



ICAR-CIPHET

NEWS

Vol. 21:1 (Jan – Mar 2021)



ICAR - CENTRAL INSTITUTE OF
POST-HARVEST ENGINEERING & TECHNOLOGY
AN ISO 9001:2015 CERTIFIED INSTITUTION

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Published by:

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DIRECTOR SPEAKS



It is a matter of pride that the Competent Authority of ICAR has approved the new ICAR-CIPHET logo which was unveiled on 5 March, 2021 during the Research Advisory Committee (RAC) meeting of the Institute. The 23rd RAC meeting of the institute was held during 05-06 March, 2021 under the chairmanship of Dr. DC Joshi, Vice Chancellor, Agricultural University, Kota, Rajasthan.

During this quarter our scientific team have developed number of technologies like rotating orifice feeding system for continuous and uniform discharge of roasted makhana seeds, tamarind deseeder, small millet dehuller, superheated steam turmeric processor for simultaneous boiling, drying, and polishing. Process for the extraction of mango seed kernel oil using Supercritical Fluid Extraction has been optimized, Near Infra-Red Spectroscopy based method for detection of *Khesari* dal flour in Chick pea flour (besan) and cereal-gluten free instant ribbon pasta etc. ICAR-CIPHET through its SCSP programme have reached out to the Scheduled Caste community of different regions of the country in the areas of processing and value addition of fish, under-utilized fruits, millets and pulses. Extension activities through farmers training, KVK activities, ABI activities and visits were also conducted during this quarter. The institute also organized demonstration-cum-interaction meet with the scientists of KVKs under GADVASU, Ludhiana on post-harvest technologies on 13 January 2021 to bridge the gap of knowledge transfer from research to field.

(Dr. Nachiket Kotwaliwale)

RESEARCH HIGHLIGHTS

Development of Rotating Orifice Feeding System for Continuous and Uniform Discharge of Makhana Seeds

A simple feeding system has been developed to discharge roasted makhana seeds of different sizes (7.48-12.40 mm diameter) that maintained 10-30 kg.h⁻¹ consistent flow rate. The feeding system consists of a rotating orifice plate at an off-center distance placed inside a pipe connected with the bottom of a trapezoidal hopper. The effects of rotation rate, orifice diameter and off-center distance on the mass flow rates of makhana seeds of different sizes were investigated. Discharge of the seeds did not take place when the orifice remains stationary. The mass flow rate increased with the increase in rotation rate, orifice diameter and off-centre distance. Finite mass flow rates in the range of 2.25-29.81 kg.h⁻¹ were obtained for all sizes of seed. Discharge was in the funnel flow regime due to the geometry of the hopper and feeding system. The existing Beverloo equation did not describe the mass flow rate adequately for the developed system and therefore modified using a function similar to the Froude number to describe the mass flow rate satisfactorily. The developed feeding system performed well in feeding makhana seeds of different sizes and maintained finite mass flow rates.



Figure 1 Rotating Orifice Feeding System

Anti-hypertensive Peptide from Rohu Fish Waste

Hypertension is one of the leading causes of death globally and in India. It is usually controlled by synthetic drugs which in turn lead to many side effects. It can be addressed by Angiotensin-I converting Enzyme (ACE)-inhibition using bioactive peptide from naturally biological material. Therefore, ICAR-CIPHET attempted to extract an anti-hypertensive (ACE-inhibitory) peptide from Rohu (*Labeo rohita*) fish waste (head, scales, fins and swim bladder) using Protease (from *Bacillus licheniformis*) enzyme. Extracted peptide showed ACE inhibition (55%) at 19.27% DH with 51.4 % peptide yield. Results indicated the potential application of rohu fish waste-based ACE inhibitory peptide in nutritional supplements, pharmaceutical products and functional foods as an alternative source of hypertension treatment following future research.



Figure 2 Spray dried Rohu fish waste-based ACE inhibitory peptide

Optimized Process for Extraction of Mango Seed Kernel Oil using Supercritical Fluid Extraction:

Response surface methodology (RSM- Box Behnken Design) was used to optimize the extraction process for mango seed kernel oil with the factors A: Pressure (300-450 Bar), B: temperature (50-70 °C), C: Time (30-60 min) with three central points. The model was found significant with probability <0.05. The linear terms pressure, time and interaction effect of pressure and time showed significant effect on mango seed kernel yield. The optimum conditions for maximum oil yield obtained as follows: pressure- 400 Bar; temperature- 63°C and time of 52 min. The predicted mango seed kernel oil yield was 7.52% and the results were validated.

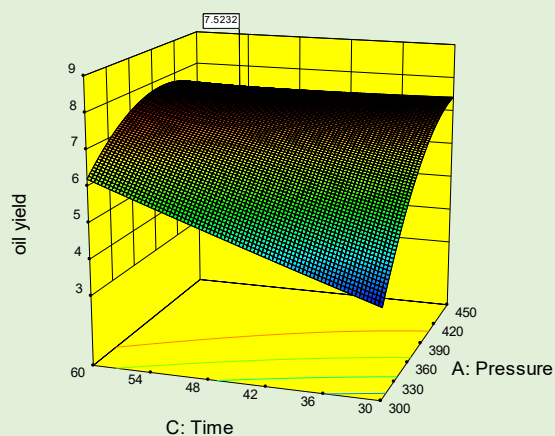


Figure 3 Interaction effect of pressure and time on mango

New Tamarind Deseeder

Tamarind deseeder is an electric motor (3 hp, 3 ph) operated machine suitable for the removal of seeds from dehulled tamarind pods especially for commercial pulp production. The prototype of deseeder consists of feed hopper, feeding belt conveyor, rotating deseeding drum, stationary concave, seed separation screen, pulp collection unit and drive mechanism (electric motor, pulley, belt and starter). The deseeding drum has sharp edged, fluted projections over its surface while the concave has smooth edged fluted /ribbed surface projections. When dehulled tamarind pods pass by gravity between the rotating deseeding drum and stationary concave, the seeds are removed due to nipping action (impact and shear). The capacity of tamarind deseeder is about 100 kg/h and the deseeding efficiency is over 90%. The perforated screen is provided for partial separation of seeds after deseeding.



