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# वार्षिक प्रतिवेदन ANNUAL REPORT

भा.कृ.अनु.प.-केन्द्रीय कटाई-उपरान्त अभियांत्रिकी एवं प्रौद्योगिकी संस्थान  
लुधियाना-141004, पंजाब, भारत

ICAR-Central Institute of Post-Harvest Engineering and Technology  
Ludhiana-141004, Punjab, India

(ISO/IEC 17025:2017 Accredited and ISO 9001:2015 Certified)

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# वार्षिक प्रतिवेदन

## ANNUAL REPORT

### 2024

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भाकृअनुप  
ICAR



भाकृअनुप-सीफेट  
ICAR-CIPHET

## प्रस्तावना

मैं भा.कृ.अनु.प.—केंद्रीय कटाई उपरांत अभियांत्रिकी और प्रौद्योगिकी संस्थान, लुधियाना की वार्षिक रिपोर्ट – 2024 प्रस्तुत करते हुए गौरवान्वित महसूस कर रहा हूँ। यह प्रतिवेदन पिछले वर्ष के दौरान हमारी प्रमुख गतिविधियों, बाह्य कार्यक्रमों और महत्वपूर्ण उपलब्धियों पर प्रकाश डालती है। यह संस्थान नवीन कटाई—उपरांत प्रौद्योगिकियों को विकसित करके मानवता की सेवा के लिए समर्पित है। हमारा कार्य स्वचालित संचालन का उपयोग करके कुशलता में बढ़ोतरी और खाद्य हानि का कम करने, कृषि उत्पादों में मूल्य संवर्धन करने, उद्यमिता को बढ़ावा देकर किसानों की आय में वृद्धि करने और कृषि उप—उत्पादों को प्रभावी ढंग से उपयोग करने पर केंद्रित है। इस प्रतिवेदन में हमारी गतिविधियों का एक व्यापक अभिलेख शामिल है, जिसमें दो अखिल भारतीय समन्वित अनुसंधान परियोजनाओं (एआईसीआरपी) और एक कंसोर्टियम अनुसंधान मंच (सीआरपी) से हमारे योगदान शामिल हैं।



संस्थान की प्रमुख उपलब्धियों में अत्याधुनिक प्रौद्योगिकियां, अभियांत्रिकी समाधान और नये खाद्य उत्पाद सहित नवाचारों की एक विस्तृत श्रृंखला शामिल है। इन नवाचारों को व्यापक अनुसंधानों के माध्यम से विकसित किया गया है और प्रमाणित वैज्ञानिक पद्धतियों का उपयोग करके मान्य किया गया है। हमारे कार्य के परिणाम स्वरूप विभिन्न क्षेत्रों में प्रभावशाली प्रगति हुई है। हमने कीट प्रबंधन (भंडारण—अनाज कीट फोटोटैक्सिस परीक्षण), सतत प्रोटीन उत्पादन, सटीक कृषि (सेंसर—आधारित केला गुणवत्ता निगरानी), जलीय कृषि (मछली निश्चेतना और पुनर्प्राप्ति) और उन्नत खाद्य प्रसंस्करण के लिए नवीन समाधान विकसित किये हैं। हमारे मानकीकृत प्रोटोकॉल उच्च गुणवत्ता वाले उत्पादों के उत्पादन को सक्षम करते हैं, जिनमें वैक्यूम—फ्राइड कमल तना चिप्स, पोषक तत्वों से भरपूर रागी और बाजरा—आधारित स्नैक्स, मखाना पफ और एक शाकाहारी व्हिपिंग क्रीम शामिल हैं। हम अपनी माइसेलियम—आधारित पैकेजिंग और कार्बन ऑडिटिंग क्षमताओं के साथ स्थिरता को भी आगे बढ़ा रहे हैं और पीसीएम—आधारित केला पकाने के साथ पालक स्याही आधारित 3डी खाद्य मुद्रण जैसी नवीन खाद्य प्रौद्योगिकियों की खोज भी कर रहे हैं।

यह संस्थान क्षमता निर्माण को प्राथमिकता देता है। वर्ष 2024 में 1500 से अधिक प्रतिभागियों के लिए लगभग 50 प्रशिक्षण कार्यक्रम आयोजित किए गए, जो कृषि और पशुधन उपज के कटाई उपरांत प्रबंधन पर केंद्रित थे। संस्थान ने बाह्य गतिविधियाँ आयोजित कीं, एक वाणिज्यिक—पैमाने की प्रसंस्करण इकाई शुरू की और एक किसान मेला के साथ सीफेट—आईफा (कृषि प्रसंस्करण पर उद्योग इंटरफेस मेला) 2024 की मेजबानी की। इन कार्यक्रमों ने उद्यमियों सहित हितधारकों की एक विस्तृत श्रृंखला के लिए अत्याधुनिक प्रौद्योगिकियों का प्रदर्शन किया। आईसीएआर संस्थानों और व्यवसायों के 70 से अधिक स्टालों ने कृषि—प्रसंस्करण में सहयोग और ज्ञान के आदान—प्रदान को बढ़ावा दिया। इसके अतिरिक्त, दो उद्योग इंटरफेस बैठकों के द्वारा खाद्य और रेशा प्रसंस्करण एवं व्यवसाय स्टार्टअप में चुनौतियों का समाधान किया। एशियाई सदस्य देशों के 16 प्रतिभागियों के लिए एक अंतर्राष्ट्रीय क्षमता—निर्माण कार्यक्रम फल—सब्जियों और श्री अन्न की कटाई उपरांत प्रौद्योगिकी पर ध्यान केंद्रित करते हुए तैयार किया जो नवंबर 2024 में संस्थान में आयोजित किया गया।

वर्ष 2024 में, संस्थान ने समीक्षित पत्रिकाओं में 70 शोध पत्र प्रकाशित किये और अपने वैज्ञानिकों द्वारा प्राप्त कई पुरस्कारों और सम्मानों के साथ अनुसंधान उत्कृष्टता के लिए एक मजबूत प्रतिबद्धता का प्रदर्शन किया। यह प्रतिबद्धता 5 उद्यमियों को 7 प्रौद्योगिकियों के लाइसेंस, 5 पेटेंट दाखिल करने और 5 पेटेंट प्राप्त करने से और भी स्पष्ट हुई। विशेष रूप से, संस्थान ने अपने खाद्य परीक्षण प्रयोगशाला के लिए राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड



(एनएबीएल) द्वारा प्रत्यायन प्राप्त किया, जिससे खाद्य परीक्षण में उच्च मानकों को सुनिश्चित किया और अपनी वेबसाइट के लिए मानकीकरण परीक्षण और गुणवत्ता प्रमाणन निदेशालय (एसटीक्यूसी) द्वारा प्रमाण पत्र प्राप्त किया, जो गुणवत्ता और सरकारी दिशानिर्देशों के पालन के लिए इस संस्थान के समर्पण को दर्शाता है। संस्थान ने उपज की बिक्री, प्रशिक्षण कार्यक्रमों, खाद्य परीक्षण सेवाओं और प्रौद्योगिकी अनुज्ञप्ति सहित विभिन्न माध्यमों से लगभग रु. 40.00 लाख का राजस्व उत्पन्न किया। इसके अलावा, कटाई उपरांत मशीनरी और उपकरण परीक्षण केंद्र (पीएचएमईटीसी) ने देश भर से 57 मशीनों का परीक्षण किया, जिससे लगभग रु. 1.36 करोड़ का राजस्व प्राप्त हुआ।

वर्ष 2024 में दो एआईसीआरपी परियोजनाओं के तहत कटाई-उपरांत प्रौद्योगिकियों में महत्वपूर्ण प्रगति की गई। पीएचईटी-एआईसीआरपी ने करीब 20 कटाई उपरांत उपकरण, प्रक्रिया प्रोटोकॉल और उत्पादों का विकास किया। इस परियोजना द्वारा 46 प्रौद्योगिकियों को हितधारकों को सफलतापूर्वक स्थानांतरित किया गया। पीईएसईएम-एआईसीआरपी ने भी करीब 9 प्रौद्योगिकियों का विकास किया और उन्हें हितधारकों को सफलतापूर्वक स्थानांतरित किया। अपने प्रभाव को बढ़ाने के लिए भा.कृ.अनु.प.-सीफेट ने अपनी राष्ट्रीय और अंतर्राष्ट्रीय दृश्यता बढ़ाने के साथ आधिकारिक कार्य में हिन्दी के उपयोग पर बढ़ावा देने पर भी ध्यान केन्द्रित किया। संस्थान ने स्वच्छ भारत मिशन, अनुसूचित जाति उप-योजना जैसी प्रमुख सरकारी पहलों को भी लगन से कार्यान्वित किया। भा.कृ.अनु.प.-सीफेट तकनीकी नवाचार और प्रभावशाली हस्तक्षेपों के माध्यम से कटाई-उपरांत अभियांत्रिकी अनुसंधान और विकास को आगे बढ़ाने के लिए समर्पित है। उत्कृष्टता के लिए मजबूत प्रतिबद्धता के साथ, मुझे विश्वास है कि हम कटाई उपरांत अनुसंधान और विकास में महत्वपूर्ण उपलब्धियों के लिए प्रयास करना जारी रखेंगे।

*Nachiket*

(नचिकेत कोतवालीवाले)  
निदेशक

## PREFACE

I am honoured to present the Annual Report - 2024 of the ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana. This report highlights our key activities, outreach programs and significant achievements during the past year. The Institute is dedicated to serving humanity by developing innovative post-harvest technologies. Our work focuses on improving efficiency and reducing food loss by automating operations, adding value to agricultural products, fostering entrepreneurship to increase farmers' income and effectively utilizing agricultural by-products. This report includes a comprehensive record of our activities, including our contributions from two All India Coordinated Research Projects (AICRPs) and one Consortium Research Platform (CRP).



The Institute's major outputs encompass a wide range of innovations, including cutting-edge technologies, engineering solutions and innovative food products. These advancements are rigorously developed through extensive experimentation and validated using sound scientific methodologies. Our work has resulted in impactful advancements across various sectors. We have developed novel solutions for pest management (stored-grain moth phototaxis testing), sustainable protein production, precision agriculture (sensor-based banana quality monitoring), aquaculture (fish anesthetizing and recovery) and advanced food processing techniques. Our standardized protocols enable the production of high-quality products, including vacuum-fried lotus stem chips, nutrient-rich ragi and millet-based snacks, makhana puffs, and a vegan whipping cream. We are also advancing sustainability with our mycelium-based packaging and carbon auditing capabilities and exploring innovative food technologies like 3D food printing with spinach ink and PCM-based banana ripening.

The institute prioritizes capacity building, having organized around 50 training programs for over 1500 participants in 2024, focusing on post-harvest management of agricultural and livestock produce. The institute conducted outreach activities, commissioned a commercial-scale processing unit and hosted CIPHET-IIFA 2024 (Industry Interface Fair on Agro Processing) alongside a Kisan Mela (Farmer's Fair). These events showcased cutting-edge technologies to a wide range of stakeholders, including entrepreneurs. Over 70 stalls from ICAR institutes and businesses, fostered collaboration and knowledge exchange in agro-processing. Additionally, two industry interface meetings addressed challenges in food and fibre processing and business startups. An international capacity-building program, designed for 16 participants from ASEAN member states and focusing on post-harvest technology of fruits, vegetables and millets was conducted at the institute in November 2024.

In 2024, the institute demonstrated a strong commitment to research excellence with 70 research papers published in peer-reviewed journals and numerous awards and recognitions received by its scientists. This commitment was further evidenced by the licensing of 7 technologies to 5 entrepreneurs, the filing of 5 patents and the granting of 5 patents. Notably, the institute achieved National Accreditation Board for Testing and Calibration Laboratories (NABL) accreditation for its Food Testing Laboratory, ensuring high standards in food testing and received Standardisation Testing and Quality Certification Directorate (STQC) certification for its website, demonstrating its dedication to quality and adherence to government guidelines. The institute generated significant revenue through various avenues, including the sale of produce, training programs, food testing services, and technology licensing, amounting to approximately Rs. 40.00 lakh. Furthermore, the Post-Harvest Machinery and Equipment Testing Centre (PHMETC) tested 57 machines from across the country, generating a revenue of approximately Rs. 1.36 crores.



