

# Research Highlights

2015-16



**ICAR-AICRP on Post Harvest Engineering & Technology  
ICAR-CIPHET, Ludhiana-141004. Punjab.**

<http://aicrp.icar.gov.in/phet/>

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**MAJOR ACCOMPLISHMENTS DURING 2015-16**

**(i) TECHNOLOGIES IMPROVED/DEVELOPED**

**(a) Post-harvest tool/equipment/structures(25 Nos)**

1. Continuous low cost turmeric washer (Akola)
2. Stripping machine for chick pea pod (Akola)
3. Steam boiling system for production of export quality jaggery (Anakapalle)
4. Mechanized paper sweet making machine for production of jaggery fortified paper sweet (Anakapalle)
5. Tamarind dehulling machine (Two pass multi-rings) (Bangalore)
6. Design of 2.5 ton capacity on-farm aeration bin for paddy (Bapatla)
7. Amaranthus popping unit (Bhubaneswar)
8. Online grading system for mango (Coimbatore)
9. Carrot de-hairing machines (Hisar)
10. Carrot twig plucker (Hisar)
11. Storage methods/structure for sharif onion (Hisar)
12. Dryer for important spices of North Eastern States (Imphal)
13. Pineapple harvester suitable for hilly region (Imphal)
14. Gadget for making “pitha” (Jorhat)
15. Modified low cost storage system of jaggery (Jorhat)
16. Vacuum based tank for jaggery (Lucknow)
17. Refinement of inbuilt filtration system in (Ludhiana)
18. Honey comb structured packaging material for fresh fig fruits (Raichur)
19. Walnut dehuller (Srinagar)
20. Walnut grader (Srinagar)
21. Walnut bleacher-cum-washer (Srinagar)
22. Modified wax applicator for coating on passion fruit (capacity: 300 kg/h)
23. Modified/Improved maize dehushker-cum-sheller (Udaipur)

24. Ginger peeler (Udaipur)
25. A prototype green gram depoder-cum-sheller developed (Udaipur centre)

**(b) Process protocol and products (33 nos)**

1. Process technology for value added products of pumpkin (Akola centre)
2. Cowpea meduvada mix (Bangalore)
3. Ready-to-serve small millet one-dish meal(Bangalore)
4. Ready-to-Cook malted white ragi based dairy food (Bangalore)
5. Process protocol for processing of industrial fruit wastes viz., mango peel, mango seed /kernel and tomato pomace (Bangalore)
6. Watermelon beverage (Bhubaneswar)
7. Modified atmospheric packaging of jamun (Bhubaneswar)
8. Utilisation of ruminal contents in formulation of Japanese quail feed (Chennai)
9. Bio- Preservation of meat using beneficial bacterial cultures (Chennai)
10. Effect of edible coating of hydrocolloids and cinnamon oil on meat (Chennai)
11. Extrudates from different blends of by-products of dal mill, maize, sorghum, and pearl millets blends (Jabalpur)
12. Process for utilization of de-oiled cake of groundnut kernels (Junagarh)
13. Developed low cost good quality gum using tapioca starch (Jorhat)
14. Extrudates and sweet snacks from coconut milk residue and virgin coconut oil cake (Kasargod)
15. Process for removal of Amorphous silica from rice husk (Kharagpur)
16. HACCP Protocol for liquid jaggery manufacturing (Kolhapur)
17. Organic clarificant (soybean DOC @ 1 kg per 1000 liters of sugarcane juice) for jaggery processing (Kolhapur)
18. Reduction of sugarcane staling losses (with application of sodium hypochlorite) (Kolhapur)
19. Technology for production of pork and chicken nuggets and sausage with dietary fibre (Khanapara)
20. Value addition to pork sausage with banana pseudostem flour (Khanapara)
21. Process for restructured pork ham using liquid whey (Khanapara)
22. Foxtail millet incorporated buffalo meat products (Khanapara)

23. Ready to eat and ready to cook fishery products (Mangalore)
24. Ready-to-eat fish ham in fibrous casings and synthetic casings (Mangalore)
25. LAMP assay based technology for easy and rapid detection of *S. aureus* and *Salmonella* spp (Mumbai)
26. Mushroom fortified extruded and baked products (Solan)
27. Optimised process for extraction anthocyanin powder from plum (Solan)
28. Value addition and shelf life improvement of pear (Srinagar)
29. Process protocol for thermal processing of “Varikka” variety of tender jackfruit (Tavanur)
30. Extruded RTE products from rice, and *Nendran* banana (Tavanur)
31. Process for biodegradable films modified cassava starch (Trivendrum)
32. Cassava starch-nano clay composite based biodegradable film (Trivandrum)
33. Multistage grinding of spices (Tavanur)