Figure 4 Tamarind Deseeder

Near Infra-Red Spectroscopy based Method for Detection of Khesari Dal Flour in Chick Pea Flour (Besan)

Besan is a popular ingredient of many culinary dishes in India. Because of its high demand, and to get more economic gains, its flour is often adulterated with cheaper legume flour of *Lathyrus sativus* (L.) commonly known as grass pea or *khesari*. By buying adulterated *besan*

with *khesari* flour consumers spend more money for foodstuffs of lower quality. Further some varieties of *khesari* dal are having higher concentration of toxin compound known as β -oxalyl-L- α , β - diaminopropionic acid (ODAP). Excess consumption of this compound is considered harmful for health. The available methods for detection of *khesari* flour in *besan* are either spectroscopy or chromatography based which are time-consuming, destructive, may require sample preparation and specialized personnel for system operations. Therefore, there is need to develop simple, fast and non-destructive methods to detect the presence of *khesari* dal flour in *besan*. Near infra-red spectroscopy in combination with chemometrics has been utilized to develop prediction model for detection and quantification of *khesari* dal flour adulteration in *besan*. Pure *khesari* dal flour and *besan* samples were prepared in laboratory. Adulterated samples of *besan* with *khesari* dal flour were prepared in the range of (1-90%) (w/w) using 174 samples. Spectra of pure *besan*, pure *khesari* dal flour and adulterated samples of *besan* with *khesari* dal flour were acquired as the logarithm of reciprocal of reflectance ($\log 1/R$) in the entire wavelength range of 400 to 2500 nm. To mathematically transform the data, pre-processing was carried out using second derivatives, gap, and smoothing pre-treatments. Win ISI III software was used for mathematical processing and statistical analysis. Modified partial least squares (MPLS) regression was used for development of the NIRS prediction model. The second derivative (2, 4, 4, 1) plot was used to resolve overlapping peaks and remove baseline variations. The usefulness of the equation was checked on the basis of standard errors of cross-validation (SEC), the coefficient of determination (RSQ), an estimate of RSQ (1-VR) and standard error of cross-validation (SECV). Developed calibration model for detection of *khesari* flour as adulterant in *besan* showed high values of RSQ (0.9994) with a low value of SEC (0.996) and SECV (2.008), and 1-VR value of 0.996.

Cereal-Gluten Free Instant Ribbon Pasta

The optimal formulation of cereal-gluten free instant ribbon pasta (CGFI pasta) based on semi-popped *makhana* flour (SPM), water chestnut flour (WCN) and potato powder (PP) with equal quantity of carrot juice was studied. The effect of semi-popped *makhana* flour (30-50%), water chestnut flour (20-30%) and potato powder (30-50%) on physiochemical, phytochemical, cooking quality and sensory properties of CGFI pasta was evaluated by using a response surface methodology (RSM) following Box- Behnken design. Optimum conditions for SPM flour, WCN flour and PP were 47.81, 23.50 and 28.69%, respectively. The total protein, total fat, iron and calcium in CGFI pasta with optimized and validated formulation were 10.23%, 0.51%, 10.62 mg/100g and 39.21 mg/100g respectively, with overall sensory acceptability as 7.39. The antioxidant activity of CGFI pasta was 28.49 % in terms of DPPH inhibition activity and 321.88 mg trolox equivalent/100 g for FRAP assay along with 713.43 mg gallic acid equivalent/100 g total phenolic content and 344.80 mg quercetin equivalent/100 g flavonoids. This CGFI pasta showed 1.62 min cooking time, 2.46 rehydration ratio, 7.25% solid loss, 27.49 g tensile strength with overall desirability of 0.90.

Superheated Steam Turmeric Processor for Simultaneous Boiling, Drying and Polishing

The unit designed is a prototype superheated dryer for turmeric. Performance evaluation of this prototype dryer was completed. This study has resulted in the basic aspects and characteristics of superheated steam drying of turmeric. This has demonstrated the usefulness and potential of applying superheated steam for simultaneous processing operations namely boiling, drying and polishing.



Figure 5 Batch type superheated steam dryer

Small Millet Dehuller

A machine based on abrasive principle & suitable for all millets has been developed. The prototype consists of a hopper, dehulling chamber and a hull aspiration unit, all mounted on a sturdy angular frame work. The machine is operated by 5 hp electric motor. The principal component of the unit is the dehulling chamber where the millets get dehulled mainly by abrasive mechanism. An emery coated cylinder (slightly tapered) rubs the millets against the ribbed concave to separate the outer hull (husk) from the endosperm of grain. The gap between the cylinder and concave slightly reduced from feed to discharge end in order to create sufficient grain pressure in the dehulling chamber. The dehulled grain along with husk come out of dehulling chamber and falls by gravity into the husk aspiration unit where the hull is separated out and carried away by the air stream. The hull laden air is passed to a cyclone separator to separate hull from the air. The dehulling efficiency of about 95% has been observed for most small millets except for brown-top millet for which it has been about 75% (2 passes). The capacity of the machine is 100 kg/h.



Figure 6 Small Millets Dehuller

Entrepreneurial Behavior of Processors and Farmers Interested in Processing of Punjab:

Data was collected from 20 processors and 20 farmers interested in processing each from Ludhiana, Sangraur and Rupnagar districts of Punjab. 'Modified Entrepreneurial Assessment Scale' which consisted of 11 different aspects/dimensions was used for estimating the entrepreneurial behavior of the respondents. The different dimensions were (1) Risk taking (2) Hope of success (3) Persistence (4) Feedback usage (5) Self-confidence (6) Knowledgeability (7) Persuability (8) Manageability (9) Innovativeness (10) Achievement Motivation and (11) Locus of Control. The different aspects were compared using Kruskal-Wallis one-way ANOVA.

The test result (K (critical) = 18.307 < K (observed) = 188.031, $df = 10$, $p < 0.001$) revealed that, there exist a significant difference among the level of influence of different dimensions in the entrepreneurial behavior. The mean rank corresponding to Persistence dimension (514.242) is more and hence it is the major influencing factor of behavior according to processors' perception. Least affecting factor influencing the entrepreneurial behavior of processors was hope of success (Mean Rank 145.167).

Based on the perception of farmers interested in processing (K (critical) = 18.307 < K (observed) = 202.423, $df = 10$, $p < 0.001$) manageability dimension (515.908) had the highest mean rank and self-confidence (Mean Rank 145.167) had the least. Therefore these are the most and least influencing dimensions affecting the behavior of farmers interested in processing.

A comparison was done to analyze the difference in the entrepreneurial behavior of processors and farmers interested in processing using Mann-Whitney U Test. Comparison of mean ranks obtained by processors (78.78) and farmers interested in processing (42.33) based on their entrepreneurial behavior using Mann-Whitney U Test showed significant difference ($p < 0.001$) between their behavior.

Constraints Faced by Processors and Farmers Interested in Processing of Punjab and Strategies for Promoting Agro-processing among Farmers:

(a) Constraints faced by processors: A scale for measuring the severity of constraints faced by processors was developed. The major dimensions identified in the constraint analysis were i) Technical and capacity building related constraints, ii) Infrastructure related constraints, iii) Financial constraints, iv) Market related constraints and v) Equipment related constraints in the case of individual processors. Reliability of this scale was tested with split half method. Coefficient of internal consistency (Spearman's rho) of this was found to be 0.760 and the Cronbach's alpha coefficient was 0.871. The constraints were compared using Kruskal-Wallis one-way ANOVA.

