



Central Institute of Post Harvest Engineering and Technology,

Ludhiana

Our Slogan: Produce, Process and Prosper

CIPHET E – Newsletter for October 2007

Vol. 2 No. 10

Director's Column



Dear All,

India is the second largest producer of rice, wheat, fruits and vegetables in the world. All these commodities leave behind substantial amount of residues which are low in bulk density and have high moisture content are difficult to handle and manage despite their high potential for conversion into ethanol due to their nutritional composition. CIPHET being located in the food bowl of India (Punjab) has taken the initiative of ethanol and enzyme production from lignocellulosic material. At present the scientists from this Institute are working on different pretreatments processes for delignification and solubilization of cellulosic biomass, especially rice straw and a process of ethanol production from acid hydrolysate of rice straw has been optimized at a laboratory scale fermenter level. A few efficient cellulase-producing strains have been isolated and the scientists are working on such strains to further improve their enzyme production capability in collaboration with Universities located close by. CIPHET has also developed processes for improved enzyme production (glucoamylase, cellulase and xylanase) using cauliflower waste and rice straw which could help in reducing the enzyme cost which is one of the important factors responsible for high cost of the cellulosic ethanol production process. To train the human resource in this important area of research CIPHET conducted a 21 days winter school on **Bio-processing Technologies in Utilization of Crop Residues for Production of Enzymes and Bio-fuel**.

Another very important but neglected area in post harvest management is development of appropriate and safe tools for cutting and separation. The use of proper hand tool in post harvest management is as important as cutting properly the umbilical cord to separate child from the mother during birth. Use of proper hand tool not only safely removes the fruit from tree or branch but also effectively recovers the edible portion from it. It helps in preventing the storage losses as single damaged fruit can also lead to damage to the whole lot. The CIPHET, Ludhiana has developed many such simple but important gadgets for saving the fruits and vegetables and the pomegranate aril extractor is one such recent development.

There are many non-governmental organizations (NGOs) in the country working on various aspects of rural development. Due to interest of corporates in retailing of the farm produce and growing demand for processed as well as ready to cook product, the NGOs are diverting their activities in food processing area. To strengthen their capabilities a National Seminar on **Identification of Appropriate Primary Processing Technologies for Value Addition of Minor Forest Produce in Tribal Areas: A Step in Rural Development** was organized during 5-6th October 2007 at CIPHET, Ludhiana. During this workshop CIPHET scientists presented information on various process equipment and technologies which are suitable to be adopted by NGOs in rural areas. On this occasion due to demand of NGOs, CIPHET initiated a scheme by which each scientist of the institute will adopt one NGO and provide them proper guidance for technology and equipment to be used to process local materials. At the end of the year these scientist-NGO team will be evaluated and suitably rewarded. It was felt that this way we could move faster in strengthening post harvest infrastructure and reduce post harvest losses.

With best regards

R.T. Patil,
Director

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

A 21 days winter school on “Bioprocessing technologies in utilization of crop residues for production of enzymes and bio-fuel” was organized at CIPHET, Ludhiana from October 16- November 5, 2007 with Dr. HS Oberoi, Scientist (SS)- Microbiology as Course Director. The training programme was attended by 21 participants at the level of Assistant Professors/ Associate Professors belonging to different disciplines from different ICAR Institutes, State Agricultural Universities and Central Universities spread across the country. 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 lecturers covered a wide range of areas like composition of biomass, pretreatments and hydrolysis of biomass, production of glucoamylase, cellulose and pectinase using crop residues, production of ethanol and biodiesel, densification, pyrolysis and gasification of biomass, utilization of starch processing waste, strain improvement techniques, instrumentation and utilization of crop residues for feed fortification for dairy and aquaculture. The practical classes covered a variety of important topics such as sugar and ethanol estimation, enzyme assays using ELISA reader, production of enzymes like cellulose, xylanase and ethanol using crop residues, starch saccharification, biocolour extraction methods, mycotoxin estimation, Bioinformatics, cell immobilization and fruit juice clarification. Besides, there were visits of Departments of Veterinary Microbiology and Animal Nutrition, GADVASU, PHPTC, Department of Plant Breedings, Genetics and Biotechnology, PAU in Ludhiana. The participants also visited GNDU, Amritsar and interacted with faculty members from Department of Microbiology and Molecular Biology on enzyme production and protein purification and an important oil refining Industry namely AP Solvex Pvt Ltd at Dhuri, Punjab.



