited the farms of Sh. Harpal Singh, Vill. Ram Diwali, Dera Baba Nanak, Distt. Gurdaspur on 22nd November 2007 to collect first hand information on the activities of the farmer. Sh Harpal Singh, a progressive farmer, is a recipient of many awards at district and state level. He took cultivation in 1969. He reclaimed the salt affected land and achieved high productivity of wheat & paddy. He has also installed underground pipelines form his tubewell to convey irrigation water to his fields. With time he has diversified into other crops such as *Hyola sarson* and eucalyptus. The sarpanch and village seniors also informed that Sh. Harpal Singh, brought the technologies to the village for improvement of agriculture. Sh Baldev Singh Kahlon, Chief Agril Officer, Distt Gurdaspur also appreciated the work being done by Sh. Harpal Singh and the efforts he puts in encouraging and helping other farmers. CIPHET is trying to motivate such progressive farmers to lead the community in post harvest sector also by adopting minimal processing at farm, adopting scientific storage techniques and if possible some value addition efforts to make available farm fresh processed products to urban population.



Dr Matthew Prasad and Dr D Dhingra at the farms of Sh Harpal Singh Village Ram Diwali

One-week Training Post Harvest Management and Value Addition of Horticultural Produce for Uttarakhand

One week training programme was organized on Post Harvest Management and Value Addition of Horticultural Produce during 19-25 November, 2007 at CIPHET, Abohar. Fourteen participants from Uttarakhand participated in the training programme. The training included various lectures including post harvest management of fruits and vegetables, role of cold chain in post harvest management of perishables, MAP including minimal processing of fruits and vegetables, plasticultural techniques for better productivity of fruits and vegetables, scope and uses of shrink packaging of fruits and vegetables and development of various value added products of fruits and vegetables. The training also included the practical classes on novel products from aonla, ber, guava, and pomegranate etc. including demonstration of waxing plant. The participants were also exposed to different laboratory and field experiments going on different aspects of post harvest management of fruits and vegetables. The participants were also exposed to different field visits particularly multi-fruit juice plant, waxing and packaging unit of kinnow, hi-tech nursery and scientifically managed farmers orchards. The training was conducted by Dr. R. K. Gupta, HOD (HCP) as Course coordinator and

Dr. Rajbir Singh, Senior Scientist as Co-course coordinator. The participants were awarded successful completion certificate by the chief guest Dr. N. S. Brar, SDM, Abohar, in the valedictory function. The chief guest urged the participants to disseminate the techniques learned during the training to the farmers and level so that the purpose of the training can be fulfilled in the larger interest of farmers and entrepreneurs.



Participants from Uttarakhand for training programme on Post Harvest Management and Value Addition of Horticultural Produce

Training for Myanmar scientists (international training)

A one-week FAO sponsored training on “Edible Oil Laboratory Analysis and Technology” was organized at CIPHET during November 12-19, 2007 on Edible oil for the participants from Myanmar. Participants were given lecture and practical training on present status and future scenario of edible oil production and processing technology, engineering properties, primary processing and pretreatments of oilseeds in relation to expelling, screw pressing of various oilseeds, solvent extraction of edible oils, refining of edible oils, property and quality of edible oils, determination of various quality parameters of oilseeds and oils, etc. In addition to theory and practical classes on oilseed processing and quality analysis, the visits were also arranged to the MERADO, Ludhiana and A.P. Solvent Extraction plant, Dhuri. The training was ended with group discussion, course evaluation and valedictory function on November 19, 2007. The training was conducted by Dr. KK Singh Head, FGOP and Dr. SK Tyagi under the direction of Director, CIPHET. The trainees Ms Moe Moe and Ms Yin Yin Latt, also visited A. P. Solvex Ltd. Dhuri and MERADO, Ludhiana on 16.11.2007. At Dhuri, the trainees interacted with Mr A.R. Sharma, Chairman and M.D.; A P Solvex Ltd. Mr Sharma gave a brief presentation on the qualities of rice bran oil & methods of its extraction and refining. The laboratory and plant of the firm were also visited. In the evening the trainees visited MERADO, where Mr Salman Moses, Mr Rajiv, Mr Ashwani & Dr Krishnendu Kundu interacted with the trainees and explained the working of the machines (oil expellers & laboratory instruments). The trainees interacted with the experts, and also collected study material from A.P. Solvex Ltd. & MERADO.