As the test (K (critical) = 9.488 < K (observed) = 100.943, $df = 4$, $p < 0.001$) revealed that, there exist a significant difference among the influence of different constraints in running the agro processing system. The mean rank corresponding to financial related constraints (204.850) is more and hence it was the major constraint faced by existing processing units involved in primary processing of cereals, pulses and oilseeds. Least affecting constraint was infrastructure related constraints (Mean Rank 75.950), whereas market related constraint has been also identified as a rigorous constraint with mean rank of 201.025. Equipment (Mean Rank 112.200) and Technical and capacity building constraints were moderately severe (Mean Rank 158.475) in processors' perception. Further analysis of each category of the constraints was conducted using the Friedman's test. From the Test statistic value and its significance, it is clear that each component in each category varied in processors view.

(b) Constraints faced by farmers interested in processing: Analysis of the constraints faced by farmers was conducted using the Friedman's test. From the Test statistic value and

its significance, it is clear that each component in each category varied in farmers view. Friedman's test statistic for constraint analysis was Chi-Square = 124.980, df = 17, $p < 0.001$. The major constraint was lack of information related to processing technologies with mean rank 12.858. This was followed by inability to find market for value added produce (Mean Rank 12.225); high cost of operation (Mean Rank 12.050) and less knowledge about marketing strategies (Mean Rank 11.775).

(c) Strategies for promoting agro processing among farmers: Based on the analysis of the constraints faced by farmers and entrepreneurs in adopting post-harvest technologies, different strategies were proposed to popularize processing technologies among them. The strategies were

a. To overcome lack of information related to processing technologies:

- ✓ Create awareness among extension functionaries
- ✓ Provide training to extension functionaries as well as farmers
- ✓ Invite successful ex-trainees during training and awareness programme to share their experience
- ✓ Crop specific post-harvest technologies and machineries developed should be popularized through crop specific institutes
- ✓ Popularize ICAR-CIPHET database and My CIPHET mobile app among field functionaries and processors
- ✓ Use social media for networking: Share information, discuss problems faced in adopting technology/ process, feedback, researchable issues and identify training needs

b. To overcome financial constraints:

- ✓ Detail Project Report of different processing technologies should be prepared for providing information to farmers as well as fund providers about the economic feasibility of the technology
- ✓ Custom Processing Centers at village/block level with all the required processing equipment's, so farmers can process their produce by paying according to the quantity processed

c. To overcome market related constraints:

- ✓ SHG's/ CIG's: should be formed for organizing farmers to promote primary processing of agricultural produce
- ✓ Farmer Processor Organization: Organize farmers both from production and processing side so that required quantity of quality produce can be processed. This will also help in branding of the produce

d. To overcome equipment related constraints:

- ✓ Multipurpose processing equipment's: Development of small multifunctional/ multipurpose machineries which can be used year-round will reduce the cost of investment

Determination of thermal profile of polyhouse using thermal image analyzer

Polyhouse increases the inside temperature by trapping the solar heat. However, it is essential to understand the temperature profile (i.e. variation in polyhouse temperature along the height) prior to utilize the vertical space inside it. Hence, thermal profile of polyhouse was determined using thermal image analyzer when tomato crop was grown in the polyhouse. Representative images obtained from thermal image analyzer are presented in following figure. Results indicated that inside temperature increased with the height of polyhouse. Pipes and fittings fixed at top were the hottest places (temperature $\geq 40^{\circ}\text{C}$). Crop temperature varied from 25 to 30°C , which is desirable for crop growth. South-west wall of polyhouse was hotter ($>35^{\circ}\text{C}$) than north wall. Hence, shading may be provided from south side.

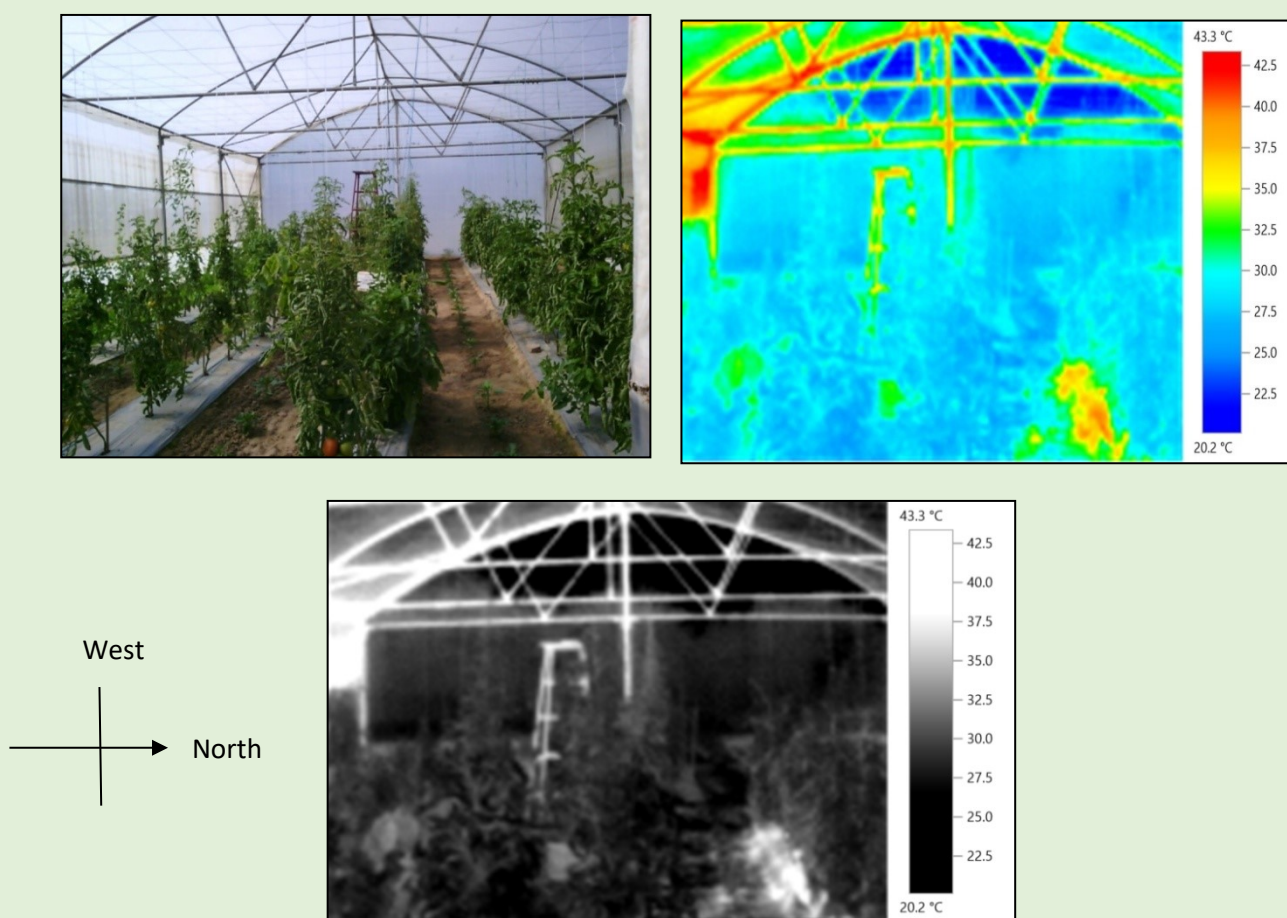


Figure 7 Thermal profile of polyhouse with tomato crop

On-farm Value Addition of Sugarcane

The Chemical free jaggery production plant was established in Uppal Farm, Rahon, SBS Nagar, Punjab under the Farmer FIRST Programme, ICAR-CIPHET, Ludhiana. This jaggery production unit is a semi-automatic plant, based on the 3-pan system. The unit is comprised of sugarcane crusher (capacity 1ton/ h), juice collection tank (capacity 750 litres), three open juice concentration pans, jaggery mouding frames and trays etc. With the help of

