Central Institute of Post Harvest Engineering & Technology Ludhiana

OUR SLOGAN: PRODUCE, PROCESS AND PROSPER

CIPHET E - Newsletter for February 2011
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Director's Column

Dear All

Under the private entrepreneur guarantee scheme for storage of food grains, the government is planning to increase the storage space for food grains. With this view a committee was formed with Director CIPHET as its Chairman to re-examine and redraw the specification of storage structures. The committee worked out the specifications for conventional godowns, specification for modern godowns, methodology for mechanization of godowns operations and specification for construction of silos. The under signed attended a bilateral workshop organized at University of Saskatchewan, Canada. The workshop looked into opportunities for bringing together researchers, scientists, students, industry partners and policy makers from both countries.

The meeting of the research advisory committee (RAC) of the institute was held and research programs and thrust areas for XIIth plan were chalked out. CIPHET organized 15 days Indo-Africa Forum Summit Training on "Post Harvest Processing and Value Addition of Food Grains" during 8-22 February 2011 for participants of African countries sponsored by Ministry of External Affairs, Government of India. During this training program, the participants were exposed to primary processing, drying, milling, extrusion processing, baking, malting, storage and packaging of food grains and co-products utilization in the form of lectures, practicals and demonstrations.

Aiming to develop entrepreneurship among farmers, many other trainings were also conducted in CIPHET. One week soybean training program sponsored by the Agricultural Technology Management Agency (ATMA), Training on Post Harvest Technology Rural Catchments for Assam Entrepreneurs, Green Chilli/Powder Technology and training to Engineering $ Management Graduates were conducted at CIPHET, Ludhiana. The technologies of value added products from guava and groundnut milk based products were licensed to entrepreneurs.

The institute participated in Agrovision 2011 workshop, National Expo. & Conference 2011 at Nagpur and National Exhibition of Plant Machinery at Ludhiana. The CIPHET stall attracted huge crowd which was very much interested in CIPHET developed technologies.

I congratulate Dr. Sunil Saini, Sr. Scientist (Biochemistry-Plant science) who has joined the CIPHET.

I personally thank the Project Co-ordinators, Heads of the Divisions, Scientists and staff for their support and active role in institute activities.

With best regards

R.T. Patil

Director

In this issue

Committee to redraw specification for Godown and silos

The Govt. of India is planning to give greater emphasis on increasing the storage space for food grains. This is being planned through involving the private sector for contract for storage up to 10 years. The storage structures available in the country are mostly conventional godowns, cover and plinth and some concrete grain silos. About 2 lakh tonne silo system is available in the country of modern silos due to initiative of FCI. However, now the expansion in the capacity required is 150 lakh tonnes. Hence the exercise of redrawing the specifications of storage structures was initiated by expert committee headed by Director, CIPHET, Ludhiana. They worked out the specifications for conventional godowns, specifications for modern godowns, methodology for mechanization of godown operations and specifications for construction of bulk storage silos. The committee looked into the new construction materials which could be used in place of asbestos sheets/ GI sheets and these have been included in specification for modern godowns. Rain Water harvesting and monitoring temperature/ handily has also been included in specifications of modern godowns. In order to reduce drudgery of labour a methodology has been suggested for mechanization of stacking, destacking and movement of grains bags. The specification for silos has also been included and these serve as an alternative to godowns. The committee opined that the mechanization need to be implemented in parts to watch performance hence a section on mechanisation requirement and methodology to implement it in selected godowns has also been suggested. The mechanization is aimed to reduce drudgery and improve work efficiency of work force has been suggested. The mechanization is partial and

only at critical points to ease the operations. The specification of the silos especially metallic silos were worked out after detailed deliberations with Dr. S.D. Sawant, Expert in silo design, installation and operations and silo system needs to be equipped with preparatory units for grain cleaning, aeration, fumigation, level indications and controllers for matching capacity of the silo system to be built.