Significant progress was made in post-harvest technologies under two AICRP schemes in 2024. The AICRP on PHET witnessed the development of approximately 20 post-harvest tools, equipment, process protocols, and products. Notably, around 46 of these technologies were successfully transferred to stakeholders. In parallel, the AICRP on PEASEM saw the development of about 9 technologies which were successfully transferred to stakeholders.

To enhance its impact, ICAR-CIPHET focused on increasing its national and international visibility while promoting the use of Hindi in official work. The institute also diligently implemented key government initiatives such as Swachh Bharat Mission, Schedule-Caste Sub-Plan. ICAR-CIPHET remains dedicated to advancing post-harvest engineering research and development through technological innovation and impactful interventions. With a strong commitment to excellence, I am confident that our team will continue to strive for significant achievements in post-harvest research and development.

**Nachiket Kotwaliwale**  
**Director**

## कार्यकारी सारांश

भारतीय कृषि अनुसंधान परिषद—केंद्रीय कटाई—उपरांत अभियांत्रिकी और प्रौद्योगिकी संस्थान (भा.कृ.अनु.प.—सीफेट), भारत में कटाई उपरांत अभियांत्रिकी और प्रौद्योगिकी विकास के लिए समर्पित एक प्रतिष्ठित अनुसंधान संस्थान है जिसने वर्ष 2024 में महत्वपूर्ण प्रगति की है। संस्थान के रणनीतिक कार्य मुख्य रूप से अत्याधुनिक प्रौद्योगिकियों के विकास और मौजूदा पद्धतियों के परिशोधन पर केंद्रित थे, जिनका उद्देश्य कटाई—उपरांत नुकसान को कम करना, कटाई—उपरांत प्रसंस्करण को अनुकूलित करना और कृषि उपज के सावधानीपूर्वक गुणवत्ता प्रबंधन को सुनिश्चित करना था। अनुसंधान परिणामों को व्यावहारिक अनुप्रयोगों में अनुवादित करने के विशिष्ट महत्व को पहचानते हुए, भा.कृ.अनु.प.—सीफेट ने व्यापक हितधारकों के लिए नवाचारों के प्रभावी प्रसार पर महत्वपूर्ण जोर दिया। इसमें जमीनी स्तर पर काम करने वाले किसान, कृषि—प्रसंस्करण के ऊर्जावान क्षेत्र में उद्यम करने वाले इच्छुक उद्यमी और अपनी परिचालन दक्षता और प्रतिस्पर्धात्मकता को बढ़ाने के इच्छुक स्थापित उद्योग शामिल थे।

ज्ञान और प्रौद्योगिकी हस्तांतरण के प्रति संस्थान की प्रतिबद्धता को रणनीतिक पहलों की एक श्रृंखला के रूप में शामिल करते हुए बहुआयामी दृष्टिकोण के माध्यम से निष्पादित किया गया। सबसे पहले, विकसित प्रौद्योगिकियों के व्यवसायीकरण की सुविधा के लिए प्रौद्योगिकी लाइसेंसिंग समझौतों को सक्रिय रूप से आगे बढ़ाया गया, जिससे उनके व्यापक अंगीकरण और प्रभाव को सुनिश्चित किया गया। दूसरा, व्यक्ति विशेष और समुदायों के व्यावहारिक कौशल और ज्ञान प्रदान करने के लिए व्यापक प्रशिक्षण कार्यक्रम सावधानीपूर्वक तैयार और कार्यान्वित किये गये जिससे उन्हें नवाचारों को प्रभावी ढंग से उपयोग करने के लिये सशक्त बनाया गया। क्षमता—निर्माण को भी प्राथमिकता दी गई, जिसका उद्देश्य मानव संसाधनों के विकास को बढ़ावा देना और कृषि क्षेत्र में योगदान करने वाले हितधारकों की क्षमता को मजबूत करना था। इसके अलावा, कृषि परिदृश्य में विविध हितधारकों तक पहुंचने के लिए लक्षित विस्तार

गतिविधियां आयोजित करके, यह सुनिश्चित किया कि संस्थान के अनुसंधान के लाभ सबसे दूरस्थ और वंचित समुदायों तक भी पहुंचे। हितधारकों द्वारा सामना की जाने वाली महत्वपूर्ण चुनौतियों का समाधान करने में संस्थान की सफलता पूरे वर्ष किए गए अनुसंधान परियोजनाओं के विविध और प्रभावशाली पोर्टफोलियो से स्पष्ट रूप से प्रमाणित होती है। इसके लिए आंतरिक रूप से संचालित और बाहरी रूप से वित्त पोषित परियोजनाओं ने संस्थान को नवीन समाधान विकसित करने और लागू करने में सक्षम बनाया, जिनका कटाई—उपरांत प्रथाओं में सुधार पर मूर्त और सकारात्मक प्रभाव पड़ा। इन समाधानों ने कटाई उपरांत नुकसान को कम करने, कृषि उत्पादों की गुणवत्ता और सुरक्षा को बढ़ाने और अंततः खाद्य प्रणाली को स्थिरता और लचीलापन प्रदान करने में महत्वपूर्ण भूमिका निभाई।

वर्ष 2024 में, भा.कृ.अनु.प.—सीफेट ने भारतीय कृषि परिदृश्य में प्रमुखता से अपनी स्थिति को मजबूत किया, जो नवाचार के लिए उत्प्रेरक के रूप में कार्य करता है और हितधारकों को कटाई—उपरांत मूल्यवर्धन को बढ़ाने के लिए सशक्त बनाता है। संस्थान का योगदान तकनीकी समाधानों के विकास से परे, अधिक कुशल और टिकाऊ खाद्य प्रणाली के निर्माण के लिए व्यापक प्रतिबद्धता को शामिल करता है। इसमें पर्यावरण के अनुकूल प्रथाओं को अपनाने को बढ़ावा देना, मूल्य वर्धित उत्पादों के विकास को बढ़ावा देना और किसानों, प्रसंस्करणकर्ताओं और उपभोक्ताओं के बीच संबंधों को मजबूत करना शामिल था। संस्थान का प्रभाव तकनीकी प्रगति तक सीमित नहीं था। इसने कृषि—प्रसंस्करण क्षेत्र में उद्यमिता को बढ़ावा देने और रोजगार के अवसर पैदा करने में भी महत्वपूर्ण भूमिका निभाई। संस्थान ने प्रशिक्षण और तकनीकी सहायता प्रदान करके व्यक्तियों को अपना व्यवसाय शुरू करने के लिए सशक्त बनाया, जिससे आर्थिक विकास और ग्रामीण विकास में योगदान दिया। संस्थान की क्षमता निर्माण के प्रति प्रतिबद्धता विस्तार कार्यकर्ताओं, शोधकर्ताओं और नीति निर्माताओं सहित विभिन्न हितधारकों तक विस्तारित करके, यह सुनिश्चित किया कि इसके अनुसंधानों का लाभ



व्यापक रूप से प्रसारित और प्रभावी ढंग से उपयोग मिले। आगे देखते हुए, संस्थान कटाई उपरांत क्षेत्र में नवाचार को लाने और हितधारकों को सशक्त बनाने के उद्देश्य के लिए प्रतिबद्ध है। संस्थान अत्याधुनिक प्रौद्योगिकियों के विकास, प्रभावशाली अनुसंधान करने और ज्ञान का प्रसार करने पर ध्यान केंद्रित करना जारी रखेगा ताकि यह सुनिश्चित किया जा सके कि इसके काम के लाभ कृषि समुदाय के सभी वर्गों तक पहुंचें।

यह प्रतिवेदन कटाई उपरांत प्रसंस्करण, मूल्यवर्धन और कृषि अभियांत्रिकी में भा.कृ.अनु.प.—सीफेट और सहयोगी संस्थानों से प्रमुख अनुसंधान प्रगति को उजागर करती है। अनुसंधान कई प्रमुख क्षेत्रों में फैला हुआ है:

उपकरण विकास के क्षेत्र में, भा.कृ.अनु.प.—सीफेट ने विभिन्न कृषि प्रक्रियाओं के भीतर दक्षता बढ़ाने और श्रम आवश्यकताओं को कम करने के उद्देश्य से मशीनों की विविध श्रृंखला की रचना और निर्माण करके वर्ष 2024 में पर्याप्त प्रगति की। इस व्यापक प्रयास ने कई नवीन उपकरणों को बनाया, जिनमें कीट प्रबंधन रणनीतियों को अनुकूलित करने के लिए कीट व्यवहार के सटीक आकलन के लिए डिजाइन किए गए उपकरण, अनाज प्रसंस्करण को सुव्यवस्थित करने के लिए ग्रिट बनाने के लिए मशीनरी और मूल्य वर्धित उत्पादों के उत्पादन को सुविधाजनक बनाने के लिए प्रोटीन अलगाव के लिए उपकरण शामिल हैं। इसके अलावा, नाशपाती वस्तुओं को संरक्षित करने के लिए निर्जलीकरण प्रणालियों के विकास के साथ कोल्ड स्टोरेज तकनीक में प्रगति हासिल की गई, साथ ही इष्टतम पकने को सुनिश्चित करने के लिए आम गुणवत्ता आकलन और केला गुणवत्ता निगरानी के लिए गैर-विनाशकारी उपकरण भी विकसित किए गए। संस्थान ने मजबूत कोल्ड रूम मॉनिटरिंग सिस्टम, मछली निश्चेतना और पुनर्प्राप्ति मशीन, बहुमुखी बहु-फसल प्रसंस्करण इकाइयों और मिर्च तना हटाने, नारियल चिप प्रसंस्करण, नन्नारी जड़ प्रसंस्करण, मुरमुरा प्रसंस्करण, चेरी प्रसंस्करण, कटहल बीज छीलने, कसावा छीलने और मखाना बीज संग्रह और सुखाने जैसे कार्यों के लिए विशेष मशीनरी बनाने को भी प्राथमिकता दी, जो सभी कृषि क्षेत्र में बढ़ी हुई उत्पादकता और कम शारीरिक श्रम में योगदान करते हैं।

प्रक्रिया और उत्पाद विकास में संस्थान के अनुसंधान ने

मौजूदा प्रक्रियाओं को अनुकूलित करने और मूल्यवर्धन को बढ़ाने के लिए नवीन उत्पादों के निर्माण पर जोर दिखाया। इस प्रयास के परिणाम स्वरूप विकास की एक विविध श्रृंखला हुई, जिसमें स्वस्थ कमल तना चिप्स के उत्पादन के लिए वैक्यूम फ्राइंग का अनुकूलन, पौष्टिक बाजरा-आधारित एक्सट्रूडेड स्नैक्स और कोदो-क्विनोआ स्नैक्स और विस्तारित बाजार विकल्पों के लिए मखाना पफ का विकास शामिल है। इसके अलावा, अनुसंधान चिरौंजी गुठली के स्व-जीवन को बढ़ाने, शहद गुणवत्ता परीक्षण विधियों में सुधार और 3डी प्रिंटिंग के माध्यम से पालक-आधारित खाद्य स्याही विकसित करने पर केंद्रित था। संस्थान ने कुशल मशरूम सुखाने की तकनीकों का भी पता लगाया, अनार प्रसंस्करण को अनुकूलित किया और नियंत्रित केला पकाव के तरीकों को विकसित किया। नवाचारों ने मूंगफली-आधारित शाकाहारी व्हिपिंग क्रीम, डेयरी उप-उत्पादों का उपयोग करके व्हे-आम पेय, पारंपरिक हवाईजार के उत्पादन और ट्रिडेक्स प्रोकम्बेंस से मूल्यवान यौगिकों के निष्कर्षण के विकास तक विस्तार किया, जो उत्पाद में विविधता लाने और कृषि उपज के पोषण और कार्यात्मक मूल्य को बढ़ाने की प्रतिबद्धता को दर्शाता है।