frames, the concentrated jaggery can be moulded into cubical shapes (1”×1”×1”), which helps in increasing the market value. Due to higher crushing capacity of crusher along with concentration in three pans, the jaggery can be produced from this plant with good efficiency.

Earlier the sugarcane grown by the farmers was sold in nearby sugar mills and some amount of jaggery was produced by traditional methods using single pan. They were largely dependent on the sugar mills for sugarcane sale and were also receiving late payments from the mills. The intervention of processing of sugarcane into solid and granular jaggery helped the farmers to produce jaggery under hygienic condition with good quality. The cube shaped jaggery also helped in fetching more prices in the market thus, increased the farmers income. The solid jaggery was sold at Rs. 50-60 per kg and granular jaggery was sold at Rs. 60-70 per kg by the farmers. As the unit was established in 2019, the farmer had earned good profit of Rs. 5,00,000 lakh in the year 2019-2020. The group of farmers had processed 300 quintals of solid jaggery and 100 quintals of granular jaggery. The selling of processed jaggery besides raw canes helped in increasing income of the farmers by 25-30 %. The farmer had also registered under FSSAI and started marketing of solid and granular jaggery under the brand name “Farm Nation”. The jaggery is packed in plastic pouches and granular jaggery in PET jars. The development of brand name helped in earning more profits and enhances more consumer demand and acceptability. Shortly after establishment of the plant, 20-30 sugarcane farmers visited this plant. After observing efficiency of plant and processing of jaggery in cubes, they were keen to establish jaggery processing unit at their farms.



Figure 8 Chemical free jaggery

PUBLICATIONS

Papers Published

1. Ghodki BM, Srihari G, Dukare AS, Kannaujia PK, Kalnar YB and Vishwakarma RK (2021) Potential utilization of guar straw and wood wool in controlling relative humidity and temperature of storage environment. *Journal of Food Process Engineering*, 44:e13618. DOI:10.1111/jfpe.13618
2. Kumar A, Ansari IA and Izhar S (2021). Performance evaluation of green pea depoder machine. *International Journal of Chemical Studies*, 9(1): 844-846
3. Chawla R, Sivakumar S, Mishra S, Kaur H and Anurag RK (2021). Modified Atmosphere Packaging for milk cake: Assessment of ideal gas composition for

extending shelf life. *British Food Journal*. DOI:10.1108/BFJ-09-2020-0785

4. Sharma K, Patel S, Jha SN, Mridula D and Vishwakarma RK (2021) Rotating orifice feeding system for continuous and uniform

discharge of *makhana* seeds (*Euryale ferox*). *Journal of Food Engineering*. 299 (2021) 110504. DOI:10.1016/j.jfoodeng.2021.110504

Training Manual:

- a. Anurag RK, Sethi S and Narsaiah K (2021). Training Manual on Packaging of Coarse Food Grains Specially Millets and its Processed Products. ICAR-CIPHET, Ludhiana, Punjab. pp. 100.
- b. Bashir AA, Ghodki BM, Nidoni U, Mathad PF, Veena T and Muzaddadi AU (2021). Training Manual on Processing and Value Addition in Millets and Pulses. ICAR-CIPHET, Ludhiana, Punjab. pp. 110.
- c. Devi TB, Khwairakpam B, Joykumar N and Muzaddadi AU (2021). Training Manual on Processing and Value Addition of Underutilized Fruits of Manipur, Under Scheduled Caste Sub-Plan, ICAR-CIPHET, Ludhiana, Punjab. pp 120.
- d. Kumar V, Reddy GVS, Dawange SP and Muzaddadi AU (2021). Training Manual on Fish Processing and Value Addition,

- Under Scheduled Caste Sub-Plan, ICAR-CIPHET, Ludhiana, Punjab. pp. 102
- e. Mridula D, Goswami D, Sethi S and Bala M. (2021) Training Manual on Nutri-Cereals and Maize based Baked Products. ICAR-CIPHET, Ludhiana, Punjab. pp.56.
- f. Muzaddadi AU, Kumar V and Kumar P (2021). Training Manual on Post-Harvest Handling and Processing of Fresh Water Fish, Under Scheduled Caste Sub-Plan, ICAR-CIPHET, Ludhiana and KVK, Jammu. pp 103.
- g. Reddy GVS, Muzadaddi AU, Kumar V, Shanthanna P, Reddy DN and Nagaraju S (2021). Skill Training Manual on *Chepala Parishudhi Ariyu Matsya Uppapathulu Teyari Vidhanam* (Telugu). ICAR-CIPHET, Ludhiana and FRS, Palair. pp 102.

Popular Article:

- a. Devi YP, Devi TB, Khwairakpam B and Devi YJ (2021). Processing and Value

Addition of Black Scented Rice. *Kerala Karshakan*. 8(9):41-45.

Book Chapter:

- a. Maheshwari H, Bharti A, Agnihotri R, Dukare A, Jeberlin P, Gangola S and Sharma MP (2021). Combating the Abiotic Stress through Phytomicrobiome Studies. In. Phytomicrobiome Interactions and Sustainable Agriculture. Ed. *Verma et al* (2021). pp 45-65. Wiley-Blackwell publication. ISBN 9781119644620 (hardback)
- b. Kumar V, Ahmad T and Muzaddadi AU (2021). Anti-Hypertensive Peptides from

- Fishery By-products: Prospects and Potential: In Neeraj Pathak and H.S.Mogalaekar (Eds.). Recent Updates in Indian Fisheries Sector. Narendra Publishing House, New Delhi. Chp-34, pp360-370. ISBN: 978-93-90611-83-6.
- c. Kumar V, Ahmad Tand Muzaddadi AU (2021). Application of Fish Processing By-Products: In Neeraj Pathak and H.S.Mogalaekar (Eds.). Recent Updates in Indian Fisheries Sector. Narendra

Publishing House, New Delhi. Chp-31, pp331-339. ISBN: 978-93-90611-83-6.