Inaugural session



Valedictory function

Training for Egyptian scientists (international training)

Two Scientists of Egypt i.e. Dr. Fatma Esimat Ibrahim, Head, Fruits Handling, Department of PHT, ARC, Giza, Egypt and Dr. Hossaim Ali Ali Metwally, Researcher, Central Lab. For Research and Development for Date palm, ARC, Giza, Egypt visited the CIPHET Abohar for International Training on Post Harvest Management of Horticultural Crops (Pomegranate and Date Palm) during November 20-29 2007. During the training following topics/training was given under this programme.

Visit of CIPHET, Abohar and Ludhiana, interaction and exchange of research programme and respective field of specialization. During training at institute technology in the field of processing and value addition of horticultural produce was discussed in detail. CA technology was discussed in length.

- I. Training on Post Harvest Management of Pomegranate and its processing for value addition.
- II. Training on Post Harvest Management of Dates and its processing for value addition
- III. Visit to Pomegranate and date groves.
- IV. Visit to Date Palm Research Station Bikaner, Rajasthan and Regional Research station, PAU, Abohar and interaction with scientists and research workers.
- V. Visit to Deptt. Of food Technology, GNDU, Amritsar.



Egyptian scientists Dr. (Ms.) Fatma Esimat Ibrahim, and Dr. Hossaim Ali Ali Metwally working on product development and shrink packaging system at CIPHET Abohar

CIPHET scientist attends a scientific seminar in Hindi at CIMAP, Lucknow

Dr. Gupta, Head HCP Division visited Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow and attended a seminar in Hindi on the theme

पादप विज्ञान द्वारा स्वस्थ समृद्ध समाज

And presented a paper in Hindi titled

गुणवत्ता एवं मूल्यवर्धन हेतु औषधीय एवं संगंध पौधों का प्राथमिक प्रसस्करण: उद्योग व व्यवसाय के नये अवसर-डा० आर० के० गुप्ता एवं डा०आर० टी० पाटिल

Besides, he has seen their facility of Agro-Industrial Technology Division and discussed with the Scientists. It was observed that by most of the organization including CIMAP more emphasis is being given on extraction of essential oil from aromatic plants along with little bit drying studies of these crops. Hence, there is a scope for collaborative work with CIMAP for primary processing of medicinal and aromatic plants such as field drying of leaves/plant, storage of fresh as well as dried plant/leaves, powdering of dried leaves/plant at low temperature and conditioning of raw material such as size reduction and curing for enhanced essential oil recovery in steam distillation.

Institute Celebrated Vishwakarma puja

In Punjab, Vishwakarma puja is celebrated on next day of Dipawali to worship the tools and machines used for fabrication of prototypes and equipment for research. Institute also celebrated Vishwakarma puja on 11th November 2007 and worshiped the tools and machinery. A get together of institute staff was held to mark the occasion.



Vishwakarma Puja at CIPHET Ludhiana

CIPHET scientist attended International Conference on Tradition Dairy Foods at NDRI, Karnal

Dr. K.Narsaiah, Senior Scientist, AS&EC Division, attended and presented a poster on microencapsulation of probiotic microorganisms and enzymes at International Conference on Tradition Dairy Foods, ICTDF 2007, at NDRI, Karnal from 14-11-2007 to 17-11-2007. In the inaugural session, Dr. Mangla Rai, DG, ICAR and Secretary DARE, GOI, as chief guest in his address emphasized the need of fusing traditional wisdom with modern technologies to mechanize production traditional foods of India as well as other countries. In plenary session, the global perspective of traditional Indian food and dairy foods was covered. This is followed by the technical