Director's Conference

Director CIPHET attended Directors' Conference on February 23-24, 2011 at New Delhi. The programme included presentations on Capacity building in NARS: Director (NAARM), ICAR Awards: ADG (Coord.), Rationalized nomenclature of Institutes and Divisions: DDG (Hort.), Questions for Indian agriculture research, education, extension and development from ICAR: ADG (IP & TM) and Performance Indicators: Director (NCAP)

Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR highlighted the major contributions of ICAR in agricultural research, education and extension during the year. He informed that as an impetus to enhance productivity of crops 52 improved varieties of important crops were released for cultivation in different agro-climatic regions, efforts were made to help timely supply of quality seeds and planting materials to farmers, a National Initiative on Climate Resilient Agriculture worth Rs 350 crores was launched to address biotic and abiotic stress and a special programme on demonstrations for pulse productivity enhancement was initiated on a wide scale. Recent efforts towards strengthening of intellectual property rights have resulted in filling of 60 patent applications of which 30 published and 7 granted to ICAR. Dr. Ayyappan briefed various other initiatives taken by the Council to strengthen scientist-farmer interactions and delivery of knowledge at the farmers' doorstep.

While inaugurating the conference Shri Sharad Pawar, Hon. Union Minister for Agriculture and Food Processing Industries called upon Vice-Chancellors of Agricultural Universities and Directors of ICAR institutes to strive to be models of all-around excellence creating institutions of global standards. He stressed that competitions posed by globalization and opening up of economies, ethical issues of trade related intellectual property rights, genetically modified foods and organisms and enforcement of strict quality regimes need immediate attention while developing technically qualified manpower.

Sri Harish Rawat, Union Minister of State for Agriculture and Food Processing Industries complimented ICAR Institutes and Agricultural Universities for their excellent research contributions having direct and positive impact on food and nutritional security of the country. He expressed happiness and satisfaction over record production of about 234 million tons of food grains during the year. Besides, Sri Rawat expressed concerns over challenges faced by higher agricultural education in the country, such as shortage of quality human resources, scarcity of resources and research facilities, inbreeding in faculty positions etc. He opined that a new thrust in higher agricultural education is required for enhancing the overall quality. He suggested strong and fruitful collaborations should be developed between agricultural universities, ICAR institutes and other stakeholders.

During this meeting Best Performance Awards to Kerala Agricultural University, Thrissur; Acharaya N G Ranga Agricultural Univresity, Hyderabad; and Govind Ballabh Pant University of Agriculture and Technology, Pantnagar were presented by Hon. Agriculture Minister. Best Annual Report Awards for 2009-10 were conferred upon Central Soil &

Water Conservation Research & Training Institute, Dehradun and National Bureau of Fish Genetic Resources, Lucknow.

ISTP DBT Canada workshop

Director CIPHET attended a bilateral workshop organized at University of Saskatchewan, Saskatoon Canada during Feb 13-15, 2011 with support from ISTP Canada, DBT (India), Province of Saskatchewan (Enterprise Saskatchewan; Advanced Education, Employment and Immigration; Innovation Saskatchewan), and University of Saskatchewan. Dr. Venkatesh Meda, Professor of Chemical and Biological Engineering and Dr. Bob Tyler, Professor of Food and Bioproduct Sciences, were the co-chairs of the Workshop. Themes of particular interest were - Bioprocessing, Bioproducts, Food Sustainability, Bioresources Utilization Research involving both Canada and India.

The main objective of the workshop was to provide an opportunity for bringing together researchers, scientists, students, industry partners and policy makers from both Countries and developing an understanding to form a broader and strong cluster partnership linking several departments and institutions in India and Canada. The Workshop was focused on developing new and strengthening existing partnerships between the U of S (Canada) and the National Agri-Food Biotechnology Institute (NABI), India. The research and development focus was in the areas of post-harvest technology and bio-processing of food/feed materials. Production and processing of high quality foods, feeds and bio-products involves several disciplines like food science, engineering, biology, chemistry and economics. The broad spectrum of adding value to agri-food commodities spans from genomics through to appropriate technology, end-product quality, safety and functionality, and environmental impacts.