- d. Kumar V, Ahmad T and Muzaddadi AU (2021). Value Addition to Aquafoods: Why and How? : In Neeraj Pathak and HS

Mogalaekar (Eds.). Recent Updates in Indian Fisheries Sector. Narendra Publishing House, New Delhi. Chp-30, pp-323-330. ISBN: 978-93-90611-83-6.

Conference Abstracts:

- a. Guru P N, Kalnar YB and Gurav SG (2021). Response of *Sitotroga cerealella* to UV light and LEDs: A preliminary lab study. In: International Virtual Conference on “Emerging Trends in Food Protectants and Infestation Control (ET-FPIC 2021)” organized by PSSG & FPIC, CSIR-CFTRI, Mysuru on 24-25 Feb, 2021.
- b. Gurav SG and Guru P N (2021). Toxicological effects of Spinosad against grubs and adults of Red flour beetle; *Tribolium castaneum* (Herbst). In: International Virtual Conference on “Emerging Trends in Food Protectants and Infestation Control (ET-FPIC 2021)” organised by PSSG & FPIC, CSIR-CFTRI, Mysuru on 24-25 Feb, 2021

TRAININGS

Training Attended

- a. Ms. Shaghaf Kaukab and Er. Thongam Sunita attended Professional Attachment Training (PAT) of 3 months from 1 Dec, 2020 to 28 Feb, 2021 at ICAR-CIAE, Bhopal.
- b. Dr. Mahesh Samota attended three months of Professional Attachment Training (PAT) from 15 Dec, 2020 - 14 Mar, 2021 at PAU, Ludhiana.
- c. Dr. Purna Nath Scientist attended DST sponsored five days online training programme on “Science & Technology for Rural Society” organized by the Indian Institute of Public Administration, New Delhi in collaboration with Department of Science and Technology held during 4-8 Jan, 2021 and submitted the certificate obtained to the PME cell for record.
- d. Dr. B.M. Ghodki and Er. Akhoon Asrar attended one day training program on "Generic Online Training in Cyber Security" for Central Govt. Ministries/Departments organized by Ministry of Electronics and Information Technology (MeiTY), Govt. of India on 05 Jan, 2021.
- e. Dr. Rahul K. Anurag and Dr. Poonam attended one day online training programme on “Importance of Participation in PT/ILC for Quality Assurance in Testing” to be conducted by National Institute of Plant Health Management (NIPHM), Hyderabad on 28 Jan, 2021.
- f. Dr Rahul K. Anurag and Dr. Poonam attended two days online Training program on ‘Documentation procedure for NABL accreditation for PTLs & PRLs to be organized by NIPHM, Hyderabad from 9-10 Feb, 2021.

Training Organized

Farmers Training

- Three days farmer's training on "Construction of low-cost polyhouse and shade net house structures for vegetables and nursery production" was conducted during 4-6 Jan, 2021 by AICRP on PEASEM, ICAR-CIPHET, Abohar.
- Two days ATMA sponsored farmers' training on "Nutri-cereals and maize based baked products" was conducted for 10 participants from Taran-Taran district, Punjab during 24-25 Feb, 2021.
- Three days ATMA-Chamoli sponsored farmers' training on "Packaging of Coarse Food Grains Specially Millets and its Processed Products" was organized for 36 participants from district Chamoli, Uttarakhand during 7-9 Mar, 2021.
- Two days Training on 'Baking Technology for Entrepreneurship development' was organized for 19 farmers of Taran-Taran during 18- 19 Mar, 2021.



Figure 9 ATMA-Chamoli farmers' training

Skill Development Trainings under SCSP

- A 3 days training on 'Post-Harvest Handling and Processing of Fresh Water Fish' was organized at KVK, Jammu under SCSP scheme of ICAR-CIPHET, Ludhiana during 02-04 February, 2021. Fifty-three scheduled caste participants attended this training. A training manual was also released by Prof. J.P. Sharma, Vice-Chancellor, SKUAST-J.
- A 3 days training on 'Entrepreneurship development on fish drying and pickle making techniques' was conducted for Scheduled Caste farmers of Bongaigaon district of Assam during 10-12 Feb, 2021, in collaboration with District Fisheries Development Office, Bongaigaon, Assam.



Figure 10 Training at KVK, Jammu under SCSP scheme of ICAR-CIPHET, Ludhiana



Figure 11 Entrepreneurship development on fish drying and pickle making techniques

- c. A three days training on ‘Processing & Value Addition of Millets and Pulses’ was organized for Scheduled Caste farmers of Karnataka at Dept. of Processing and Food Engineering, College of Agricultural Sciences, Raichur, Karnataka during 23-25 Feb, 2021.
- d. A three-day training programme on “Processing and value addition of underutilized fruits of Manipur” was organized for Scheduled Caste participants of Manipur during 15-17 Mar, 2021. The training was organized by ICAR-CIPHET, Ludhiana in collaboration with College of Food Technology, CAU, Imphal. More than 50 SC participants from Andro and Sekmai villages attended the training.



Figure 12 Processing and value addition of underutilized fruits of Manipur

- e. A 3 days training on ‘Fish Processing and Value Addition’ was organized at Fisheries Research Station (FRS), Palair, Telangana during 16-18 March 2021. Fifty scheduled caste women participants from Gaigollapally village attended this training. Dr. V. Ravinder Reddy, Vice Chancellor, PVNTVU, Hyderabad released training manual (English and Telugu) on inaugural day.
- f. A 3-day Skill Development Programme on "Processing and Value Addition in Millets and Pulses" was organized at Dept. of Processing and Food Engg, College of Agricultural Engg, University of Agricultural Sciences, Raichur, Karnataka during 18-20 Mar, 2021 for 50 SC beneficiaries under SCSP of ICAR-CIPHET.

Programs under ABI

- a. Training on “Groundnut flavored beverage, curd and paneer” to Mr. Narinder Singh, Ludhiana and Mr. Jaswant Singh, Chandigarh during 17-18 Mar, 2021.
- b. Training on makhana processing (makhana processing pilot plant) to Mr. Gurdeep Singh, Mohali on 18 Mar, 2021.
- c. Sensitization program on Agribusiness Entrepreneurship Development through Agro Processing at Jainpur Village (20 participants) on 19 Mar, 2021.
- d. Sensitization program on Agribusiness Entrepreneurship Development through Agro Processing at Ayali Khurad, Ludhiana (26 women participants) on 20 Mar, 2021.



Figure 13 Training on "Groundnut flavored beverage, curd and paneer"



Figure 14 13 Agribusiness Entrepreneurship Development through Agro Processing at Ayali Khurad, Ludhiana



Figure 15 Agribusiness Entrepreneurship Development through Agro Processing at Jainpur Village

EVENTS/ACTIVITIES

• National Science Day-2021

ICAR-CIPHET organized National Science Day-2021 on the theme 'Future of STI: Impact of Education, Skill and Work'. Quiz competition was held on 28 Feb, 2021 wherein four teams of three members each participated in the competition.