sessions on cheese and fermented dairy foods, convenience foods and ingredients, chemistry and microbiology and a panel discussion on HRD requirements. In technical sessions on Equipments and Novel Packaging, New Concepts in Dairy Processing where interesting processes like super critical fluid extraction and high pressure processing were presented and need of promoting research in the area of process engineering and mechanization was recommended. On the last day the sessions were on functional foods and quality aspects of dairy foods, where maximum speakers presenting the various aspects of development of functional foods. Their presentations on micro and nano-encapsulation of probiotics and food ingredients enlightened the potential of these emerging processes and the directions of research for these frontier areas. Dr. Narsaiah presented a paper coauthored with Dr. Oberoi on **Microencapsulation of probiotic microorganisms and food ingredients for functional foods**. Microencapsulation paves way for development of innovative functional foods. Consumers are increasingly viewing nutraceuticals as adjuncts to traditional, pharmaceutical-based therapeutics. The growing awareness of the therapeutic potential of nutraceuticals has prompted the application of pharmaceutical controlled delivery technologies to the nutraceutical industry. While controlled release of nutraceuticals have thus far developed to a limited extent for both economic and technical reasons, delivery technologies are being developed to adapt to the unique demands of the nutraceutical market. With developments in particle size control, microencapsulation is expected to play a vital role in ushering nano bio sensors. Fresh amla juice as source of ascorbic acid was encapsulated by CIPHET scientist using alginate (3%) as matrix material. For increasing the retention of ascorbic acid starch (1, 1.5 and 2 %) was also added in alginate solution. The diameter of calcium alginate capsules was around 3 mm. The release rate of ascorbic acid from capsules was high for matrix containing 1% starch (3 µg/h) and it decreased as starch content increased.

New Horizons in Biotechnology

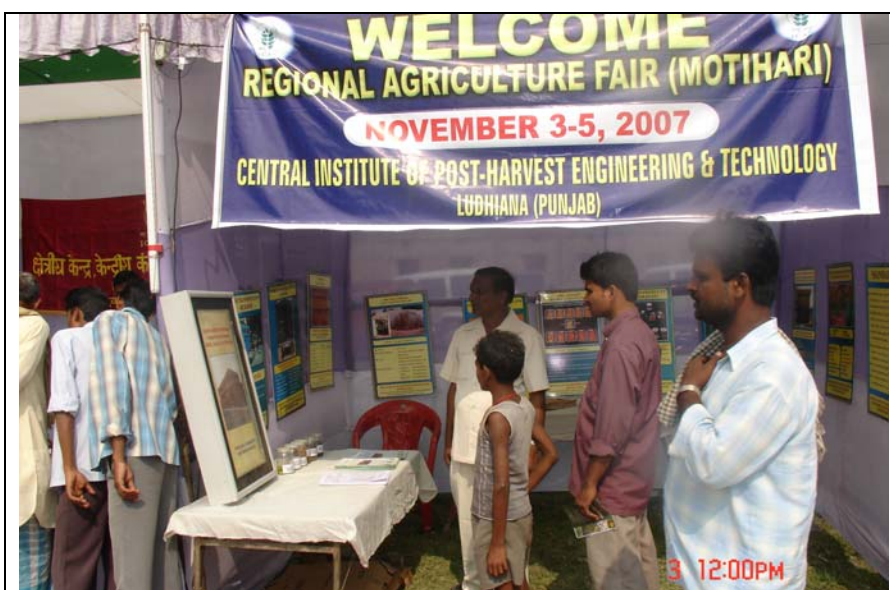
Dr. Harinder Singh Oberoi, Scientist (SS), CIPHET, Ludhiana attended an International Conference on “New Horizons in Biotechnology” (NHBT) which was organized jointly by NIIST (CSIR), Trivandrum and Biotechnology Research Society (BRSI). In all there were 39 lectures by eminent speakers in the area of Industrial Biotechnology only followed by 13 in Medical Biotechnology, 10 in Environmental Biotechnology and 6 in Food and Agricultural Biotechnology. The mini symposium comprised of 9 lectures in Biofuels, 3 in Food and Agricultural Biotechnology, 4 in Advances in Food Safety, 7 in Mycobacterial research, 5 in Molecular ecology and 5 in Nanotechnology. The conference was attended by experts , leading scientists, researchers and students from India, US, France, Spain, Greece, Sweden, Hungary, Brazil, Korea, Japan, Australia, Mexico, Nigeria, Argentina, UK, Italy, Switzerland, Portugal and Malaysia. There was a good representation from the CSIR Institutes, IITs, Conventional Universities, Central Universities and other Research Institutes. Out of the 497 posters 256 were presented in only Industrial Biotechnology (IB) section and the lectures and posters in the IB covered different aspects such as lignocellulosic ethanol production, enzyme production, properties, purification, immobilization and characterization, fermentation for enzymes and organic acids used in food processing. Dr Oberoi also presented a poster on “Evaluating the potential of rice straw for production of cellulases and bioethanol” and reported an enzyme activity of Fpase (1.89 IU /ml), CMCCase (2.03 IU/ml), cellobiase (0.97 IU/ml) and xylanase (110 IU/ml) on the third day of incubation and an ethanol yield of 0.15 g/g with ethanol concentration of 2.14% using alkali pretreated rice straw.