Dr. R.T. Patil with delegates in ISTP DBT Canada workshop

This workshop provided opportunity for showcasing current India-focused research and scholarly activities by faculty and researchers at U of S, and colleagues from other Canadian universities. This workshop was sponsored by International Science and Technology Partnership (lSTP) Canada, DBT (India), Enterprise Saskatchewan, AEEI, Innovation Saskatchewan, Ag-West Bio Inc., NRC-Plant Biotechnology Institute, and the University of Saskatchewan Colleges of Engineering and Agriculture & Bioresources, and Office of the Vice-President Research.

From Canadian side presentations were given by Digvir Jayas, Jerome Konecsni, Wilf Keller, S. Abrams, R. Chibbar, Dr. Murrell, Xiao Qiu, P. Krishna, Philip Stephan, Lioneel LaBelle, R. Green, M. Reaney, M. Pickard, B. Tyler, V. Meda, C. Christensen, D. Prefontaine, J. Cutler, Abdul Jalil and AK Dalai

From Indian side presentations were made by Rakesh Tuli, R.T. Patil, H. N. Mishra, A. Saxena, Narpinder Singh, J. Roy, S. Mantri and Sudhir Singh.

The following programmes in post harvest sector were suggested for collaboration

1. Production bio fuel from crops residues like paddy straw
2. Value added products from legume
3. Bio composites from natural fibre and polymers
4. Value added health products from flax seed

Research Advisory Committee Meeting of CIPHET

Third meeting of Research Advisory Committee (RAC) was held under the Chairmanship of Prof. Satish Bal, IIT Kharagpur on February 25 – 26, 2011. The other members of RAC who participated in the meeting were, Dr. Dr. K. K. Singh, ADG (PE), ICAR New Delhi, Mr. Harinder Singh Lakhmirwala, PO-Sunam Distt. Sangrur, Punjab, Dr. R.T. Patil, Director CIPHET, Ludhiana and Dr. S. N. Jha, Head AS&EC Division, CIPHET Ludhiana and Member Secretary of RAC. Other invitees besides members in this meeting were: Dr. S.K. Nanda I/C PC (PHT), Dr. P.R. Bhatnagar, PC (APA), Dr. R.K. Gupta, Head (HCP Division) CIPHET Abohar, Dr. D. R. Rai, Head (TOT) Division and Dr. (Mrs) Mridula D., Sr. Scientist, FG&OP Division on the first day and CIPHET scientists along above members on the other day of the meeting.

Dr. S. N. Jha, member secretary welcomed the RAC members. Dr. Patil Director, CIPHET in his welcome address appreciated the chairman and other members for giving their valuable time as and when requested for enhancement of research output of CIPHET, Ludhiana. He informed that government is going to finance many projects and activities related to post-harvest engineering and technology in the 12th Plan. There is also possibility of 100 % FDI through ASSOCHAM in this sector. He therefore requested RAC to suggest what CIPHET in particular and Post-harvest fraternity in general should do for this sector. Dr. Patil offered that CIPHET can provide leadership in this area through KVK and other ICAR institutes, so the most important purpose of this RAC is to chalk out the programmes to be taken up in 12th plan and identify the future thrusts. Dr. K. K. Singh, ADG (P), ICAR, informed that activity for 12th plan formulation at council level has begun and CIPHET should identify only few areas on which institute should focus. He also appraised the role of RAC in stream lining the R& D work and suggesting mid-course corrective measures, if any. Dr. S. N. Bhoumik nodal officer (RFD) and Dr. D. Dhingra, I/C PME Cell and Dr. D. M. Kadam, I/C ITMU presented the activities of their respective sections.