स्थिरता और मूल्यवर्धन में अनुसंधान ने पर्यावरण के अनुकूल प्रथाओं और कृषि संसाधनों के अधिकतम उपयोग के प्रति एक मजबूत प्रतिबद्धता का प्रदर्शन किया। यह माइसेलियम-आधारित पैकेजिंग सामग्री, बायो थर्मोकॉल के विकास में स्पष्ट था, जो पारंपरिक प्लास्टिक के लिए एक बायोडिग्रेडेबल विकल्प प्रदान करता है। इसके अलावा, संस्थान ने एक लचीले चेक डैम के विकास के माध्यम से जल संरक्षण पर ध्यान केंद्रित किया और सौर ऊर्जा से चलने वाले चारा ड्रायर के विकास के साथ अक्षय ऊर्जा को अपनाने को बढ़ावा दिया। मटर की फली से आहार फाइबर संवर्धन पर केंद्रित परियोजनाओं के माध्यम से मूल्यवर्धन प्राप्त किया गया, जिससे कृषि उपोत्पादों की पोषण क्षमता को बढ़ावा दिया। इसके अतिरिक्त, अनुसंधान में मोरिंगा से ग्लूकोसाइनोलेट्स के निष्कर्षण और इसके मूल्यवान बायोएक्टिव यौगिकों की खोज की, और इमली के बीजों से स्टार्च और प्रोटीन के निष्कर्षण को अनुकूलित किया, जिनका उपयोग करके नवीन बायोफिल्म सामग्री का विकास किया। इन विविध परियोजनाओं ने टिकाऊ कृषि के लिए एक समग्र दृष्टिकोण को रेखांकित किया, जो

संसाधन दक्षता और कृषि संसाधनों से मूल्य वर्धित उत्पादों के निर्माण पर जोर देता है।

अनुसंधान तकनीकी नवाचार से परे प्रभाव आकलन और क्षमता निर्माण के महत्वपूर्ण पहलुओं को शामिल करने के लिए विस्तारित हुआ, जो प्रौद्योगिकी हस्तांतरण और सामाजिक-आर्थिक विकास के लिए एक व्यापक दृष्टिकोण को दर्शाता है। इसमें विस्तार पेशेवरों की क्षमताओं को बढ़ाने के उद्देश्य से समर्पित अनुसंधान प्रयास शामिल थे, यह सुनिश्चित करते हुए कि विकसित प्रौद्योगिकियां जमीनी स्तर पर प्रभावी ढंग से प्रसारित और कार्यान्वित की जा सके। इसके अलावा, संस्थान ने मूल्य वर्धित उत्पादों के गहन प्रभाव आकलन किए, उनकी आर्थिक व्यवहार्यता और सामाजिक लाभों का मूल्यांकन किया और इसी तरह मखाना पॉपिंग मशीनों के प्रभाव का आकलन किया, उनकी प्रसंस्करण दक्षता और आजीविका में सुधार के लिए उनके योगदान का विश्लेषण किया। इन अध्ययनों ने न केवल नवीन प्रौद्योगिकियों को विकसित करने के लिए बल्कि कृषि समुदाय और व्यापक अर्थव्यवस्था पर उनके सफल अंगीकरण और सकारात्मक प्रभाव को सुनिश्चित करने के लिए संस्थान की प्रतिबद्धता को रेखांकित किया।

उपकरण विकास, प्रक्रिया और उत्पाद विकास, स्थिरता और प्रभाव आकलन में संस्थान के विविध नवाचारों को चलाने वाला सर्वोपरि और एकीकृत उद्देश्य कृषि और खाद्य प्रसंस्करण क्षेत्रों को व्यापक रूप से बढ़ाना है। यह बहुआयामी लक्ष्य खाद्य गुणवत्ता में लक्षित सुधार, अपशिष्ट को कम करने के लिए उत्पाद के स्व-जीवन में महत्वपूर्ण विस्तार, कटाई उपरांत नुकसान में पर्याप्त कमी, खाद्य

उत्पादों के पोषण मूल्यों में रणनीतिक वृद्धि, पर्यावरणीय संसाधनों की रक्षा के लिए टिकाऊ प्रथाओं को बढ़ावा देने और अंततः एक अधिक मजबूत, लचीला और लाभकारी खाद्य प्रणाली में योगदान करते हुए कृषि आपूर्ति श्रृंखला में परिचालन दक्षता में लगातार वृद्धि के माध्यम से प्राप्त किया जा सकता है।

इस अवधि के दौरान, संस्थान ने सहकर्मी-समीक्षित पत्रिकाओं में 70 से अधिक शोधपत्र प्रकाशित किए हैं। भा.कृ.अनु.प.—सीफेट ने गतिविधियों के एक व्यापक समूह के माध्यम से कृषि और खाद्य प्रसंस्करण क्षेत्रों को आगे बढ़ाने में महत्वपूर्ण भूमिका निभाई है। संस्थान ने 25 से अधिक प्रशिक्षण कार्यक्रम आयोजित किए हैं, जिन्होंने किसानों, उद्यमियों और ग्रामीण युवाओं को कृषि-प्रसंस्करण, मूल्यवर्धन और कटाई के बाद के प्रबंधन में आवश्यक कौशल के साथ सशक्त बनाया है, जिससे उनकी आजीविका में सुधार हुआ है। कृषि विज्ञान केंद्र (कृ.वि.के) की गतिविधियों ने खेत पर प्रदर्शनों, परीक्षणों और सलाहकार सेवाओं के माध्यम से प्रभावी प्रौद्योगिकी हस्तांतरण की सुविधा प्रदान की है।

इसके अतिरिक्त, भा.कृ.अनु.प.—सीफेट की कृषि-व्यवसाय इन्क्यूबेशन सुविधाओं को महत्वपूर्ण समर्थन प्रदान करके पांच से अधिक उष्णयन केंद्रों तक विस्तारित किया गया है, जिससे नवीन कृषि-प्रसंस्करण प्रौद्योगिकियों के व्यवसायीकरण में तेजी आई है। संस्थान ने ज्ञान का प्रसार करने, अत्याधुनिक प्रौद्योगिकियों को प्रदर्शित करने और हितधारक बातचीत को सुविधाजनक बनाने के लिए कई कार्यक्रमों और कार्यशालाओं का आयोजन किया है, जिससे सहयोग और ज्ञान विनिमय को बढ़ावा मिला है।



## EXECUTIVE SUMMARY

The Indian Council of Agricultural Research-Central Institute of Post-Harvest Engineering and Technology (ICAR-CIPHET), a distinguished research institution dedicated to the advancement of post-harvest engineering and technology in India, marked a year of substantial progress in 2024. The institute's strategic endeavours were primarily focused on the development of cutting-edge technologies and the refinement of existing methodologies, all aimed at reducing post-harvest losses, optimizing post-harvest processing and ensuring the meticulous quality management of agricultural produce. Recognizing the critical importance of translating research outcomes into practical applications, ICAR-CIPHET placed a significant emphasis on the effective dissemination of these advancements to a broad spectrum of stakeholders. This included farmers operating at the grassroots level, aspiring entrepreneurs venturing into the dynamic field of agro-processing and established industries seeking to enhance their operational efficiency and competitiveness.

The institute's commitment to knowledge and technology transfer was executed through a multi-faceted approach, encompassing a range of strategic initiatives. Firstly, technology licensing agreements were actively pursued to facilitate the commercialization of developed technologies, ensuring their widespread adoption and impact. Secondly, comprehensive training programs were meticulously designed and implemented to impart practical skills and knowledge to individuals and communities, empowering them to effectively utilize the advancements. Capacity-building initiatives were also prioritized, aiming to foster the development of human resources and strengthen the capacity of stakeholders to contribute to the agricultural sector. Furthermore, targeted extension activities were conducted to reach diverse audiences across the agricultural landscape, ensuring that the benefits of institute's research extended to even the most remote and underserved communities. The institute's success in addressing

the critical challenges faced by stakeholders is clearly evidenced by the diverse and impactful portfolio of research projects undertaken throughout the year. These projects, both internally and externally funded, enabled institute to develop and implement innovative solutions that had a tangible and positive impact on improving post-harvest practices. These solutions played a crucial role in reducing post-harvest losses, enhancing the quality and safety of agricultural products and ultimately contributing to the sustainability and resilience of the food system.

In 2024, ICAR-CIPHET solidified its position as a key player in the Indian agricultural landscape, acting as a catalyst for innovation and empowering stakeholders to enhance post-harvest value addition. The institute's contributions extended beyond the development of technological solutions, encompassing a broader commitment to building a more efficient and sustainable food system. This involved promoting the adoption of environmentally friendly practices, fostering the development of value-added products and strengthening the linkages between farmers, processors and consumers. The Institute's impact was not limited to technological advancements; it also played a crucial role in fostering entrepreneurship and creating employment opportunities in the agro-processing sector. Institute empowered individuals to start their own businesses by providing training and technical assistance, contributing to economic growth and rural development. The institute's commitment to capacity building extended to various stakeholders, including extension workers, researchers and policymakers, ensuring that the benefits of its research were widely disseminated and effectively utilized. Looking ahead, institute remains committed to its mission of driving innovation and empowering stakeholders in the post-harvest sector. The institute will continue to focus on developing cutting-edge technologies, conducting impactful research, and disseminating knowledge to ensure that the benefits of its work

reach all segments of the agricultural community.

This report highlights key research advancements from ICAR-CIPHET and collaborating institutions in post-harvest processing, value addition and agricultural engineering. The research spans several key areas:

In the realm of equipment development, ICAR-CIPHET made substantial strides in 2024 by designing and fabricating a diverse range of machinery aimed at enhancing efficiency and minimizing labour requirements within various agricultural processes. This comprehensive effort yielded numerous innovative devices, including those designed for the precise assessment of insect behaviour to optimize pest management strategies, machinery for grit making to streamline grain processing, and equipment for protein isolation to facilitate the production of value-added products. Furthermore, advancements were achieved in cold storage technology with the development of dehumidification systems to preserve perishable goods, alongside non-destructive tools for mango quality assessment and banana quality monitoring to ensure optimal ripening. The institute also prioritized the creation of robust cold room monitoring systems, fish anesthetizing and recovery machine, versatile multi-crop processing units, and specialized machinery for tasks such as chili stem removal, coconut chip processing, nannari root processing, popped rice processing, cherry processing, jackfruit seed peeling, cassava peeling and makhana seed collection and drying, all contributing to increased productivity and reduced manual labour within the agricultural sector.

Institute's research in process and product development showcased a strong emphasis on optimizing existing processes and creating innovative products to enhance value addition. This endeavour resulted in a diverse range of developments, including the optimization of vacuum frying for producing healthier lotus stem chips, the development of nutritious millet-based extruded snacks and kodo-quinoa snacks and makhana puffs for expanded market options. Furthermore, research focused on extending the

shelf-life of Chironji kernels, improving honey quality testing methods, and developing spinach-based food ink through 3D printing. The institute also explored efficient mushroom drying techniques, optimized pomegranate processing, and developed controlled banana ripening methods. Innovations extended to the development of peanut-based vegan whipping cream, a whey-mango beverage utilizing dairy by-products, the production of traditional Hawaijar and the extraction of valuable compounds from *TridaxProcumbens*, all demonstrating a commitment to diversifying product offerings and enhancing the nutritional and functional value of agricultural produce.