NIN Conference at Hyderabad on Food security and safety-central to health security

Dr. Mridula D., Scientist, SS (F&N) attended this two days National Conference of Nutrition Society during 15th and 16th November 2007. Nutrition Society of Indian organized this Conference in collaboration with National Institute of Nutrition and Indian Council of Medical Research at National Institute of Nutrition, Hyderabad, Andhra Pradesh. The focal theme of this year's conference was "Food security and safety-central to health security" which was deliberated in two symposia namely 'New initiatives for promoting health and nutrition well being' and Food safety-an essential aspect of nutrition security. The research and technical papers were presented by Scientists and researchers from different organizations viz. International Union of Nutritional Sciences, University of Chile, NIN, AIIMS, MSRU Baroda, CFTRI, Institute of Home Economics, and Lady Irvin College, University of Delhi, MDSU, Rajasthan, ICMR New Delhi etc. Dr. Mridula presented a paper on **Effect of storage on physico-chemical quality and acceptability of fortified bengal gram sattu** . She reported protein digestibility, calcium and iron content in fortified samples was 80.58%, 170.10 and 12.55 mg/ 100g, respectively against that in control sample as 80.6%, 69.5 and 10.2 mg/ 100 g, respectively. NAs fortified bengal gram *sattu* was well accepted during sensory evaluation in drink form; both fresh and stored, it is recommended that this practice may be followed by the processors to make the product more nutritive and balanced compared to traditional sattu.

CIPHET participates in Regional Agriculture Fair at East Champaram in Bihar

CIPHET team consisting of Mr. MP Singh and Mr Jaswinder Singh from TOT participated in the Agricultural fair held at Areraj, Motihari, East Champaram (Bihar), during 3-5 November 2007. Dr. Akhilesh Partap Singh, MOS Agriculture, Govt of India inaugurated the fair and addressed over 3000 farmers participating the fair. CIPHET stall exhibited products and technologies for post harvest management and prevention of losses. The various training programmes held at CIPHET for farmers and entrepreneurs were explained to the visiting farmers.



Regional Agriculture Fair, Areraj, Motihari, East Champaram (Bihar) during Nov 3-5, 2007

CIPHET scientist attends Bharatiya Vigyan Sammelan at Bhopal

Dr. DM Kadam, Scientist of TOT Division attended Bharatiya Vigyan Sammelan at Bhopal during Nov 23-25, 2007 organised by MP Council of Science and Technology. The theme of the conference was **“Integral Scientific Management of natural resources for sustainable development”**. The research papers were presented in following disciplines:

1. Agriculture, Horticulture, Animal Husbandry and Veterinary Sciences
2. Forestry and Environmental Sciences
3. Water Management
4. Energy Management
5. Mineral Resources and Materials Science /Technology
6. Meteorology and Climate
7. Health and Medical Sciences including AYUSH and Nutraceuticals
8. Housing, Habitat and Architecture
9. Basic Sciences: Mathematics, Physics, Chemistry, Geology, Astronomy, Life Sciences.
10. Cutting Edge Technologies (BIO, IT, NANO)
11. Science Communication through Regional Languages
12. Engineering Science & Technology

Dr. Kadam presented a research paper in the discipline of Engineering Science and Technology on 24th November 2007 for **“All India Young Scientist Award”**. The title of the paper was **“Drying of Onion (*Allium cepa L*) Flakes in Low Cost Greenhouse”**. Dr. A P J Abdul Kalam, Ex-President of India was the chief guest during valedictory function at 4.30 pm on 25th November 2007.