• Research Advisory Committee (RAC) meeting

The 23rd Research Advisory Committee (RAC) meeting of CIPHET was held on 05-06 Mar, 2021 at ICAR-CIPHET, Ludhiana under the Chairmanship of Dr. D. C. Joshi, Vice Chancellor, Agriculture University, Kota, Rajasthan. On this occasion, ICAR-CIPHET's

newly approved logo and new division of Automation and Sensor Technology was inaugurated. ICAR-CIPHET's coffee table book and two technical bulletins were also released.



Figure 16 Inauguration of 23rd Research Advisory Committee (RAC) meeting of CIPHET

- **International Women's Day-2021**

ICAR-CIPHET, Ludhiana celebrated International Women's Day-2021 on 8 Mar, 2021. This year's theme of ICAR for celebration of International Women's Day was "Women Leadership in Agricultural: Entrepreneurship, Equity & Empowerment (3 E's)". To commemorate the occasion and to celebrate the theme, five successful women entrepreneurs, who were trained by the institute, were honoured. Three women entrepreneurs' viz. Mrs.



Figure 17 International Women's Day-2021

Anita Goyal, M/s Zaika, Jagraon; Mrs. Sarabjeet Kaur, M/s Gill Farms, Jalandhar and Ms. Shruti Goyal, M/s. Swadam Labh, Jagraon joined the programme at ICAR-CIPHET, Ludhiana while Mrs. Renu Mishra M/s Siya Ram Food Industries, Noida and Mrs. Snehal Dudue of Yavatmal, joined the programme online. KVK, ICAR-CIPHET, Abohar also celebrated the event and 40 women participated in this occasion.

- हिंदी कार्यशाला
हिंदी कार्यशाला में डॉ. राकेश शारदा, प्रधान वैज्ञानिक (मृदा एवं जल संरक्षण अभियांत्रिकी), मृदा एवं संरक्षण अभियांत्रिकी विभाग, पंजाब कृषि विश्वविद्यालय, लुधियाना, पंजाब ने 'छतही शीर्ष पोषण उद्यानीय संरचना' एवं 'तकनीकी जानकारी का हिंदी में प्रचार प्रसार' पर अपनी प्रस्तुति दी है। इस कार्यशाला का आयोजन 19 मार्च, 2021 को 2:30 से 5:30 के बीच भाकृअनुप-सीफेट, लुधियाना में हुआ।

- **World Water Day -2021**

ICAR-CIPHET celebrated World Water Day on 22 Mar, 2021 on theme "Valuing Water". Total 12 farmers of Ludhiana and 26 students of SKUAS&T, Srinagar attended the program. Three Sarpanch, Shri Charan Singh of Talwara village, Shri Surender Singh of Ayali village and Shri Sukhwant Singh of Partap Singh wala village were also present in the programme. KVK, ICAR-CIPHET, Abohar also organized an awareness programme at village Dhani Chirag and 20 farmers participated in this program.



Figure 18 World Water Day

EXTENSION ACTIVITIES ORGANIZED

- ICAR-CIPHET organized a demonstration-cum-interaction meet with the scientists of KVKs under GADVASU, Ludhiana on post-harvest technologies on 13 Jan, 2021. Eighteen scientists of KVKs participated in interaction meet. Dr. Inderjeet Singh, Vice Chancellor, GADVASU, Dr. Rajbir Singh, Director ATARI, Zone-I and Dr. Parkash Singh Brar, Director of Extension Education, GADVASU were also present during the demonstration and interaction meeting.



Figure 19 Demonstration-cum-interaction meet with the scientists of KVKs under GADVASU, Ludhiana

- b. A group of 15 farmers under the training programme of KVK Sangrur visited Agro Processing Centre of the ICAR-CIPHET, Ludhiana on 21 Jan, 2021. The farmers interacted with the scientists and showed their willingness to undergo training on millet processing at ICAR-CIPHET, Ludhiana.
- c. A group of 33 B.Sc. (Community Science) Students farmers from Department of Extension Education and Communication Management, College of Community Science, PAU, Ludhiana visited ICAR-CIPHET, Ludhiana on 18 Feb, 2021
- d. B.Sc. Agril. Students from Feroze Shah College of Agricultural Engineering, Ferozepur, Punjab visited ICAR-CIPHET, Abohar Campus on 25 Feb, 2021.
- e. A group of 11 farmers visited ICAR-CIPHET, Abohar Campus ICAR-CIPHET on 18 Mar, 2021. The visit was organized by ATMA, Mukhtsar .
- f. B. Sc. Agriculture Students from Adesh Institute of Higher Education, Faridkot visited at ICAR-CIPHET, Abohar on 19 Mar, 2021. 14 Students participated in this visit.
- g. 26 B.Tech. (Agri. Engg.) students and 2 faculties from Sher-e-Kashmir University of Agricultural Science and Technology- Kashmir visited ICAR-CIPHET, Ludhiana on 22 Mar, 2021 as a part of educational tour
- h. Dr. Renu Balakrishnan, Scientist visited different Agro Processing Centers in Raikot (20 Mar, 2021) and Sangrur (25 Mar, 2021) to identify the present status of processing units and constraints faced by these units. The entrepreneurs were also sensitized about the various technologies developed by ICAR-CIPHET and also shared valuable information about packaging and marketing strategies for their products.



Figure 20 Farmers visited ICAR-CIPHET, Abohar Campus



Figure 21 Students from Adesh Institute of Higher Education, Faridkot visited at ICAR-CIPHET, Abohar



Figure 22 Visit of Agro Processing Centers in Raikot and Sangrur

Custom Hiring Services

- I. Custom hiring services of *Makhana* processing plant at the rate of Rs.20/- per kg (based on cleaned raw *makhana* seed) is given to Sh. Bhawnik Singh from 'PVK ASSOCIATES', Ludhiana engaged in *makhana* trading business.
- II. Custom hiring services of 'Jamun pulp to jamun bar' at the rate of Rs.7/- per kg (based on pulp) is given to Sh. Ashwani Garg from 'UniTech Technocrats', Kala Amb, Sirmour, Himachal Pradesh.

KVK Activities

- i. One day training programme on "Organic farming approaches in agro-horticultural crop production" was organized at KVK, ICAR-CIPHET, Abohar on 30 Jan, 2021. About 16 farmers participated in this training program.
- ii. One day training programme on "Training program on Pruning of Fruit Orchards" was organized at KVK, ICAR-CIPHET, Abohar on 12 Feb, 2021. About 40 farmers participated in this training program from surrounding villages.
- iii. KVK, ICAR-CIPHET, Abohar conducted field day under CRM on 22 Mar, 2021 and 24 Mar, 2021 at Dhani Chirag, Dhani Kamamian and Awa Village. About 50 farmers participated in these field days.
- iv. One day off campus training program on "Small Scale Fruit Processing" was conducted at Jhurar Khera village on 27 Mar, 2021. Around 29 women participated the training programme. Practical demonstration on preparation of apple jam, pomegranate jelly and kinnow squash was done along with creating awareness about principles of fruits and vegetable processing and importance of kitchen gardening.