Research in sustainability and value addition demonstrated a strong commitment to environmentally responsible practices and the maximization of agricultural resources. This was evident in the development of a mycelium-based packaging material, BIOTHERMOCOL, offering a biodegradable alternative to traditional plastics. Furthermore, the institute focused on water conservation through the development of a flexible check dam and promoted renewable energy adoption with the development of a solar-powered fodder dryer. Value addition was achieved through projects focused on dietary fiber enrichment from pea pods, maximizing the nutritional potential of agricultural byproducts. Additionally, research explored the extraction of glucosinolates from moringa, harnessing its valuable bioactive compounds, and optimized the extraction of starch and protein from tamarind seeds, leading to the development of innovative biofilm materials. These diverse projects underscored a holistic approach to sustainable agriculture, emphasizing resource efficiency and the creation of value-added products from agricultural resources.

Research extended beyond technological innovation to encompass crucial aspects of Impact Assessment and Capacity Building, reflecting a comprehensive approach to technology transfer and socio-economic development. This included dedicated research efforts aimed at enhancing the capabilities of extension professionals, ensuring

that the developed technologies are effectively disseminated and implemented at the grassroots level. Furthermore, the institute conducted thorough impact assessments of value-added products, evaluating their economic viability and social benefits and similarly assessed the impact of makhana popping machines, analysing their contribution to improving processing efficiency and livelihoods. These studies underscored institute's commitment to not only developing innovative technologies but also ensuring their successful adoption and positive impact on the agricultural community and the broader economy.

The overarching and unified objective driving institute's diverse innovations across equipment development, process and product development, sustainability and impact assessment is to comprehensively enhance the agricultural and food processing sectors. This multifaceted goal is achieved through the targeted improvement of food quality, the significant extension of product shelf life to minimize waste, the substantial reduction of post-harvest losses, the strategic enhancement of nutritional value in food products, the promotion of sustainable practices to safeguard environmental resources, and the consistent increase in operational efficiency throughout the agricultural

supply chain, ultimately contributing to a more robust, resilient, and beneficial food system.

During this period the institute has published more than 70 research paper in peer reviewed journals. ICAR-CIPHET, has played a pivotal role in advancing agricultural and food processing sectors through a comprehensive suite of activities. The Institute's has conducted more than 25 trainings programs which have empowered farmers, entrepreneurs and rural youth with essential skills in agro-processing, value addition and post-harvest management, directly contributing to improved livelihoods. The Krishi Vigyan Kendra (KVK) activities have facilitated effective technology transfer through on-farm demonstrations, trials and advisory services.

Furthermore, institute's agri-business incubation facilities has been extended to more than five incubators by providing crucial support, accelerating the commercialization of novel agro-processing technologies. The Institute has also organized numerous events and workshops to disseminate knowledge, showcase cutting-edge technologies and facilitate stakeholder interactions, fostering collaboration and knowledge exchange.





**ICAR CIPHET**  
Estd 1989



सर्वे भद्राणि कुर्यात्

## VISION AND MISSION

### VISION

Higher profitability of agricultural production systems ensuring better income to farmers and increased employment opportunities in rural sector through efficient post-harvest engineering and technological interventions for loss reduction and value addition to agricultural produce and byproducts resulting in high quality and safe food and feed at competitive prices for domestic and export markets.

### MISSION

Creating prosperity through minimization of post-harvest losses from 15% to 5% and increase in value addition from present level of 10% to 30% to produce and by-products from crops, horticulture, livestock and fisheries sectors.

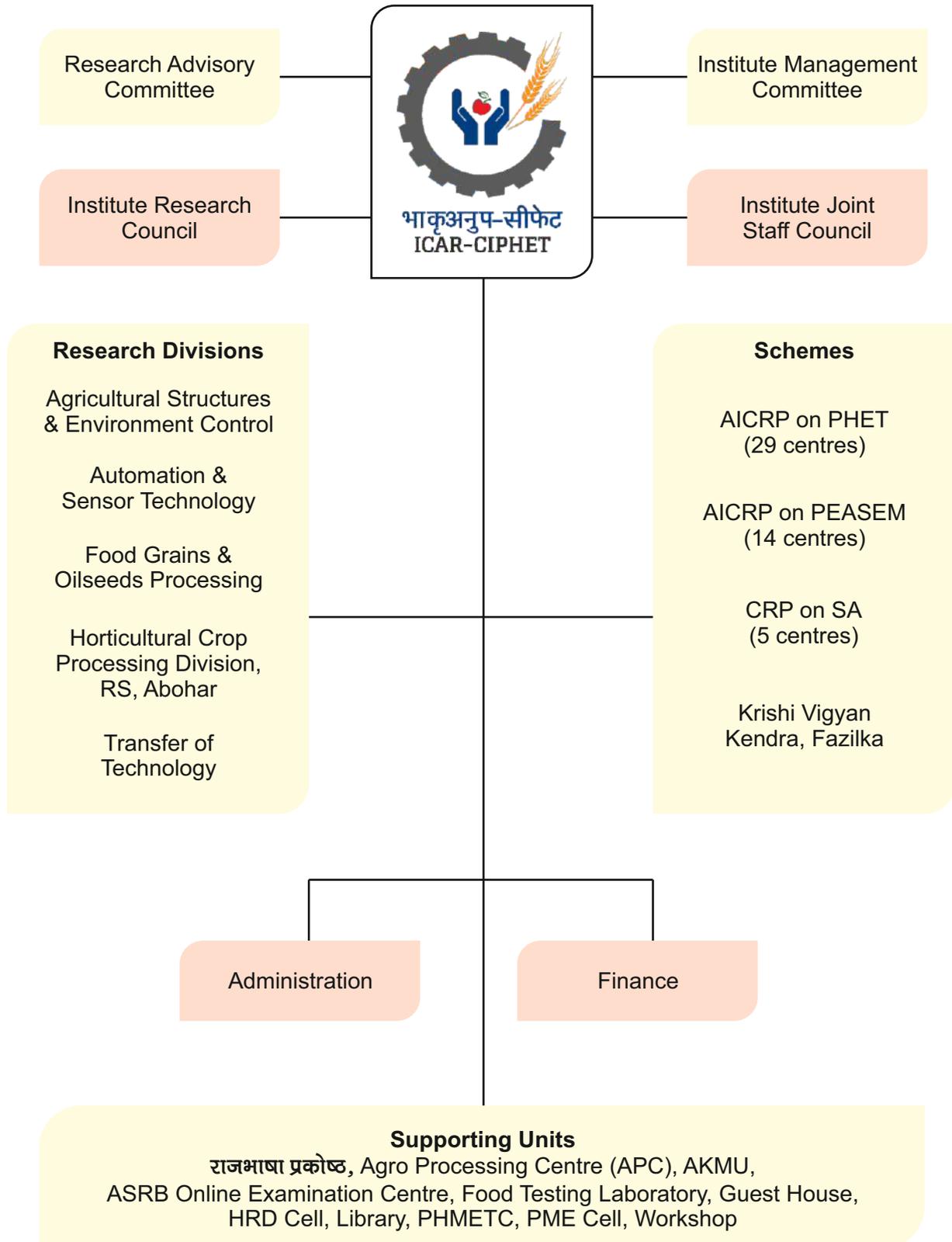


## MANDATE

- ➔ Research on post-harvest processing, preservation, storage and value addition of agricultural commodities.
- ➔ Human resource and entrepreneurship development in post-harvest engineering and technology.



# ORGANOGRAM



## OVERVIEW

Established on 03 October 1989 with a primary campus in Ludhiana, Punjab and a secondary campus established on 19 March 1993 at Abohar, ICAR-CIPHET serves as India's central institute dedicated to post-harvest engineering and value addition technologies. Its mission is to conduct pioneering research tailored to the needs of specific agricultural regions and processing industries. ICAR-CIPHET plays a pivotal role in coordinating research efforts across the country by leading two All India Coordinated Research Projects (AICRPs): one focused on Post-Harvest Engineering and Technology (PHET) and another on Plastic Engineering in Agriculture, Structures, and Environment Management (PEASEM). Uniquely positioned as the sole institute in India solely dedicated to applied post-harvest technologies, ICAR-CIPHET directly benefits farmers, orchardists, rural youth, and entrepreneurs by developing practical solutions and value-added applications for agricultural commodities. Furthermore, ICAR-CIPHET actively generates foundational knowledge through basic and strategic

research projects within its mandated areas. The institute has five divisions:

1. Agricultural Structures and Environmental Control.
2. Automation and Sensor Technology.
3. Food Grains and Oilseeds Processing.
4. Horticultural Crop Processing Division at Abohar
5. Transfer of Technology

The institute has a strong track record of innovation, having developed over 100 technologies, including specialized food processing equipment, structures designed to ensure safe handling and extend the shelf life of agricultural produce and innovative processing protocols for creating high-value products. These technologies have been successfully transferred to the market, with 87 of them licensed or commercialized by 167 entrepreneurs and end-users, demonstrating the institute's significant impact on the agricultural value chain.

ICAR-CIPHET has significantly contributed to the



farming community by developing innovative technologies that address critical challenges in the post-harvest value chain. These technologies encompass a wide range of areas, including protected cultivation, improved threshing and milling techniques, efficient processing methods, enhanced storage and preservation solutions, non-destructive quality evaluation, and the development of functional foods and food safety measures. By minimizing post-harvest losses, adding value to agricultural produce, and effectively utilizing by-products, these technologies have empowered stakeholders by increasing income and generating employment opportunities in rural areas. ICAR-CIPHET's commitment to innovation is evident in its impressive intellectual property portfolio, with 69 patents filed and 33 granted. Furthermore, the institute's establishment of an Agri-Business Incubation Centre and a Post-Harvest Machinery and Equipment Testing Centre further strengthens its role in supporting agricultural development and promoting technological advancements.

### All India Co-ordinated Research Projects (AICRP) on Post-Harvest Engineering and Technology (PHET)

The Indian Council of Agricultural Research initiated the All India Coordinated Research Project on Post-Harvest Engineering and Technology in September 1972. This project, currently active across 29 centres spanning various states and agro-climatic zones of India, focuses on developing post-harvest technologies and equipment tailored to specific locations and crops. The primary objective is to significantly reduce both quantitative and qualitative losses incurred after harvest while simultaneously exploring avenues for producing value-added products from agricultural crops, livestock, and their byproducts. The major activities are:

1. Adoption/development of equipment/technologies for reduction in post-harvest losses during critical post-harvest stages/operations
2. Development of need based agro processing centres (APCs) in different production catchments for income augmentation and

employment generation

3. Value added products from agricultural crops/commodities
4. Prototype development and process refinement with a view to develop complete packages for post-harvest utilization of crops/commodities and their by-products
5. Multilocation trials and demonstrations of the post-harvest technologies

### All India Co-ordinated Research Projects (AICRP) on Plastic Engineering in Agriculture Structures & Environment Management (PEASEM)

The AICRP on Plastic Engineering in Agriculture Structures & Environment Management (PEASEM), initially known as AICRP on Application of Plastics in Agriculture (APA), was established in 1988. This project operates across 14 centres, encompassing six ICAR Institutes, seven State Agricultural Universities (SAUs) and one Central Agricultural University (CAU). Through its research, PEASEM has significantly contributed to the advancement and refinement of plasticulture technology. This includes innovations in water harvesting and management, surface cover cultivation, irrigation systems, plastic mulching, animal shelters, aquaculture technology, and the utilization of plastics in farm tools, machinery, post-harvest handling and packaging processes. The project has demonstrated a substantial positive impact on farmers' fields, primarily through increased income per unit of land and significant savings in inputs such as water, fertilizers, and labour.

#### Objectives:

1. To apply plastics in agriculture, both in production agriculture and postharvest management.
2. To identify newer areas of plastics applications in agriculture, particularly in inland fisheries, and animal shelters and environment control.
3. To carry out operational research on laboratory proven technologies at pilot level with area saturation approach.

4. To disseminate plasticulture technologies through publications, media, exposure and training programmes, workshops, developing linkages with industry, other stakeholders and catalyzing developmental programmes.