Training Program for participants of African Countries

Delegates from African Countries with the CIPHET Faculty

CIPHET organized Ministry of External Affairs, Government of India sponsored 15 days Indo-Africa Forum Summit Training on "Post Harvest Processing and Value Addition of Food Grains" from 8-22 February, 2011. Dr. R.T. Patil, Director and Dr. M.R. Manikantan, Senior Scientist coordinated this training program. A total of 13 participants working in Ministry of Agriculture and Allied fields from Egypt, Mali, Nigeria, Tanzania, Malawi, Mauritius, Niger and Mauritania attended this training program. During this training program, the participants were exposed to primary processing, drying, milling, extrusion processing, baking, malting, storage and packaging of food grains and co-products utilization in the form of lectures, practical and demonstrations.

The participants visited CIPHET, Abohar for demonstration of millet processing, M/s A.P. Organics Pvt. Ltd, Dhuri for rice bran oil extraction, M/s Lakshmi Energy and Feeds Ltd., Khamano for rice milling, M/s Cremica Bector Foods Ltd., Phillaur for biscuits plant, M/s B.K. Soya Industries, Sangrur for soy based dairy analogues and snacks plant, M/s Adani Agro Logistics Ltd., Moga for bulk handling and storage system for food grains.

At the end of the training program, all the participants expressed that the objectives of the training program have been fully achieved. Some of the suggestive area of collaboration with CIPHET/ICAR by the participants are agro machinery design and fabrication, cold storage of fruits and vegetables, value addition to the co-products from grain processing, Entrepreneurship Development Programs on prominent technologies, Assistance in rice milling turn key projects, post harvest quality control, extrusion processing, solar drying, packaging and storage, baking technologies, primary processing of food grains, processing and value addition of soybean, mango and tomato fruits.

Collaborative Training Program at CIPHET, Abohar

Trainees during Visit at Kinnow Processing Plant

A one day training program on cottage level food processing entrepreneurship development for the farmers was jointly organized by CIPHET and Indian Institute of Crop Processing Technology (MOFPI, Govt. India), Thanjavur, Tamilnadu on 2nd February at CIPHET, Abohar. Dr. R.K. Gupta, Head, HCP and Mr. Amutha Surabi, Scientist, IICPT, Thanjavur were the training coordinators. Around 70-80 farmers including men and women of nearby Abohar participated in the programme. The training included lectures, practical and field visits. The hands on training was given to prepare value added products such as mixed fruit jam of

apple, mango and papaya, lemon squash, lemon pickles, etc.

Seven Day Training Program on Soybean Processing

Aiming to develop entrepreneurship among farmers, CIPHET, Ludhiana initiated a 7-days soybean training program on 2nd February, 2011. Seven farmers participated in the training program sponsored by the Agricultural Technology Management Agency (ATMA).

Participants of Soybean Training with the Expert Faculty

"Soybean is emerging as best alternative to compensate shortage of milk and many health benefits are attributed to soyabean," said, Director CIPHET Dr R.T Patil, while addressing the participants taking part in the training programme. Dr. Devinder Dhingra, (Sr. Scientist) coordinated the training programme. Besides soyabean milk, farmers were also trained in other value-added products including Tofu.

Training on Post Harvest Technology in Rural Catchments for Assam Entrepreneurs

Assam Entrepreneurs with CIPHET Scientists

A seven-day training programme on "Post Harvest Technology on Rural Catchments" for participants from SIRD Assam (Khanapara) was inaugurated on 9th February, 2011 at CIPHET. 15 farmers participated in the training program.

While welcoming the participants, Director Dr R.T Patil said that shifting of processing to rural catchments would immensely benefit both farmers as well as consumers. "At present, while consumers are paying high price for processed food, farmers are not able to increase their income. Farmers income could only be increased when they would be getting share from consumers expenditure on processed food sold at higher prices in supermarkets," he added.

The training program included processing and value addition of technologies for soybean, processing and value addition of beetroot and carrot, concept of agro processing center, food packaging for rural catchments, processing and value addition for groundnut, technology for processing of onion, application of plastics in agriculture, low cost storage of fruits and vegetables, minimal processing of fruits and vegetables, meat processing technologies, value addition of garlic and ginger, processing of chillies into powder etc.