Dr. MS Kang, Vice Chancellor, PAU, Chief Guest at the Inaugural function of winter school



L to R, Dr. Narsaiah, Dr. Oberoi, Dr. MS Kang, Vice Chancellor, PAU, Dr. R. T. Patil and Dr. OD Wanjari

National workshop on MFP

National workshop on Identification of Appropriate Primary Processing Technologies for Value Addition of Minor Forest Produces in Tribal Areas: A Step in Rural Development was organized during 5-6th October 2007 at CIPHET, Ludhiana. In this workshop, Technical session-I on Primary Processing of Forest Produce, Technical session- II on Value Addition to MFP and Special session on gums and resins obtained from forest produce followed by Inaugural, Panel discussion, Success stories of SHGs and NGOs and plenary sessions were held. The participants from various organizations presented their findings on forest-based products.



**Release of souvenir on the occasion of inauguration of national seminar
L to R Dr. R. T. Patil, Dr. SM Ilyas, Chief Guest, Dr. Vinita Sharma, Director,
DST and Dr. Matthew Prasad, Head TOT, CIPHET**

Conclusion of Hindi Pakhwada

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Concluding session of Hindi National Language Fortnight



Awards being distributed to winners

Annual workshop of CIPHET coordinated All India Research Project on Plastics in Agriculture

The Annual workshop of AICRP on Application of Plastics in Agriculture was held at Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora during 26-27 October 2007. The delegates who participate in the workshop included Dr Pitam Chandra, ADG(PE), ICAR, New Delhi ; Dr. H. S. Chauhan, Ex. Professor, GBPUA&T, Pantnagar ; Er. Prashant Mishra, Joint Secretary, NCPAH, New Delhi; Dr. H.S.Gupta, Director, VPKAS Almora; Dr. K.K.Singh, Professor, GBPUA&T, Pantnagar and Dr. P.R.Bhatnagar, Project Coordinator, AICRP on APA ; Scientists/ Research Engineers of APA Cooperating Centres and scientists of the VPKAS, Almora were present.

During the workshop Dr. P. R. Bhatnagar, PC (APA) presented the progress report of the AICRP. Dr. H. S. Chauhan, was delighted to see an impact of development of plasticultural techniques which is

the ultimate objectives of the project. Er. Prashant Mishra, Joint Secretary, NCPAH put forth his critical observations about different studies carried out at different stations and announced that NCPAH and APA will work in synergy with each other and he was quite hopeful to share the information in the best interest of council and farmers. He also emphasized that there is an urgent need to provide exposure to all the researchers to the recent advances in plastics and their uses for incorporation of different kinds of plastics in their technical programme. Dr. Pitam Chandra, ADG(PE) enlightened the house about the initiation of Horticultural Mission and the production of fruits and vegetables has to be doubled by 2012. In the process, plasticulture has to play very crucial role. He elaborated the need of plastics in the field of water harvesting, covered cultivation and post harvest management. Dr. H.S. Gupta, Director, VPKAS elaborated the different uses of plastics in hill agriculture and cited the example of small paddy thresher, developed with different parts of plastics, thus making it affordable to carry to different plots in the hill. He cited the enormous uses of plastics in hill agriculture and he was quite hopeful that plastics can make the life of hill farmers easy and comfortable. The research engineers of respective centers presented their research achievements for the years 2005-06 and 2006-07. XI plan priorities of the AICRP was discussed and programmes for different were decided. Technical programme for next year and various issues on plasticulture were discussed during the workshop. A field visit to Jageshwar Block (Farmers Field) was also organized on 28th October 2007 where farmers had developed a large number of greenhouses and polythene-lined tanks.



Technology of the month

NOVEL HAND TOOL FOR SEPARATION OF ARILS FROM POMEGRANATE

The proper hand tool in post harvest management is as important as cutting properly the umbilical cord to separate child from the mother during birth. Use of proper hand tool not only safely removes the fruit from tree or branch but also effectively recovers the edible portion from it. It helps in preventing the storage losses as single damaged fruit can also lead to damage to the whole lot. The CIPHET, Ludhiana has developed many such simple but important gadgets for saving the fruits and vegetables while harvesting and cutting from damage and the pomegranate aril extractor is one such recent development.

In India, Pomegranate (*Punica granatum* L.) is grown in the states of Maharashtra, Karnataka, Gujarat, Andhra Pradesh, Tamil Nadu and Uttar Pradesh in large quantities as a commercial horticulture. The area under this fruit is expanding day by day and its cultivation is now gaining high importance in Punjab and Rajasthan. Annual production of pomegranate in the country is about 6 lakh tones per year. Maharashtra and Karnataka stand first and second respectively in the production of pomegranate. Cultivars like Ganesh, Mridula, Aaraktha, Sindhura are popular varieties grown in the country. Large quantities of fruits are consumed in fresh form, however many products like pomegranate juice, RTS beverage, squash, jelly and anardana (dried arils/seeds) can be prepared on commercial scale. The pomegranate has been regarded as medicinal fruit of great importance. All parts of the tree, the roots, the reddish brown bark, leaves, flowers, rind and seeds have featured in medicine for thousands of years. The saying *Ek Anar Sau Bimar* in comparison to *An apple a day keeps doctor away* proves the point. Mature fruits should be immediately removed from the plants as delay in harvesting leads to fruit cracking. It is believed that the skin of pomegranate is just as delicate as that of any other fruits. A bruise or scratch would can cause a dark blemish on the shiny rind that does not actually damage the inside arils of the fruit but harms its external appearance.