### **Consortia Research Platform on Secondary Agriculture (CRP on SA)**

The Consortia Research Platform on Secondary Agriculture (CRP on SA) represents a strategic intervention in the agricultural landscape, addressing the critical need for sustainable and economically viable utilization of agricultural biomass. Initiated in 2015 with limited resources, the project has transitioned from a modest project-mode operation to a network of five strategically positioned centers across various states, reflecting its growing significance and impact. The fundamental objective of the CRP on SA is to transcend the conventional focus on primary agricultural production by emphasizing the crucial role of processing and value addition. This approach, known as secondary agriculture, aims to maximize the economic potential of agricultural output, ensuring that no part of the harvest goes to waste. By promoting the comprehensive utilization of agricultural biomass, the platform seeks to generate substantial income opportunities for farmers and other stakeholders involved in the agricultural value chain. This not only enhances their economic well-being but also contributes to the overall prosperity of rural communities. Furthermore, the emphasis on efficient biomass utilization plays a pivotal role in minimizing agricultural waste, a significant environmental concern. By transforming agricultural byproducts into valuable commodities, the CRP on SA fosters a more sustainable and environmentally responsible agricultural sector. The project has achieved notable milestones, demonstrating its effectiveness in translating research and development into tangible outcomes. The development and establishment of pilot plants for Makhana processing, a specialized aquatic crop, exemplify the platform's commitment to addressing niche agricultural sectors. The creation and licensing of a diverse range of value-added products, derived from various agricultural commodities, further underscores its innovative approach. Ultimately,

the CRP on SA is dedicated to improving the quality of life in rural areas while promoting a cleaner and more ecologically sound environment. Through its focus on secondary agriculture, the platform is driving positive change, fostering sustainable agricultural practices, and creating economic opportunities for rural communities.

### **Krishi Vigyan Kendra (KVK), Fazilka**

The Krishi Vigyan Kendra (KVK) at Abohar, situated in Fazilka district of Punjab, is dedicated to accelerating the transfer of agricultural technologies to farmers' fields. Strategically located in the south-western part of Punjab, this KVK operates in a region that holds geographical and agricultural significance, sharing inter-state borders with Haryana and Rajasthan, as well as an international boundary with Pakistan. This unique location makes it a crucial hub for addressing diverse agro-climatic challenges and reaching out to a wide farming community. The primary mandate of the KVK is to act as a bridge between research institutions and the farming community by ensuring the last-mile delivery of scientific knowledge and innovations. To fulfill this mission, the KVK actively conducts on-farm trials (OFTs) to assess and refine technologies under local conditions, and implements frontline demonstrations (FLDs) to showcase proven technologies directly to the farmers. Additionally, it engages in various extension activities such as field days, kisan melas, kisan gosthi (farmer-scientist interactions), training programs, awareness campaigns, and special expert lectures to enhance farmers' knowledge and skills. In response to the growing importance of value addition and the need to minimize post-harvest losses, the KVK at Abohar places special emphasis on post-harvest management and processing at the farm gate level. It promotes scientific handling, storage, processing, and marketing of agricultural produce to ensure better income generation for farmers and reduction in overall wastage. The KVK empowers farmers to adopt sustainable and profitable agricultural practices by integrating traditional practices with modern technologies, thereby contributing to the overall development of the farming community in the region.

## INFRASTRUCTURE

### Workshop

Ludhiana and Abohar campuses of ICAR-CIPHET possess dedicated workshops equipped for the fabrication and modification of post-harvest machinery arising from their research projects. These facilities also provide essential support services for the repair and maintenance of the

institute's infrastructure and operational equipment. The workshops are well-equipped with machinery such as lathes, drilling machines, welding sets, and sheet bending machines, along with a range of measuring instruments crucial for daily research activities.



### Library

ICAR-CIPHET plays an important role and acts as a centre for knowledge and information related to the institute's mandate. It has a good collection of books and journals in post-harvest engineering, food processing, engineering, microbiology, biochemistry, biotechnology etc. During the reported year, the total number of books and standards in the library were 5401. The library as a member of the Consortium for e-Resources in Agriculture (CeRA) is getting access to online full text journals and e-books. In addition to these, several national and international serial publications, annual reports, newsletters and

research bulletins received on gratis are also available to the readers. Current content service of journals and list of new arrivals are also being circulated among the ICAR-CIPHET staff. During this year library received one Punjabi, one Hindi, one English Newspapers viz. Ajit, Dainik Jagran, The Tribune, respectively and received Employment Newspaper, Science Reporter magazine (English), Grehshobha magazine (English) & India Today magazine (both Hindi & English). Library facilities are also made available to all the trainees coming from different organizations from different parts of the country.



### Agricultural Knowledge Management Unit (AKMU)

The AKMU section at ICAR-CIPHET provides comprehensive technology support crucial to the institution's daily operations. Their services encompass IT support and technical assistance, including hardware/software procurement and troubleshooting, robust networking via a 1 Gbps NKN (National Knowledge Network) connection, a 300 Mbps BSNL (Bharat Sanchar Nigam Limited) optical fiber line and an EPABX (Electronic Private Automatic Branch Exchange) system, a modified SBI (State Bank of India) payment gateway for online transactions, diverse software services, including editing, design and utility software, along with an Aadhar-based biometric attendance system

and eHRMS integration, conference hall maintenance and AV support for various events and ICAR-CIPHET website maintenance, ensuring regular updates of key information like tenders, training details and recruitment notices. AKMU's efforts have also secured STQC (Standardization Testing and Quality Certification) and SSL (Secure Sockets Layer) certifications for the website, demonstrating a commitment to security, accessibility, quality and ensuring compliance with GIGW (Guidelines for Indian Government Websites) guidelines. The redesigned bilingual website offers dynamic content in English and Hindi, catering to a wider audience.





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contact@innovadorinfotech.com

#### Web Application Security Audit Certificate

Certificate Number: CERT-IN/2024/August/18 "Rev" Date of Issue: 14 Aug 2024

Web Application Name	ICAR-Central Institute of Post-Harvest Engineering and Technology
Portal Testing URL	<a href="https://ciphet.solarman.in">https://ciphet.solarman.in</a>
Production URL	<a href="https://ciphet.icar.gov.in">https://ciphet.icar.gov.in</a>
Audit Performed by	Mihul Mehdi
Testing Date	26.07.2024 to 10.08.2024
Completion Date	10.08.2024
Conclusion	Web Application is free from OWASP version - 2021 (any other known) vulnerabilities and is safe for hosting.
Executed Through	Solarman Engineering Project (P) Ltd.

Recommendations:	
1	Site may be hosted with the permission of read only for general public.
2	Web server & OS level hardening to be in place on the production server.
3	Entire website should be hosted over valid SSL.
4	All the software components used in the application should be of latest & stable version.

**Note:** This certificate is valid till no additional changes in the dynamic content are carried out or One year from the date of issue, whichever is earlier.

Reviewed by:  
Abhishek Jain  
Sr. Security Analyst  
Innovador Infotech Pvt Limited

Digitally signed  
by RAHUL  
MISHRA  
Date: 2024.08.14  
13:01:26 +05'30'  
Authorized Signatory  
Innovador Infotech Pvt. Ltd.

The MD5 value of Published Code on Staging Server 83c2514983f05af03aefc7036c2e2



REGISTERED OFFICE - 49 /61,  
TAKKARGANA, TEHSIL SADAR,  
PRATAPGARH, UTTAR  
PRADESH - 23001



CORPORATE OFFICE 1 -  
OFFICE NO. G01/G75, SECTOR  
03, NOIDA, UTTAR PRADESH -  
201301



CORPORATE OFFICE 2 -  
1128, AHMAMAU, SHAHEED  
PATH, ARIJUNGANI, LUCKNOW,  
UTTAR PRADESH - 226002

### Guest House

Ludhiana and Abohar campuses of ICAR-CIPHET offer guest house accommodations to employees from ICAR, State Agricultural Universities (SAUs), government agencies, and farmers. Additionally,

the Ludhiana campus features an International Training Centre equipped with eight air-conditioned rooms and a dining hall with a kitchen, catering to various training and accommodation needs.



### Agro Processing Centre (APC)

Agro-processing centers play a crucial role in boosting rural economies by enhancing employment and income opportunities through the processing of agricultural produce within local areas. ICAR-CIPHET has established a modest agro-processing center dedicated to processing black gram, green gram, black pepper, turmeric,

coriander, and other crops. The processed products are marketed to customers within and around the institute. Furthermore, the center serves as a valuable training ground for aspiring rural entrepreneurs, equipping them with the skills and knowledge necessary to establish their own agro-processing ventures.



### Institute Technology Management Unit (ITMU)

The Institute Technology Management Unit (ITMU) at ICAR-CIPHET is responsible for safeguarding, managing, and commercializing the intellectual property (IP) arising from the institute's research endeavors. ITMU plays a pivotal role in fostering and expediting the development of cutting-edge technologies within the post-harvest management domain. By effectively bridging the gap between research and real-world applications, ITMU facilitates the transformation of innovative ideas, inventions, and technologies into commercially viable ventures that serve societal needs. Since its establishment, ITMU has actively engaged in protecting, managing, and commercializing the institute's intellectual property. To date, ITMU has filed 69 patent applications, resulting in 33 granted patents. Through consistent and dedicated efforts, ITMU has successfully facilitated the commercialization of 87 technologies developed by ICAR-CIPHET.

### Agri-Business Incubation (ABI)

ICAR's Agri-Business Incubation Centers (ABICs) play a crucial role in empowering farmers, entrepreneurs and unemployed individuals by fostering innovation and developing new agricultural technologies and machinery. These centers provide access to cutting-edge agricultural advancements and offer customized support services tailored to specific needs. ABICs cater to a diverse range of beneficiaries, including farmers, entrepreneurs, unemployed youth, women entrepreneurs, and small and medium-scale industries. This comprehensive support system facilitates the effective utilization of agro-based technologies developed by ICAR-CIPHET, thereby creating avenues for income generation and employment opportunities within the agricultural sector.

### Post-Harvest Machinery & Equipment Testing Centre (PHMETC)

The Post-Harvest Machinery and Equipment Testing Centre (PHMETC) at ICAR-CIPHET, Ludhiana holds official approval from the Government of India to conduct rigorous testing on a wide range of post-harvest equipment and

machinery. This accreditation empowers PHMETC to ensure the delivery of high-quality and reliable equipment from manufacturers to end-users. By establishing PHMETC, ICAR-CIPHET aims to provide a credible platform that instills confidence in manufacturers, buyers and entrepreneurs involved in post-harvest technology. PHMETC conducts comprehensive testing on all machinery related to the processing of agricultural and allied products, thereby contributing to the advancement and adoption of efficient and reliable post-harvest technologies.

### Regional Station, ICAR-CIPHET, Abohar

The Regional Station is the second campus, established on 19 March 1993 at Abohar. This station is dedicated to advancing post-harvest technology and controlled environment agriculture. Their major programs focus on a range of crucial areas, including assessing and mitigating post-harvest losses in various commodities, developing improved packaging for extended shelf life and transport of perishable goods, employing high-pressure processing to preserve nutrients and quality in fruit and vegetable products, optimizing greenhouse designs and environmental control systems for diverse agro-ecological zones, creating predictive models for greenhouse environments, designing low-cost micro-irrigation systems for efficient water and nutrient management and developing effective dryers for high-value crops. These initiatives collectively aim to enhance agricultural sustainability and productivity in the region.