Technology of the month

Beetroot based Health Foods

Beetroots (*Beta vulgaris*) have been utilized for their medicinal properties since ancient times. Beetroot has long been considered beneficial to the blood, the heart, and the digestive system. It has been regarded as a laxative; a cure for bad breath, coughs and headaches; and even as an aphrodisiac. More recently, it has been advocated as a cancer preventative and as a means of bolstering the immune system. Beetroot is rich in many important minerals, micronutrients and with many health-giving properties. Beetroot is among the sweetest of vegetables, containing more sugar even than carrots or sweet corn. Since Roman times, beetroot juice has been considered an aphrodisiac. Hippocrates advocated the use of beet leaves as binding for wounds. From the Middle ages, beetroot was used as a treatment for a variety of conditions, especially illnesses relating to digestion and the blood. Today the beetroot is still championed as a cure all.

Beetroots are rich in the nutrient Betaine (betacyanin). Betaine supplements, manufactured as a byproduct of sugar beet processing, are prescribed to lower potentially toxic levels of homocysteine, a naturally occurring amino acid that can be harmful to blood vessels thereby contributing to the development of heart disease, stroke, and peripheral vascular disease. Beetroot is a nutritious vegetable that is an ideal component of a healthy diet. In healthy diets, it is always advised to include some amount of most important vegetables like carrot, beetroot, and spinach due to the role played by plant pigments in disease prevention. Beetroot is a rich source of carbohydrates, a good source of protein, and has high levels of important vitamins, minerals and micronutrients. It is a good source of dietary fibre, has practically no fat, and no cholesterol. Specific anti-carcinogens are bound to the red colouring matter, which supposedly helps fight against cancer. As far as the anemic is concerned, beetroot increases the uptake of oxygen by as much as 400 percent.

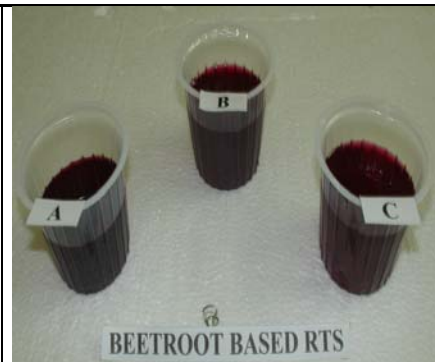
At CIPHET Efforts were made to standardize the process for making beetroot powder that can be further utilized for making various health products. Ready to drink beverage is one of the item that has been accepted by Scientific panel, children, women group, and also been appreciated by the people when served in a party. Reconstituted beetroot powder in water is one of the drink which is useful for all adults, even in case of degenerative diseases conditions. The acceptability of the developed powder in the reconstituted form in plain water (without any flavouring agent) was also good because of the high solubility (more than 77%). The developed powder was incorporated in health drink mix, which was well accepted by the group of college students. The technology is ready and can be adopted by a small entrepreneur/ farmer for income generation.



Raw beetroot



Beetroot powder



Beetroot based RTS

Publications of the Month

<p>Produce Process Prosper CIPHET NEWS Vol. VII No 1 & 2 POST HARVEST ENGINEERING & TECHNOLOGY - UPDATE January to June, 2007</p> <p>RESEARCH HIGHLIGHTS</p> <p>Processed products of 'Perlette' grapes</p> <p>RTS beverages of guava developed at CIPHET</p> <p>IN THIS ISSUE</p> <ul style="list-style-type: none"> Research Highlights ACRPs Programmes Organized Papers Published / Presented Programme Participation Personalia From the Director's Desk <p>Central Institute of Post Harvest Engineering & Technology, Ludhiana, (Punjab)</p>	<p>SHORT TERM TRAINING ON Post Harvest Management of Fruits & Vegetables (19- 25 November, 2007)</p> <p>TRAINING MANUAL</p> <p>Course Coordinator: Dr. R.K. Gupta Co-Course Coordinator : Dr. Rajbir Singh</p> <p>CENTRAL INSTITUTE OF POST HARVEST ENGINEERING AND TECHNOLOGY, ABOHAR – 152 116</p>
<p>Quarterly newsletter</p>	<p>Training manual</p>

International Training for Egyptian Scientists
On
Post Harvest Management and Processing of Fruits
(Pomegranate and Date Palm)

Course Coordinator
Dr. Desh Beer Singh
Sr. Scientist (Horticulture)
Course Co-Coordinator
Dr. R.K. Gupta
Head, Horticultural Crop Processing Division

Central Institute of Post Harvest Engineering and Technology,
Abohar, Punjab, India

Training manual

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