Women Inmates of Central Jail Got Training in Garlic/Ginger Powder Making Technology

Women inmates of Central jail with CIPHET Scientists

On 17th February, 2011 inmates of the Ludhiana Women Central Jail tried their hands on garlic and ginger making powder technology during the training programme on food processing conducted by the CIPHET in jail premises. More than 80 women inmates took part in the training program. Notably, CIPHET has initiated one and half year long training programme for women jail inmates and total of eighteen trainings would be conducted during this period.

Dr Devinder Dhingra, Senior Scientist, explained process of making powder from ginger and garlic and their potential for converting them into business. "Ginger and garlic could also be dried up in ordinary sunlight in two to three days in summers," he said, adding that process get accelerates when carried out in solar dryers, which has almost negligible running cost.

Dr Deepak Raj Rai, Head Transfer of Technology Division said that many of the government agencies might also help them in finance of their training programmes and thereafter in establishing their units. Jail Superintendent Sukhwinder Singh said that such programmes might go long way in transforming lives of prisoners. Deputy Jail Superintendent Snehjot Dhawan requested CIPHET scientists to conduct more training programmers keeping in mind the interest of women prisoners.

Opening of a Sale Outlet for Self-Help Groups and Women Entrepreneurs

An inaugural function of sale out-let, which is opened exclusively for Self Help Groups and women entrepreneurs, was attended by Dr. Indu Karki, TOT Scientist. A social and non-governmental organization, "Super Punjab International Art Center" is busy with mission of building an aesthetic society where every person can enjoy equal status. On the occasion of international women's day (8th March, 2011), it was a great opportunity for this NGO to come forward and do something for the welfare of women community. This NGO has provided them a "SHG product sale point". For this purpose, Dr. Surjit Singh Bhadour, Dy. Manager, Verka milk plant was working as a liasion person between SHG members and the NGO. For this initiative the financial assistance of NABARD had played a key role.

Engineering & Management Graduates got CIPHET's Green Chilli Powder/Puree Technology

Looking at high potential of technology of green chilli powder/puree developed at Central Institute of Post Harvest Engineering and Technology, three youngsters from management and engineering background got the license of these technologies for commercial scale production.

Engineering & Management Graduates got CIPHET's Green Chilli Powder/Puree Technology

The technology was transferred to Aniruda H More, Engineering graduate from Rauhri, Maharashtra, Ajit Kumar Singh, Management Graduate from Bhilai Nagar, Chattisgarh and Shri Chand from Mandloi, Madhya Pradesh.

Handing over copies of MoU's to the youngsters, CIPHET Director Dr R.T Patil said that young graduates could create employment for others rather than looking for jobs by adopting food processing technologies. "There is no other sector which has as high a value addition available as in food processing. Need is to maintain quality and hygiene," he emphasized. People are showing tremendous response to technology of green chilli powder/puree and product has even hit shelves of the local market, he further added. Senior Scientist Dr Dilip Jain, Dr Ramesh Kumar, Dr Mirdula Devi have jointly standardized the technology.

Transfer of Novel Technology of Value Added Products from Guava

Institute transferred the technology of value added products from guava to a Bhiwani based youth on 11th February, 2011 after five day training on processing and packaging of these products. CIPHET Scientist Dr Ramesh Kumar has developed number of products from guava including bar, leather, jelly, squash and RTS beverages etc. "While lot of value added products were available from other fruits including mango and apples etc in the market, no product could be produced from guava due to its gritty texture," he said, adding that they had done intervention in extracting finer pulp minimizing gritty texture and developing a new pulper for that. "These products have lot of potential as no value added products are so far available from guava. Also, these are very good in taste and shelf life extends up to nine months," Transferring Technology to Vikas Punia, Project Coordinator (PHT) Dr S.K Nanda hoped that soon these products would be available for consumers. Vikas Punia, B.Sc Agriculture student from Hisar Agricultural University, said "I will start from small scale and would expand after looking at response from the customers."