## Staff Position (as on 31 Dec 2024)

### ICAR-CIPHET, Ludhiana

Category	Sanctioned Strength	Filled	Vacant
Director (RMP Post)	1	1	--
Scientific	65	33	32
Administrative	37	20	17
Technical	31	17	14
Supporting	2	1	1
<b>Total</b>	<b>136</b>	<b>72</b>	<b>64</b>

### ICAR-CIPHET, Regional Station, Abohar

Category	Sanctioned Strength	Filled	Vacant
Scientific	12	4	8
Administrative	4	2	2
Technical	8	6	2
Supporting	1	1	--
<b>Total</b>	<b>25</b>	<b>13</b>	<b>12</b>

### KVK, Fazilka, Abohar

Category	Sanctioned Strength	Filled	Vacant
Programme Coordinator /Senior Scientist & Head	1	1	--
Subject Matter Specialist/T-6	6	5	1
Farm Manager/T-4	1	--	1
Program Assistant (Computer)/ T-4	1	--	1
Program Assistant (Lab. Tech.)/ T-4	1	--	1
Assistant	1	1	--
Stenographer Grade-III	1	--	1
Driver	2	--	2
Skilled Support Staff	2	--	2
<b>Total</b>	<b>16</b>	<b>7</b>	<b>9</b>

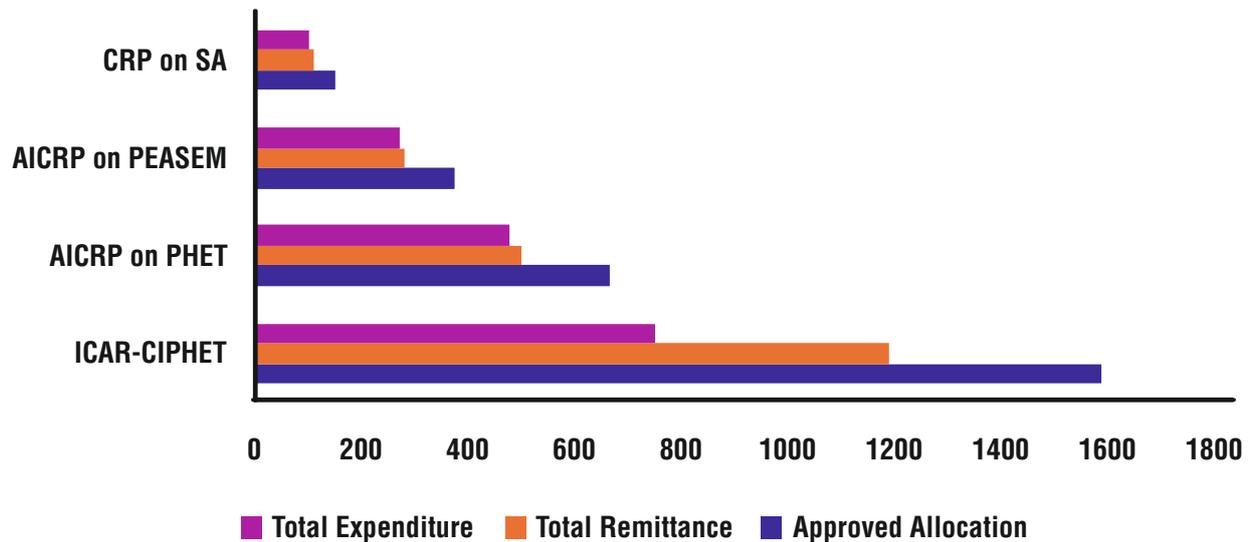
## Budget (Rs. in lakh)

Plan BE/RE (2024-25)

(as on December 31, 2024)

Scheme	Approved Allocation	Total Remittance	Total Expenditure
ICAR-CIPHET	1591.00	1191.25	752.47
AICRP on PHET	666.00	499.50	479.66
AICRP on PEASEM	376.00	282.01	271.00
CRP on SA	150.00	112.50	101.56

## Budget in Lakh



## Revenue Generation

Scheme	Target for the Financial Year (2024-25)	Revenue Generated up to 31.12.2024
ICAR-CIPHET	50.00	40.39

Note: The Financial Year is from April to March (2024-2025)

# RESEARCH HIGHLIGHTS

## ICAR-CIPHET

### Machines/Equipment

#### Test chamber for assessment of phototactic behaviour of stored-grain moths

A four-arm test chamber was designed to systematically study insect phototaxis by providing a controlled environment that mimics natural conditions. The design is inspired by boxed and Y-maze chambers, allowing for a structured and systematic study of insect behaviour. The chamber can be equipped with four LEDs at a time of known wavelength and intensity at a time. The central chamber is a dark box with insect release point at the top and is considered a repellence zone. All the entry points were connected to this chamber. Near the arm end, where the light was placed, was equipped with trapping systems which can collect insects in one-way entry. The test chamber can be operated in the dark conditions created by covering it with nylon cloth under laboratory conditions ( $27\pm 0.5^\circ\text{C}$ ,  $60\pm 5\%$  RH). The prototyped test chamber is an effective tool to measure the insect attraction or repulsion (phototaxis) towards the various wavelengths of light in a 'free choice' test mode.



**Fig. 1. A four-arm test chamber**

#### Grit making machine

Grits refer to broken food grain particles commonly used in dishes such as Dalia or other food preparations. In India, cereal grains are typically processed into forms like dalia and sooji for home cooking. Conventional grit production methods, such as burr mills or hammer mills, often result in lower grit recovery and higher powder generation.

To address these limitations, the Institute has developed a prototype grit-making machine based on a screw pitch design. This machine aims to enhance grit recovery and minimize processing losses. The machine operates on the principle that food grains can be crushed, shattered, or pulverized through compression and shear forces. It is powered by a 1 hp DC motor, with grains fed through a hopper and broken by a rotating shaft. To evaluate its performance, the machine was tested using pearl millet grains (PCB166). Results showed an increase in grit recovery to 94.5% and a reduction in losses to just 0.5%. Comparative analysis against burr mills and hammer mills demonstrated the prototype's superior performance, with significantly higher recovery rates and lower losses. The grit-making machine was found to be more efficient and suitable for commercial applications, offering a reliable solution for producing high-quality grits.

#### Continuous plant for production of protein isolates and concentrates from de-oiled plant meals and cakes

The Institute has developed advanced process technologies for producing protein isolates and concentrates from plant-based de-oiled meals and cakes. This includes rice bran protein concentrate, as well as groundnut and soy protein isolates. To facilitate scaling up of these technologies, a continuous plant (Capacity: 100 kg raw material/day) has been established for production of protein isolates and concentrates from de-oiled plant meals and oilseed cakes, such as rice bran, soybean meal, and groundnut cake. The facility comprises of following major components viz. 1) Extraction tank 2) Decanter 3) Centrifuge, 4) Precipitation tank, 5) Spray dryer, along with control panel for automatic operation. The entire facility is well connected enabling seamless and efficient continuous processing. The continuous plant has a raw material handling capacity of 100 kg/day, with product yields varying based on the feedstock. For example, processing 100 kg of de-oiled rice bran yields approximately 10 kg of rice bran protein concentrate, 100 kg of de-oiled groundnut cake yields about 28 kg of groundnut protein isolate, and 100 kg of de-oiled soybean meal produces

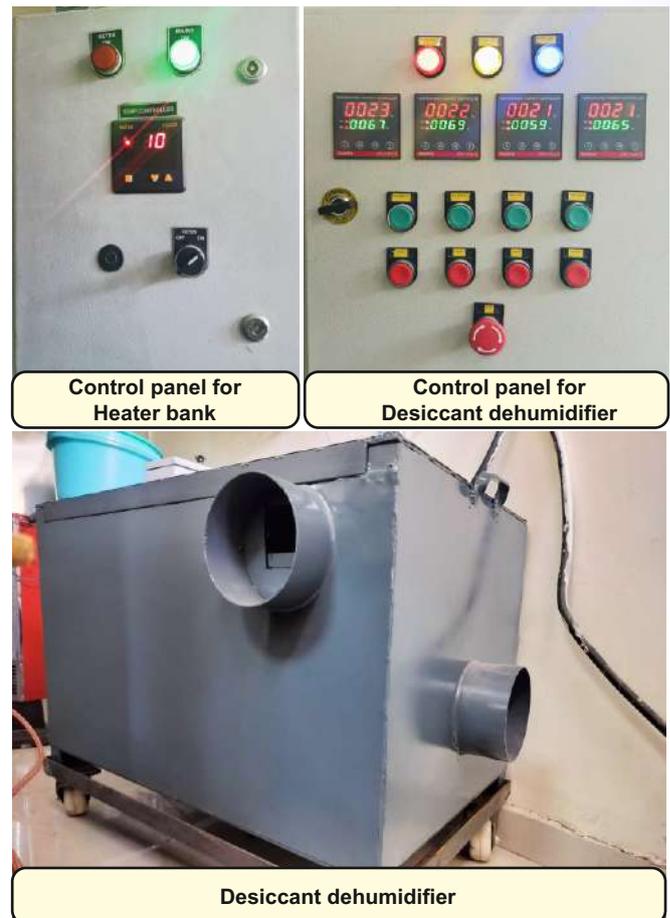
approximately 35 kg of soy protein isolate. This facility also functions as an incubation centre, offering entrepreneurs a platform to explore and develop plant protein production, thereby fostering the growth of small and medium-sized enterprises. The plant plays a pivotal role in advancing the development of affordable, protein-enriched health foods.



**Fig. 2. Continuous plant for protein production**

### Desiccant dehumidifier for optimizing cold storage conditions

A desiccant dehumidifier was developed and fabricated to maintain relative humidity in the range of 60–70% within a cold storage chamber. The system consists of a rotary wheel with sinusoidal flow passages coated with silica gel. A performance evaluation study of the desiccant dehumidifier was conducted under varying conditions to optimize storage environments, with process and regeneration air flow rates fixed at 350 m<sup>3</sup>/h and 760 m<sup>3</sup>/h, respectively. The relative humidity of the process air was reduced from 61%–91% at the inlet to 33.5%–48.75% at the outlet. During the experiments, the process air inlet temperature varied between 27.75°C and 36°C, while the regeneration air outlet temperature ranged from 37.75°C to 57.5°C. Key performance parameters—dehumidification effectiveness ( $\eta$ ), moisture removal capacity (MRC), coefficient of performance (COP), and sensible energy ratio (SER)—were analyzed. At 90% RH and 80°C regeneration air temperature, a maximum dehumidification of 13.35 g/kg was achieved, whereas the lowest dehumidification of 5.5 g/kg was observed at 60% RH and 60°C regeneration air temperature. These findings demonstrate the potential of the desiccant dehumidifier to maintain optimal storage conditions, extend shelf life, and reduce post-harvest losses.



**Fig. 3. Desiccant dehumidifier with the control panel**

### X-ray imaging and processing for internal quality assessment of mango

X-ray imaging technology is used for assessing the internal quality of mangoes, offering a non-destructive alternative to traditional methods. This objective focuses on utilizing X-ray imaging to detect internal defects such as spongy tissue and seed weevil infestation, which are critical factors affecting mango quality in Alphonso. The development process began with data acquisition and parameter optimization for X-ray imaging. Alphonso mango samples were subjected to imaging at varying voltages (40–80 kV) and currents (4–20 mAs) to determine the optimal settings for highlighting internal anomalies. The analysis identified 40 kV with 20 mAs and 50 kV with 20 mAs as ideal parameters for achieving high contrast and clarity in defect visualization. The X-ray imaging system is equipped with advanced components, including a dynamic detector with 85  $\mu$ m pixel resolution and a tunnel size of 130 x 120 mm, capable of processing up to one ton of mangoes per

hour. This system integrates a push-out rejection mechanism, enabling automated segregation of mangoes with internal defects, thereby enhancing sorting efficiency. Image processing techniques were applied to improve the interpretability of X-ray images for spongy tissue detection. Methods such as blurring, grayscale conversion, histogram equalization, and adaptive thresholding were employed to enhance contrast and highlight defect-prone regions. Blurring reduced noise, facilitating a clearer focus on the mango structure, while grayscale conversion simplified the images for analysis. Histogram equalization improved visibility by enhancing subtle differences in tissue density, and adaptive thresholding created high-contrast binary images to delineate defect areas effectively. These preprocessing steps helped in preparing the dataset for model training. For spongy tissue defect classification, deep learning models such as Mobile Net V3 and Xception were explored. Mobile Net V3, optimized for resource efficiency, showed limitations with validation accuracy stabilizing at 60%, indicating some degree of overfitting. In

contrast, the Xception model achieved superior results, with test accuracy reaching 84.88%, a balanced area under the curve (AUC) of 0.95, and high precision in distinguishing between spongy and non-spongy tissues in Alphonso mangoes. The robust performance of Xception highlights its potential for real-time applications in mango quality assessment.