Figure 23 Farmers participates under CRM



Figure 24 Training on Small Scale Fruit Processing at Jhurar Khera

PARTICIPATION IN CONFERENCE/ SEMINAR/ MEETING

Programmes Attended

- 1) Ms. Surya attended ICAR-Industry Meet on Aflatoxin management in food and feed: Challenges and opportunities, on 04 Jan, 2021, organized by ICAR-IARI, New Delhi.
- 2) Dr. Sakharam Kale attended pre-workshop review meeting of AICRP on PEASEM (PET) conducted by PC, PET on 4-5 Jan, 2021
- 3) Dr. Sakharam Kale Attended annual workshop of AICRP on PEASEM (PET) on 8-9 Jan, 2021 and presented the progress of PET centre.
- 4) Dr Rahul K. Anurag attended Online Photonics Spectra Conference 2021, 19-22 Jan, 2021, organized by Photonics Media, 100 West St., Pittsfield, MA, 01201 USA.
- 5) Dr. K. Narsaiah attended IMC meeting of ICAR-IIHR, Bengaluru on 15 Mar, 2021 through online mode.
- 6) Dr. Vinod Saharan attended International webinar on capacity building on PHT for better seed quality on 15-17 Mar, 2021
- 7) Dr. Renu Balakrishnan, Scientist attended a webinar organized by ICAR- CIWA, Bhubaneswar on “Partnering Women in Value Chain Development: A Promising Way for Creating Sustained Livelihood and Agripreneurship” on 17 Mar, 2021
- 8) Mr. Vikas Kumar, Scientist attended a virtual talk on ‘Precision Mechanization’ delivered by DDG (Agri Engg.), ICAR, New Delhi on 25 Mar, 2021.

Lectures Delivered

1. Dr. Deepika Goswami delivered a plenary lecture via digital platform on ‘Non-nutritive bioactive components of pulses’ as Invited plenary speaker in the 9th International Conference on ‘Technology, Innovation and Management for Sustainable Development-TIMS 2021’ held during 18-20 Feb, 2021 at ITM University, Gwalior (M.P.).
2. Dr. Guru PN delivered invited Lecture entitled “Technological advancements in stored insect management - Use of Non-chemical options” in International Virtual Conference on Emerging Trends in Food Protectants and Infestation Control (ET-FPIC 2021)” organized by PSSG & FPIC, CSIR-CFTRI, Mysuru on 24-25 Feb, 2021.
3. Dr. Sandeep Mann delivered an invited lecture on “Grading and sorting of fruits and vegetables” to officers of Horticultural department at SKUAST-Jammu on 25 Feb, 2021.
4. Dr. DN Yadav delivered a lecture on “Pulse processing & value addition” in brain storming workshop at RLBAU, Jhansi during 27-28 Feb, 2021.
5. Mr. Vikas Kumar, Scientist delivered lecture on-line on “Fish Processing” in a DST sponsored ‘Technology Development Entrepreneurship Program’ of Amity University, Noida on 13 Mar, 2021.
6. Dr. DN Yadav delivered invited lecture to participants of District Training on Fats and Oilseed Processing, Balrampur District, Chattisgarh on “Groundnut processing for development of dairy analogues and other value-added products” on 20 Mar, 2021 organized by IGKV Raipur during 19-27 Mar, 2021.
7. Dr. Khwairakpam Bembem delivered an invited lecture on the topic ‘Organic and genetically modified foods’ on 22 Mar, 2021 at (3.00-5.00pm) through online mode for the final year

students of the College of Community Sciences, Central Agricultural University, Tura Meghalaya.

8. Rahul K Anurag delivered two online lectures on 25 Mar, 2021 in Online Training of Master Trainers on Fat and Oilseed processing' Capacity Building Component of THE PMFME Scheme for District Balrampur, Chattisgarh organized by organized by IGKV Raipur during 19-27 Mar, 2021.

PATENT

Patent Filed:

S.No.	Patent Application No.	Title	Inventors	Date of Filing
1	20211014289	Encapsulated curcumin in microcapsules for use as food ingredient	Dr.K. Narsaiah	30.03.2021
2	202111014302	Cool tower for production of microcapsules from high melting fats and waxes	Dr.K. Narsaiah	30.03.2021

TRANSFER OF TECHNOLOGY

Technologies Licensed/Commercialized:

S.No.	Name of Technology	Contracting Party	Date of Licensing
1	Portable Smart Ultraviolet-C Disinfection System" (UViC)	M/s GT Bio sciences Pvt Ltd., Plot No. 47/ 48, Prem Sai-IV, Shilpa Co-op. Housing Society, Nagpur Nagpur	30.03.2021
2	Ozone based Fruits and Vegetable Washer-Cum-Purifier (Ozo-C)	M/s GT Bio sciences Pvt Ltd., Plot No. 47/ 48, Prem Sai-IV, Shilpa Co-op. Housing Society, Nagpur Nagpur	30.03.2021

PERSONALIA

Transfer

Dr. Dukare Ajinath Shridhar, Scientist has been transferred from ICAR-CIPHET, Ludhiana to ICAR-CIRCOT, Mumbai and relieved from his duties at ICAR-CIPHET, Abohar in the afternoon of 02 Mar, 2021

TITBITS

Vegan Diet Significantly Remodels Metabolism in Young Children

Researchers of University of Helsinki reported a comprehensive pilot study on the metabolic effects of full vegan diet on young children. The study found vegan children to have remarkably altered metabolism and lower vitamin A and D status compared to children with no special diet.

<https://www.sciencedaily.com/releases/2021/01/210121132300.htm>

Turning Food Waste Back into Food

Scientists of the University of California have discovered fermented food waste can boost bacteria that increase crop growth, making plants more resistant to pathogens and reducing carbon emissions from farming.

<https://www.sciencedaily.com/releases/2021/01/210128091143.htm>

Making Wheat and Peanuts Less Allergenic

Sachin Rustgi, a member of the Crop Science Society of America and his colleagues, are using plant breeding and biotechnology to remove proteins associated with food allergies, to develop less allergenic varieties of wheat and peanuts. Their goal is to increase food options for people with allergies.

<https://www.sciencedaily.com/releases/2021/01/210127085239.htm>

Bleeding Gums may be a Sign You Need More Vitamin C in Your Diet

Bleeding of the gums on gentle probing, or gingival bleeding tendency, and also bleeding in the eye, or retinal hemorrhaging, are associated with low vitamin C levels in the bloodstream.

<https://www.sciencedaily.com/releases/2021/02/210201101526.htm>

Omega 3 Fatty Acids may Prevent Development of Asthma

Researchers found that in children carrying a common gene variant, a diet high in long-chain omega-3 fatty acids may reduce the risk of developing asthma.