Transfer of Groundnut Milk Based Products Technology

Transferring Groundnut Milk Based Products Technology to Entrepreneur

Institute has licensed technology of groundnut milk based products to an Uttar Pradesh based entrepreneur for the commercial scale production. The institute has standardized the groundnut based products technology with deodorizing technique and negligible nutty flavor.

On the scope of establishing business, Dr Yadav, Sr. Scientist CIPHET said that market acceptability of these products would be high as they were able to reduce the nutty flavor to the large extent. "Also, we consume groundnut directly from ages and have already developed

taste for the same," he added. "With investment of 5 to 6 lakh equipment for production of groundmilk could be set up.

Entrepreneur from Bareilly of Uttar Pradesh Chandra Pal Jain, who got the technology, said that he saw no reason on getting market for the CIPHET developed groundnut milk based products. "In California, groundnut milk is already very popular and imported butter from groundnut has also hit shelves of the Indian market," he said, adding that groundnut milk could turn out to be best alternative for cow/buffalo milk, which is failing to meet the ever growing demand of increasing population.

CIPHET Scientists Participated in Conference/Meetings

DR. P.R Bhatnagar, Project coordinator (APA) attended the Interface Meeting between VCs, PCs and ICAR Directors during 23-24th February, 2011 at NASC Complex, New Delhi. He also participated in a National Seminar on "Advances in Micro Irrigation organized by NCPAH, New Delhi. The major target for the seminar was to bring all stakeholders for the micro irrigation under one umbrella so that road map can be worked out for future expansion to meet the national requirement of food.

Dr. D. Dhingra, Sr. Scientist presented a paper entitled "Principle and Applications of Ohmic Heating in Food Processing" in INAE National Symposium on Emerging Innovative Technologies for Assurance of Quality and Safety in Processed Foods (FoQSAT 2011) during 24-25 February 2011 at Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur.

Dr Indu Karki gave a presentation on in which experts from different universities and institutions all over India and foreigners delivered their lectures related to status of women in India and abroad. Dr. Indu Karki gave a presentation on "Working environment of Nurses in the health care industry: A study of Uttarakhand state" in an international conference on "Women and child issues: National and International perspectives" held from February 11-12th, 2011 at Patiala.

Dr. M Manjunatha, Scientist, AS&EC division was a resource person for NAIP (ICAR) national training course - "Biotechnological approach for the enhanced production of nutraceauticals in fruits and vegetables of arid zone" and delivered a lecture on "Advances in Packaging Technology for Processed Food Products". Lecture covered CIPHET developed packaging technologies, recent advances in packaging technology including plastics, nanocomposites, smart active and intelligent packaging and active MAP. Lecture was also deliberated on solutions for environmental risks of plastics through bioplastic and biodegradable packaging materials.

Ms. Monika Sharma (Scientist) Participated in the national conference "New Horizons in Bio-Processing of Foods" held during 25-26th February, 2011 at SLIET, Longowal, Sangrur.

CIPHET Participated in Farmers Meet/ Exhibitions

4th progressive farmer's meet 2011 was held on 18th February, 2011 at CII, Chandigarh. Dr. Indu Karki represented the Institute and explained the technologies to the audience. The participants took keen interest in them. Success stories of the farmers were discussed in the meet and their problems were also addressed.

Demonstration of CIPHET Technologies at exhibitions

National Exhibition of plant and Machinery was organised by National Horticultural board at PAU, Campus Ludhiana from 10-12 March 2011. CIPHET participated in the exhibition and displayed the technologies to visiting famers from all corners of the country which have came to attend the exhibition with the finanial support of NHB.