**(c) Pilot Plants (likely to be completed by March 2016), 04 nos**

1. Pilot plant for extraction of pectin from kinnow peel/waste (Ludhiana)
2. Pilot plant for production of probiotic and synbiotic juice from guava, kinnow and mango (Ludhiana)
3. Protocol and pilot plant for extraction of pectin from apple pomace (Solan)
4. Value Chain of ginger primary processing (Coimbatore)

**(ii) TECHNOLOGY TRANSFERRED /ADOPTED**

1. PKV Mini dal mill sold 57 units by manufacturer during the period
2. Honey-heating-cum filtration system licensed to AB Engineers and manufacturer, who has sold 10 units (Ludhiana)
3. Mahua seed decorticator (Bhubaneswar)
4. Beverage from stone apple, mango pine apple and aloe-vera (Bhubaneswar)
5. Probiotic finger millet porridge (Coimbatore)
6. Honey-heating-cum filtration system commercialized & licensed to AB Engineers (Ludhiana)
7. Fish Patties and Fish Chikuwa were transferred to a women entrepreneur Smt. Joyce Dias (Mangalore)

8. Technologies for the production of protein rich cassava pasta (Trivendrum)
9. Production of fried products from cassava (Trivendrum)
10. Mechanized jaggery granulator (MoU with three firms)

### **(iii) SUCCESS STORY PUBLISHED**

- Agro-Processing Centre for Turning Farmers into Entrepreneurs (ICAR web: <http://www.icar.org.in/> dated 9-12-2015)
- Model Retail Outlet for Production of Hygienic Chicken Meat developed by centre has been published in the 'Yashogatha' (Success stories) of our University, (MAFSU, Nagpur)

### **(iv) PATENTS**

1. Manual mahua seed decorticator, (Bhubaneswar)
2. Mahua stamen remover (Bhubaneswar)
3. Mini oil refining unit (Bhubaneswar)
4. Portable evaporative cooled vegetable storage cabinet (Bhubaneswar)
5. Cocoa pod breaker (Coimbatore)
6. Onion Umbel Thresher (Coimbatore)
7. Process for the production of low-moist gelatinised dough for using in cassava (tapioca) *papad*making machine (Trivendrum)

### **(v) AWARDS (5 NOS)**

1. Best Paper Award conferred to Lakshmi, R., B. Ranganna and K.B. Suresha, (2015). Development of jamun (*syzygiumcumini* L.) fruit blended set and stirred yoghurts, National Conference on "Research Strategies, Technologies and Upcoming Challenges in food Science and Biotechnology for Healthier Life (RTCFSB – 2015)" held at Kongu Engineering College, Perundurai, Erode, on September 2015.
2. Best Poster Award conferred to Pampanagouda, K.B.Munishamanna and ShivabasuKhanagodar(2015). Development of pearl millet (*Pennisetumglaucum*) based probiotic beverage by fermentation with *Saccharomycesboulardii* and *Lactobacillus acidophilus*.

3. State Level Doordarshan Sahyadri Award (2014-2015) conferred to entrepreneur Smt. Sarita Shyamsundar (disabled women), running APC at Kanzara, Tq. Murtizapur, Dist. Akola under the technical guidance of AICRP on PHET Akola Centre
4. Krishi Gaurav Award (2015) conferred to Dr. P.A. Borkar, Research Engineer, AICRP on PHET Dr. PDKV, Akola by Maharashtra state
5. Outstanding Poster Appreciation Award (2015) conferred to Dr. Surekha Bhatia, Green packaging for foods: An environment friendly perspective during Regional Seminar on “Geospatial technology in natural resource management” organized by ISRS at PRSC, Ludhiana.

**(vi) AGRO PROCESSING CENTRES ESTABLISHED**

Sr. No.	State	Name of the Centres	Address of APC established	Total APC established (No)
1	Maharashtra	PDKV Akola	Shri Shivanand Waghmare, Kanshivni, Tq. and Dist. Akola	2
			Shri Himmatrao Tekade, At Post Ruikhed, Tq. and Dist. Buldhana	
2	Uttarakhand	VPKAS Almora	Shri Puran Chander Pandey, S/o Shri Ramesh Chander Pandey, Dhaspar, Post Office Suwakhan, Tehsil Bhanauli, district Almora, Uttarakhand	1
3	Karnataka	UAS Raichur	Millet Processing Unit Post : Uttangi Village, Tq: Huvinahadagali, Dt: Bellary	2
			Dhal Mill At Post : Athanur Village Tq: Manvi Dt: Raichur	
4	Orissa	OUAT Bhubaneswar	Cashewnut processing Kaluram Pradhan, Pitanpalli, Kalikote, Dist: Ganjam	4