<https://www.sciencedaily.com/releases/2021/02/210201101526.htm>

Global Leader in Nutrition, Amway Bets Big on Ayurveda

Amway India has launched *chyawanprash* under its flagship brand Nutrilite. It is a concentrated blend of nutrient-rich 32 herbs authenticated by DNA fingerprinting made with 16 certified organic ingredients, and with no preservatives.

<http://www.fnbnnews.com/Nutrition/global-leader-in-nutrition-amway-bets-big-on-ayurveda-62627>

Pulses are Key to Food Security, Healthy Diets and Sustainable Agri-Food Systems: FAO

The Director-General of the Food and Agriculture Organisation of the United Nations (FAO) QU Dongyu highlighted pulses' crucial role in achieving food security, healthy diets and

sustainable agri-food systems. The Director-General also pointed out that pulses had a higher cost-benefit ratio than other staples, which helped diversify and improve the income of rural people, often women and youth, and located in vulnerable regions.

<http://www.fnbnnews.com/Food-Processing/pulses-are-key-to-food-security-healthy-diets-and-sustainable-agrifood-systems-fao-62255>

India Needs Post-Harvest Revolution or Food Processing Revolution: PM Modi

PM Modi, while addressing a webinar on budget provisions for the farm sector, highlighted the various initiatives taken by the government in the financial document for the next fiscal year. Prime Minister Narendra Modi on Monday stressed it is time to expand the agriculture sector to “a global market for processed food” and said India needs a post-harvest or food processing revolution.

<https://www.hindustantimes.com/business/india-needs-post-harvest-revolution-or-food-processing-revolution-pm-modi-101614584015949.html>

₹ 1 Lakh Crore Fund to Reduce Post-Harvest Losses: Agriculture Minister

Flagging health of the soil and post-harvest management as major areas of concern for the Indian farm sector, Agriculture Minister Narendra Singh Tomar on Wednesday (27Jan, 2021) said the government has set up ₹ 1 lakh crore fund under Aatmanirbhar Bharat programme to strengthen the storage infrastructure and reduce post-harvesting losses.

<https://www.ndtv.com/india-news/rs-1-lakh-crore-fund-to-reduce-post-harvest-losses-agriculture-minister-narendra-singh-tomar-2359011>

NEWS COVERAGE

ICAR-CIPHET celebrated International Women's Day

These celebrities shared their success stories

 cityairnews Mar 8, 2021 08:56



Adopt Fisheries as an enterprise for income enhancement: VC SKUAST-J



Prof. J.P. Sharma, VC, SKUAST inaugurating 'Post-Harvest Handling and Processing of Freshwater Fish' at Krishi Vigyan Kendra in Jammu on Tuesday.

GJ REPORT
JAMMU, FEB 2: Prof. J.P. Sharma, Vice-Chancellor, SKUAST Jammu today inaugurated 3 days training on 'Post-Harvest Handling and Processing of Freshwater Fish' for Scheduled Caste community of Jammu at Krishi Vigyan Kendra Jammu. The training programme was organized by ICAR-CIPHET Ludhiana with the aim to provide hand-on-training for increasing their income and thereby improving their socio-economically. Speaking on the occasion Prof. J.P. Sharma, Vice-Chancellor, SKUAST-J stressed upon

the adoption of fisheries as an enterprise for achieving manifold increase in farmers income and suggested the organizers to demonstrate the practical aspect of post-harvest handling and processing during the programme.

Prof. Sharma, VC SKUAST-J thanked ICAR-CIPHET for its collaboration with the institute for the benefit of SC beneficiaries of Jammu and acknowledged the role of the institute. Dr S.K Gupta, Director of Extension and Dr. M.S. Badhwal, Dean FVSc & AH, SKUAST-J were Guests of Honour during inaugural function of the training. At the outset Dr. Punith Choudhary, Sr. Scientist and Head, KVK Jammu welcomed the dignitaries in the program.

The programme was organized under the guidance of Dr. Nachiket Kotwalwale, Director, ICAR-CIPHET, Ludhiana and coordinated by Dr. A.U. Muzaddadi, Pr. Scientist and Nodal Officer, SCSP, and Scientist (Fisheries) delivered expert lectures on post harvest handling and value addition on the opening day. Dr. Prem Kumar and Dr. Vikas Kumar demonstrated the preparation of fish pickles to a total of 50 participants from different villages of Jammu district. A training manual was also released in the occasion.

VC SKUAST-J for many fold income enhancement by adoption of Fisheries as an enterprise

JL NEWS SERVICE

JAMMU, Feb 2: Prof. J.P. Sharma, Vice-Chancellor, SKUAST Jammu today inaugurated 3 days training on 'Post-Harvest Handling and Processing of Freshwater Fish' for Scheduled Caste community of Jammu at KrishiVigyan Kendra Jammu. The training programme was organized by ICAR-CIPHET Ludhiana with the aim to provide hand-on-training for increasing their income and thereby improving their socio-economically.

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శ్రీమతి ఉత్పత్తుల తయారీ శిక్షణ
 కూసుమంచి, మ్యాంటుడే: రాష్ట్రంలోని మంచిరీటి తెలుపులో పెంచుతున్న చేపలు, కొయ్యలతో తయారుచేసే అనేక రకాల ఆహార పదార్థాలకు మార్కెట్లో మంచి గిరాకీ ఉంటోంది దని పెట్టెరులోని మత్స్య కళాశాల సహాయ అధ్యాపకులు ఆర్.శ్రీమతి విల్లమలకి సాగించి మత్స్య పరిశోధన కేంద్రంలో ఎన్టీఎస్ఎల్ కలకత్తా తయారీ అంశంపై శిక్షణ పంపిణీ చేసారు. ఈ సందర్భంగా ఆర్.శ్రీమతి విల్లమలకి సాగించి మత్స్య పరిశోధన కేంద్రంలో ఎన్టీఎస్ఎల్ కలకత్తా తయారీ అంశంపై శిక్షణ పంపిణీ చేసారు.

ఈనాడు ఖమ్మం
 మార్చి 19, 2021

మత్స్య సాంకేతిక విద్య కళాశాల ఏర్పాటుకు ప్రతిపాదన
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ఈనాడు ఖమ్మం
 మార్చి 24, 2021

ఆహా ఏమి రుచి..
 చేపల ఉత్పత్తుల తయారీ శిక్షణ పంపిణీ

సమస్య తెలంగాణ
ఖమ్మం
 మార్చి 25, 2021

ఈనాడు ఖమ్మం
 మార్చి 24, 2021

శిక్షణ చేపటి.. భక్షణ చూపిటి
 చేపల ఉత్పత్తుల తయారీ శిక్షణ పంపిణీ

SC Sub Plan
FORWARD AT THE LUDHIANA'S CENTRAL RESEARCH OF Post-Harvest Engineering and Technology