Fig. 4. X-ray with rejection mechanisms

Model Training Metrics Over Epochs

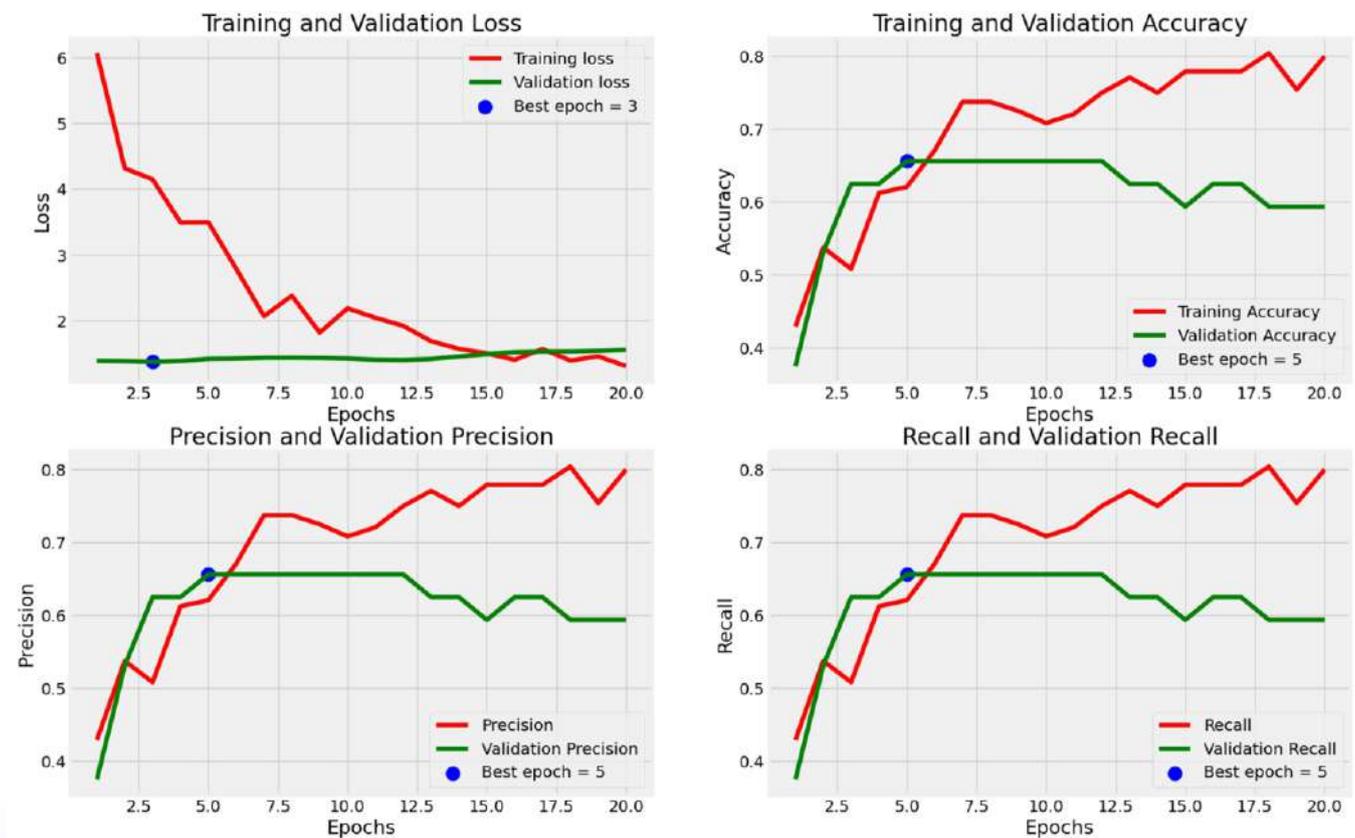


Fig.5. Training performance of Xception model over 10 epochs

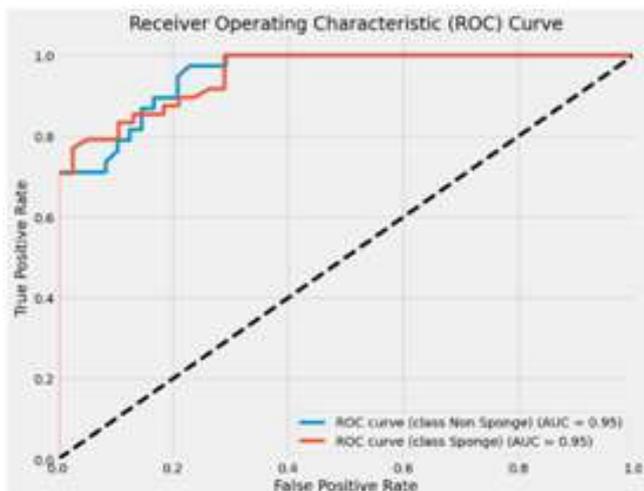
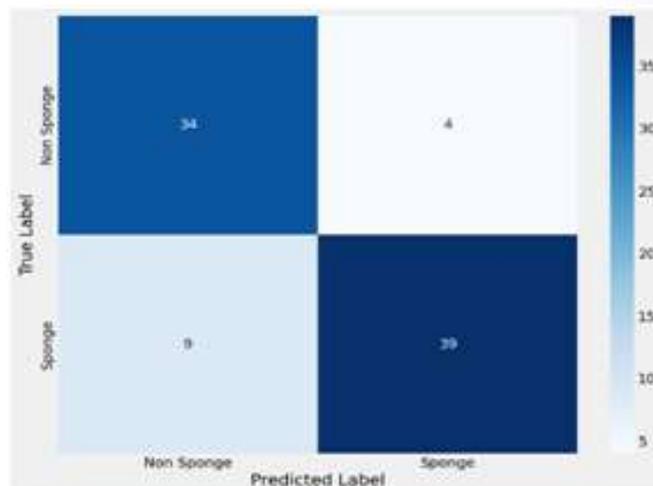


Fig.6. (a) ROC curve of Xception model



(b) Confusion matrix of Xception model

### Real-time sensor-based monitoring system of banana in supply chain

Bananas are highly perishable and sensitive to environmental conditions such as temperature, humidity, and ethylene levels, making real-time monitoring essential to maintain quality from farm to market. Hence, a sensor-based monitoring system has been developed to enhance the supply chain management of bananas, focusing on maintaining optimal environmental conditions during transport, storage, and ripening. The compact, durable device system integrates advanced sensors to monitor critical parameters such as temperature, relative humidity, ethylene concentration, and GPS location in real time. The inclusion of a low-power paper display extends operational life, while the enclosed design protects internal components and improves usability. The system employs precision temperature and humidity sensors to ensure the

maintenance of ideal conditions, preventing premature ripening or spoilage. An ethylene sensor tracks ripening stages by measuring gas concentrations, enabling dynamic adjustments to storage or transport conditions to control ripening rates. Data collected is transmitted wirelessly through Wi-Fi or SIM connectivity to a secure SQL database, where it is accessible via a web-based interface. Trials conducted demonstrated the system's reliability, with data such as temperature, humidity, and ethylene levels recorded over time to validate performance. For instance, ethylene concentrations were observed to increase progressively, correlating with ripening stages. The device was showcased at events like the Indian Mobile Congress and ICAR-CIPHET Kisan Mela. This system ensures quality retention, reduces losses, and supports sustainable banana supply chain practices.



Fig. 7. Sensor-based monitoring system of banana





Fig. 10. Fish anesthetizing and recovery machine

### Pilot plant to produce hydrolyzed plant proteins

The institute has developed a pilot plant specifically designed for energy-efficient oil extraction from mustard seed, coupled with the innovative creation of novel products. This facility represents a significant step towards maximizing the utilization of mustard seeds and minimizing waste. The plant's design prioritizes both efficiency and scalability, featuring an input capacity of 10 kilograms per day of de-oiled mustard cake, a byproduct of traditional oil extraction. This input is then processed to yield 2 kilograms per day of hydrolyzed plant protein, a valuable product with diverse applications in food

and other industries. The pilot plant's physical dimensions are substantial, reflecting its robust construction and processing capabilities, with a total weight of 1300 kilograms and a height of 12 feet. This size allows for the integration of various processing units necessary for the efficient extraction and hydrolysis processes. The total cost of designing and fabricating this pilot plant amounted to Rs. 7.5 lakh an investment aimed at fostering sustainable and value-added processing of deoiled mustard cake, ultimately contributing to the agricultural and industrial sectors.



Fig. 11. Pilot plant for hydrolyzed protein production

## Processes/Protocols/Products

### Vacuum frying of lotus stem chips in the developed vacuum fryer

The effect of frying temperature and frying time on quality (moisture loss, oil content, color index, textural parameters, and sensory attributes) of lotus stem chips was evaluated. Experiments with temperature (85–105°C), frying time (17–25 min) and constant absolute pressure of 7.99 kPa as independent variables were conducted. The process consists of a selection of uniform-sized lotus stem, washing, peeling, and cutting to a size of 2.21 mm thick followed by dipping in 1% citric acid solution to prevent browning. The water was then drained, the sample was spined to remove the excess moisture. The sample was then kept in the freezer at -25°C for 1 hr. The product was then retained in the frying basket while achieving desired temperature & vacuum. After achieving the desired vacuum level and temperature, the basket was immersed in the frying medium for the required duration. Then, the basket was lifted, and vacuum was released, and the product was taken out of the vessel. The surface oil was removed using the

vegetable spinner. The effect of vacuum frying parameters on moisture loss, fat absorption, color index, texture, and free fatty acids have been evaluated. Fresh oil has been used for every experiment to maintain the constant characteristics of the frying medium. The color change was positively correlated to the vacuum frying temperature and duration of frying. The L, a and b values were 40.39, 10.95, 31.83 and 54.85, -1.81, 30.95 for the standardized vacuum fried samples. Textural analysis of lotus stem chips indicated an increase in hardness and crispness with increasing time and temperature of vacuum frying. Vacuum fried lotus stem chips exhibited reduced fat absorption, improved color and texture in comparison to conventionally fried lotus stem chips. The quality of vacuum fried lotus stem chips was better than traditionally fried lotus stem chips in terms of color, texture, oil content and sensory acceptability.