			Dal processing SORD, Bhanjapadar, G.Udayagiri, Dist: Kandhamal	
			Dal Processing Dharitri Sanchya Samiti, Siminai, Dist: Dhenkana	
			Oil processing Pradyumna Sahu, Naranpur, Nilagiri, Dist: Balasore	
5	Haryana	CCS HAU Hisar	Smt. Pooja Garg w/o Sh. Vikas Jain, H.No. 435, Sector 9-11, Hisar – 125005	
6	Manipur	CAU Imphal	APC for Training cum Demonstration, CAU, Iroisemba, Imphal	1
7	Gujarat	JAU Junagadh	EktaMahilaSahkariMandli (Tribal MahilaSangh). Village – Vadala, Taluka – Talala, Dist – GirSomnath.	1
8	Punjab	PAU Ludhiana	Baby oil expeller, S Gurpreet Singh S/o S. Iqbal Singh Vill Churad, Muktsar	5
			S Husandeep Singh S/o S Gurbachan Singh, Husandeep Agro Food Processing Model , Ramuwal, Distt Bhatinda	
			S. Darshan Singh S/o S Niranjan Singh Dogar Basti, Street- 11, Faridkot	
			S Iqbal Singh s/o Sh. Sukhjinder Singh, Satshiv Flour Mill, VPO Dadha hoor Distt. Ludhiana	
			S Sukhwant Singh, “Sandhu Agro Food Processing” Vill Patti, District Amritsar	
9	Uttar Pradesh	ICAR-IISR Lucknow	Shri H.P. Vasisth, FAPRRO, Village Ghugial, Post Haryana, Distt Hoshiarpur, Punjab	3
			Sri Himanshu Gangwar, Vill	

			Kuiyandhar, Post Kuiyankhora, Farrukhabad U.P.	
			Sri Raghunath Singh, Village Sipian, Block Hajpur Distt Hoshiarpur, Punjab	
10	Srinagar	SKAUST & T Srinagar	M/s Kashmir Gulbadan, Habak Hazratbal Srinagar	2
			M/s Mannat Food Products, Bari Brahmana, Jammu	
	Total			22

#### **(vii) ADAPTIVE TRAILS, POPULARIZATION AND TRANSFER OF TECHNOLOGY/PROCESS**

- Adaptive trails on various post-harvest technologies (machineries/plant/process/storage/storage, etc.) were conducted. For instance, management of pulse beetle (Akola Centre); millet thresher cum pearler, millet dehuller, paddy thresher, dal mill, soya processing, etc. were given to about 581 farmers/extension personnel (Almora centre); low cost sunflower oil refining unit (Bangalore), Tamarind dehuller-cum-deseede, Fluidised bed mushroom dryer, Mango fruit stone remover, Tender Coconut punch and splitter (Bhubaneswar centre); Evaluated tomato seed extractor machine (Solan centre); chestnut decorticator (Srinagar centre); Model retail outlet for production of hygiene chicken meat (Mumbai Centre); Performance evaluation and popularization of the tamarind dehuller cum de-stoner machine (Bangalore centre).
- Capacity building programmes in post-harvest sector and training-cum-demonstrations (10 ns) were conducted by Imphal centre and more than 550 farmers participated; Training on Bottling of Sugarcane juice technology and Large scale Demonstration on value chain of Turmeric (Coimbatore); 37 training programmes at KVK of PAU and PAU were conducted on working knowhow of developed honey heating-cum filtration system benefiting 350 beekeepers/farmers/entrepreneurs (Ludhiana); Popularization of Agro processing complexes by giving T.V. Talk (Door darshan)/ Radio talk (6), Farmers camps/field days/Farmers' fairs (20), Training courses (2), Lectures in various training programmes (50), Guidance to farmers (25) by Ludhiana Centre



- Four Training-cum demo on ‘Production of clean and hygienic chicken meat on newly developed model retail outlet’ on 16<sup>th</sup> March, 19<sup>th</sup> March, 3<sup>rd</sup> and 4<sup>th</sup> November, 2015 at Department of VPH, Veterinary College, Parbhani (MAFSU, Nagpur), no of beneficiary 23 (Mumbai)
- Training-cum-Demo on Turmeric boiler and polisher (Raichur); Four training –cum-demo on walnut technologies and value addition of fruits and vegetables in Jammu and Kashmir region (Srinagar).
- Entrepreneurship development programmes/workshops (11 Nos) to prospective stakeholders (Tavanur)

#### **(viii) PUBLICATIONS**

- Papers published in referred journals: 75 Nos
- Document published by Coordinating Unit: 03 nos

#### **In addition, AICRP on PHET centres have undertaken the following activities:**

1. Monitoring of existing APCs and motivation for establishment of new APCs,
2. Training and demonstration under TSP,
3. Report on ‘Assessment of Harvest and Post-harvest Losses of Major Crops and Commodities in India’ submitted to MoFPI;
4. Report on Storage study of URS wheat submitted.
5. Data collection and data entry is in progress under ICAR-FCI project on “Determining storage losses in food grains in FCI and CWC warehouses and to recommend norms for storage losses in efficient warehouse management”.
6. Nation-wide KisanMela 2015 - Technology and Agricultural Machinery Demonstration in association of AICRP on Farm Power Machinery on 20<sup>th</sup> March 2015.