CIPHET participated in "Agrovision 2011" workshop, National Expo. and Conference held at Nagpur Maharashtra from 4th-7th March. CIPHET stall attracted huge crowd which was very much interested in CIPHET developed technologies. Dr. Nilesh Gaikwad made presentation on the topic "Post harvest management and value addition" in workshop session on the 'Pre and Post Harvest Technologies'.

New Joining

Dr. Sunil Kumar joined as a Sr. Scientist (Biochemistry-Plant Science) at CIPHET, Ludhiana on 23rd February, 2011. He did his graduation from Kurukshetra University, Kurukshetra. He accomplished his post graduation and Ph.D from CCS Haryana Agricultural University, Hisar. He has served as Assistant Professor at MPUAT, Udaipur and as Assistant Scientist at CCSHAU, Hisar. He has published more than 15 papers in journals of international and national repute, and contributed 3 book chapters and a training manual.

Technology of the Month

Indigenous Meat Cutter

Comminuted meat products are the major group of processed meat products marketed in India. There is a rising demand for convenience processed meats due to progression of urbanization and increased income among city dwellers. Most popular meat products like burger patties, balls (kofta), kebabs, frankfurter type sausages and nuggets are produced from finely chopped meat emulsion. Emulsion type cooked meat products are composed of water, muscle proteins, fat particles, salt and small amounts of non-meat ingredients, where the meat proteins serve as natural emulsifier. To form a stable meat emulsion, meat proteins must surround the finely chopped fat particles before cooking. Therefore, chopping/cutting is one of the most important steps in meat emulsions manufacturing. During this process, the raw materials are extensively comminuted in a bowl chopper/meat cutter in order to reduce the size of the particles and obtain a stable and homogeneous emulsion.

Indigenous Meat Cutter

The meat cutter/bowl chopper is the commonly used meat chopping equipment designed to produce small or very small ("finely comminuted") lean meat and fat particles. Bowl cutters consist of a horizontally revolving bowl and a set of curved knives rotating vertically on a horizontal axle at required

speeds. Bowl cutters are equipped with a strong cover. This lid protects against accidents and its design plays a crucial role in the efficiency of the chopping process by routing the mixture flow. Number, shape, arrangement, and speed of knives are the main factors determining the performance of the cutter. Bowl cutters are used to chop and mix fresh or frozen lean meat, fat (and/or edible offal, if required) together with water (often used in form of ice), functional ingredients (salt, curing agents, additives) and extenders (fillers and/or binders).

Increased consumer demand for ready to eat meat products in India has motivated small and medium scale entrepreneurs come into meat processing. Further rapid growth in the processed meat sector has increased demand for basic equipment like meat cutter/chopper. Currently these meat processing equipment have to be imported from Germany, Italy, U.S and South Korea. Small scale entrepreneurs can not afford such equipment mainly because of higher cost and un-availability. Hence Indian meat industry is searching for indigenous meat processing equipment to produce good quality processed meats. Therefore, and an indigenous meat cutter (MC) was designed by CIPHET and got manufactured by local manufacturer M/s Kalsi, Ludhiana. It was tested for its efficiency in producing the chicken meat emulsion and also compared the meat cutter with imported bowl chopper. Different physicochemical, texture profile and electron microscopic studies (SEM) were conducted on these emulsions. Results showed comparable product yield, emulsion stability and hydration properties in emulsion prepared using bowl chopper and meat cutter. Total fluid release (TFR), water release (WR) and fat release (FR) were also not highly significant different. Results of texture profile analysis showed slightly higher firmness, gumminess and chewiness in emulsion prepared from bowl chopper. Electron microscopic studies showed structures that are compatible with fat globules, muscle fiber, meat protein matrix and heat induced gel/protein matrix. The indigenous meat cutter therefore is suitable for producing a stable chicken meat emulsion required for manufacture of indigenous meat products. The capacity of the unit is 5L, power required is 1 HP with chopping time 4-6 min. per batch. The cost of the unit including electric motor works out to Rs. 20,000. The unit is being further improved for its easier cleaning for achieving utmost sanitary conditions.

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