The first step in processing of pomegranate is to extract or separate the arils (juice-enclosed seeds) from its peel and other non-edible parts of the fruit. It has been felt that fresh arils may have a promising market if packed in attractive package for direct consumption or further processing into various products. The traditional method for extraction of aril from pomegranate involves cutting the fruit in pieces and then removing the arils by hitting on the fruit by wooden mallet. This method also cuts some arils and shortens their shelf life. For juice the separated arils are pressed in the screw press or basket press. Juice extracted is clarified by chemical methods because peel contributes high amount of tannins and other undesirable biochemical.

The hard peel of pomegranate fruits makes it difficult to release the arils, thus limiting its consumption as fresh fruit. At present in the country, there is no mechanical method or machine, commercially available for safe separation of arils from the pomegranate. Since a pomegranate contains several hundreds of arils, manual processing of pomegranates consisting of cutting the fruit by knife into pieces and then separation of arils tends to be very inefficient and highly labour intensive, time consuming and irritating. To separate the intact arils from the fruit, there is no need to cut the fruit cross-sectionally; but only needs cutting of outer peel so that the pomegranate can be easily broken into pieces by using the fingers. Arils are so firmly attached to each other and; with rind and peel that it makes difficult to separate by fingers.

The CIPHET has developed a hand tool for breaking of pomegranate and consequently easy separation of arils from its peel. The tool consists of fruit holders having knife arrangement in such a way that it only penetrate into the peel. Pomegranate fruit has to be held between the pair of holders, and the holders are turned by hand in opposite direction to each other. Due to rotating action of the holders, fruit is broken into two irregular halves as a simultaneous effect of compression with twist on the peel. During this action the whole fruit experiences a shearing effect; and due to this effect the insides arils get loosened which are easy to separate. About 20-25% arils get separated in the process of irregular breaking due to shearing action on the inner sheath and outer peel, and fingers can easily separate rest of them. The hand tool is designed considering the medium size of the fruit because the maximum distribution of medium sized fruit is observed on pomegranate plant. The result of the hand tool was found to be encouraging as it makes the task of safe separation of arils from the peel and sheath effortless. CIPHET is willing to license the design of this hand tool for its commercial manufacture and the negotiations for this are going on with prominent hand tool manufacturers in Punjab.



Figures: Working with hand tool for easy separation of arils from pomegranate

Publications of the Month

वार्षिक प्रतिवेदन
ANNUAL REPORT
2005-2006

PRODUCE PROCESS PROSPER



केंद्रीय कटाई-उपरांत अभियांत्रिकी एवं प्रौद्योगिकी संस्थान
CENTRAL INSTITUTE OF POST HARVEST ENGINEERING & TECHNOLOGY

बेहतर उत्पादन बेहतर प्रसंस्करण बेहतर आय

कृषि प्रसंस्करण वर्षा

जनवरी - जून, 2007 अंक 2

उप महाविदेशिक (अभियांत्रिकी) के आविष्कार



इस अंक में

1. फल एवं सब्जियों के संवर्धन के लिए प्रौद्योगिकी
2. फल एवं सब्जियों के संवर्धन के लिए प्रौद्योगिकी
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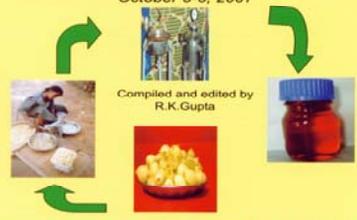
कृषि प्रसंस्करण वर्षा

Annual Report

Six monthly Hindi Publication from CIPHET

Souvenir and Compendium of Abstracts

National Workshop
On
Identification of Appropriate Primary Processing Technologies for Value Addition of Minor Forest Produce in Tribal Areas:
A Step in Rural Development
October 5-6, 2007



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R.K. Gupta

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बेमौसमी सब्जी उत्पादन के लिए कम लागत की पालीहाउस तकनीक



राजवीर सिंह
सत्येन्द्र कुमार
आर.के. गोयल
ओ.डी. बन्गारी

केंद्रीय कटाई उपरांत इन्जीनीयरींग एवं प्रौद्योगिकी संस्थान
अबोहर - 152116

Souvenir of the workshop

Technical Bulletin

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