Fig. 12. Vacuum fried lotus stem chips

### Millet based extruded snacks with special dietary requirements

Protein deficiency is a major concern in India, particularly among children and vulnerable populations. Despite being the world's second-most populous country, India struggles to meet the protein needs of its people due to dietary habits, economic challenges, and limited awareness of balanced nutrition. Protein-energy malnutrition (PEM) is a serious issue among children, leading to

stunted growth, weakened immunity, and impaired cognitive development. This problem is especially prevalent in rural and underprivileged areas, where access to protein-rich foods is limited. In addition to protein deficiency, micronutrient deficiencies, particularly calcium, often go unnoticed but have long-term health implications. Incorporating these essential nutrients into everyday snacks can help

meet daily requirements in an accessible way. Fortifying ready-to-eat (RTE) snacks with protein and calcium rich substrates can help combat protein malnutrition. Finger millet (*Eleusine coracana*), commonly known as ragi, stands out for its high calcium content. Therefore, this study was taken up to develop high-protein (>19%) and high-calcium RTE expanded snacks from ragi, roasted Bengal gram, maize and soy protein isolate. According to the Indian Council of Medical Research, the recommended daily allowance for protein is 0.91 g/kg/day for boys and 0.90 g/kg/day for girls (ICMR - NIN, 2020). Thus, product formulation with protein content higher than 18%, with high expansion ratio and low bulk density was selected. The formulation comprised of Ragi (40%), roasted Bengal gram (30%), corn (20%) and SPI (10%). The formulation resulted in extrudates with a protein content of 19.68%. A typical 35g pack of these extrudates would contain 6.89g of protein, which would fulfil nearly 22% of the recommended



**Fig. 13. Ragi based high protein extrudates**

protein requirement for a 10–12-year-old child. Further, extrusion process parameters were optimized using response surface methodology with the help of Design-Expert (version 8, Stat-Ease Inc, Minneapolis, MN, USA). Box-Behnken experimental design was employed. Feed moisture content (13, 15 and 17%), screw speed (375, 425 and 475 rpm), temperature (100, 120 and 140 °C) and feed rate (0.09, 0.17 and 0.25 kg/min) were selected as independent variables and their impact

on expansion ratio, bulk density, Water absorption index (WAI), water solubility index (WSI), hardness, *in-vitro* protein digestibility (IVPD), DPPH antioxidant capacity were studied. Optimum conditions were identified using a desirability value of 0.85. The selected criteria for obtaining the optimized product included the minimization of bulk density and hardness, as well as the maximization of the expansion ratio, water absorption index (WAI), specific mechanical energy (SME), *in vitro* protein digestibility (IVPD), and antioxidant activity. Sensory evaluation, performed by twenty-six panellists, on the basis of 9-point hedonic scale revealed that the extrudates had high overall acceptability of 8.5 with a pleasing taste and texture. The optimal extrusion conditions were determined to be a feed moisture content of 15.3%, a screw speed of 428.6 rpm, a temperature of 124.4°C, and a feed rate of 0.17 kg/min.

#### **Ready-to-eat extruded snack food developed from co-extrusion of kodo millet and quinoa**

One strategy for addressing food insecurity is to provide affordable, nutrient-dense, handy, and acceptable foods that are safe for human consumption. Kodo millet and quinoa are nutritionally rich grains and are considered to be diabetic friendly and are low in calories. These grains are rich in minerals, fibres, protein and antioxidants and can be used in ready-to-eat snack products. The extrusion behaviour of a formulation consisting of kodo millet and quinoa grits was examined using a twin-screw extruder. The current study aimed to optimize the extrusion process parameters for the production of healthy expanded snacks based on kodo-quinoa. Experiments were constructed utilizing the Box-Behnken design, with a 50-50 split of kodo and quinoa. The independent parameters used were feed moisture (12-20% w.b.), screw speed (300-400 rpm), and barrel temperature (80-140°C). The dependent factors studied for process optimization were expansion ratio, bulk density, water absorption index, and sensory acceptability. The kodo-quinoa-based extruded samples differed significantly in terms of extrusion behaviour and extrudate properties. The extrudates' expansion ratio ranged from 2.77 to 4.54. The bulk density of various combinations ranged between 78.77 and 275.83 kg/m<sup>3</sup>, while the water absorption index ranged from 5.08 to 7.18 g/g. The colour index's Lightness (L\* value) ranged from 40.92 to 56.16. The sensory acceptance

scores for the optimized combination exceeded 6.1-8.4 on a 9-point hedonic scale. The optimal conditions for producing high-quality extrudates are feed moisture content of 15.44%, barrel temperature of 96.87°C, and screw speed of 341.19 rpm. The optimized product had a bulk density of 79.25 kg/m<sup>3</sup>, an expansion ratio of 4.48, and a total acceptability of 8.39.

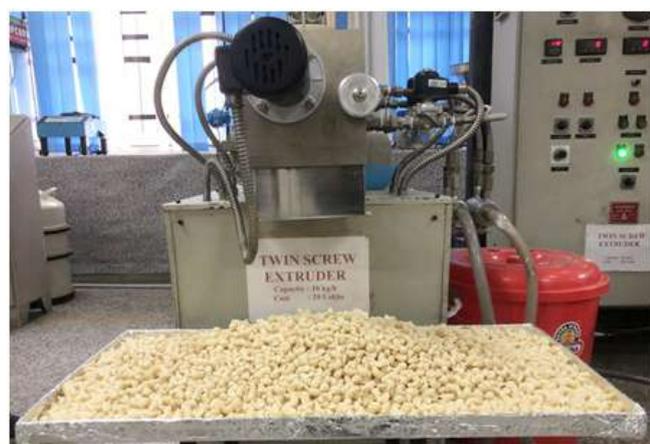


**Fig. 14. Extruded snack food**

### Preparation of 'Makhana puffs'

The mechanized system of makhana processing produces fully popped makhana along with some by-products such as flattened makhana, over-

popped makhana, semi-popped and unpopped makhana. These fetch lower market value as it is considered to be lower grade and size but have equivalent nutritional value to popped makhana. Therefore, it can be used in preparation of various value-added products like composite expanded snacks. Unpopped/ Semi-popped/flattened popped makhana, maize, potato flour, dehulled black gram dhal and rice were taken for development of "Makhana Puffs". In the very first step, Unpopped/semi-popped/flattened makhana ground to get flour using a pulverizer (20-30 mesh size sieve). Maize, dehulled black gram dhal and rice coarsely ground before extrusion (18-20 mesh size). Potato flakes ground to 30- mesh size and this formulation was properly blended. Moisture content of feed was set to 15-16% and fed to extruder for puffing. The extruder parameters were 10.5 kg/h feed rate, 325 rpm screw speed, 60-80°C barrel temperature and 110 ± 2°C die head temperature, the cutter speed was about 15 rpm. The puffs were dried to 3-4% moisture content (w.b.). Makhana puffs are highly nutritious and prepared using semi-popped/ flattened/ unpopped makhana with fruit and cereal flour. This makhana based product is protein, minerals, antioxidants and dietary fiber rich ready to eat snack. This product is generally consumed by children who require nutritious and healthy foods for their growth and development.



**Fig. 15. Makhana puffs**

### Shelf-life extension of Chironji kernels using different packaging systems

Chironji (*Buchanania lanzan* spreng.) is a medicinally important tropical tree species found abundantly in Chhattisgarh state known for its kernel being used as dry fruit. Kernel is rich in oil content and also a significant source of

antioxidants, essential nutrients and bioactive compounds. However, presence of high oil content poses challenges for its shelf life, as the high oil content makes it prone to deterioration under high humid conditions. In order to address this issues, a

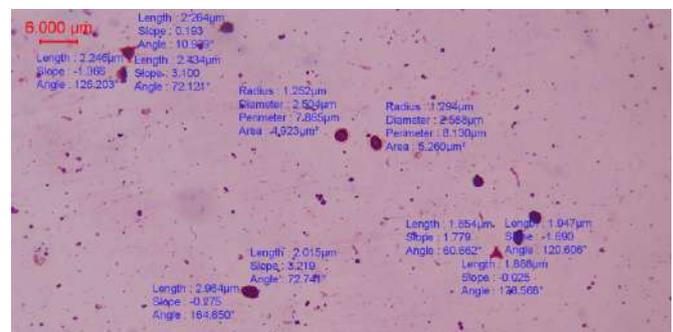
study has been executed to evaluate physicochemical and microbiological properties of Chironji kernels packaged in three different packaging materials viz. Low-density Polyethylene (LDPE), Ethylene Vinyl Alcohol Co-polymer (EVOH), Aluminium laminate (ALL) combined with two different packaging techniques (Vacuum and nitrogen flushing) and stored under ambient ( $24\pm 2^\circ\text{C}$ ) and refrigerated ( $4\pm 1^\circ\text{C}$ ) conditions for 6 months.

The proximate analysis of samples revealed that moisture, protein, fat, ash and dietary fiber content were 4.29% (db), 29.54%, 55.20%, and 3.14% 2.85%, respectively. The free fatty acid and the peroxide values value were 0.97%, and 2.005 meqO<sub>2</sub>/kg fat, respectively. Furthermore, the water activity of raw Chironji kernels was 0.635, which was within the permissible limits (<0.65) to avoid microbial activity. The lightness (L value) of the Chironji kernels, was 39.19, and hardness as measured by the texture analysis was 14.292 (N) for the control samples. After the storage for 120 days, it has been observed that the lowest moisture content (2.51%) was observed in samples packed in aluminium pouches with vacuum and stored under refrigerated conditions. Free fatty acid content increased during storage with pronounced variation in LDPE pouches followed by EVOH and aluminium pouches. Similarly, peroxide values also increased during storage in all packages and was within limits (i.e., 10meqO<sub>2</sub>/kg fat) except for LDPE pouches stored at ambient conditions. Water activity values were significantly ( $p < 0.05$ ) higher in LDPE pouches, however, EVOH and aluminium pouches had non-significant changes for all samples. L-values of stored kernels were found to be lowest in vacuum sealed bags under ambient conditions for all packages followed by vacuum sealed bags under refrigerated conditions. The texture of Chironji kernels was found to be non-significantly different for all samples. For all the studied parameters, samples packed in aluminium pouches with vacuum technique and stored under refrigerated condition provided best results.

### Quality testing of honey samples

Four samples of honey (SAS Bodla, Kaccha Bodla Shehad, processed honey, and raw honey) were received by ICAR-CIPHET from CGMFP Fed, Raipur, Chhattisgarh for quality analysis and to provide specifications of filter for filtration of honey. Different parameters, namely, moisture content,

pH, total soluble solids, specific gravity, reducing and non-reducing sugar content, pollen count per gram and pollen dimensions were assessed for each sample. The moisture content varied from 16.96 to 19.65% and pH ranged from 4.43 to 4.60. Total soluble solids ranged from 78 to 81° Brix, while specific gravity values varied from 1.401 to 1.412. The reducing and non-reducing sugar contents were 68.62 to 76.19% and 1.19 to 4.62%, respectively. The amount of pollen in each gram varied greatly, ranging from 10,000 to 112,500. The size and shape of the pollen grains in each sample were further investigated using pollen dimension analysis under stereo zoom microscope in the beginning to check the load, later processed in compound microscope at 10x and 40x. The average size of the observed pollen particles ranged from 1.5µ to 4.5µ at 40x. Based on this size range, a 20-micron mesh filter was recommended for the honey filtration process. This filter size will effectively allow the honey to flow smoothly while retaining larger particles, ensuring both efficient processing and maintenance of honey quality. As per FSSAI guidelines, all the quality parameters were within the acceptable limit.



**Fig. 16. Average size of the observed pollen particles**

### Spinach based food ink for 3D food printing

3 D food printing is an emerging technology which has gained primacy over other food processing technologies due to its potential for automation, less wastage, versatility, personalized nutrition, cost-effective customization and digital manufacturing of food into creative and complex forms. To make a food ink, the formulation and evaluation of 3D printability of food matrices is required. The present study focused on development of green leafy vegetable-based food ink for 3D food printing using spinach, hydrocolloids, corn starch, salt and spices. This work evaluated extrusion printability, rheological properties and textural properties of the developed food ink. The formulation, finalized

based on preliminary work, gave a stable structure and good printability with 3D food printer (Felix) upon printing with 1.6 mm diameter nozzle at printing speed of 1800 mm/min and movement speed of X/Y and Z axis of 9000 mm/min and 1000 mm/min, respectively. The dynamic viscoelastic properties (0.1-100 rad/s) and viscosity (shear rate range of 0.01-100/s) of food ink were measured using a rheometer at 25°C with a parallel plate of 25 mm diameter and a gap of 1 mm. The results indicated a shear thinning behaviour and weak gel characteristic of food ink. The textural parameters-hardness, cohesiveness and gumminess of the food ink were recorded as 4.56 N, 0.07 and 301.20 g, respectively. The color attributes of the food ink were recorded in terms of L\*, a\* and b\* as 25.89, -4.21 and 10.69, respectively.

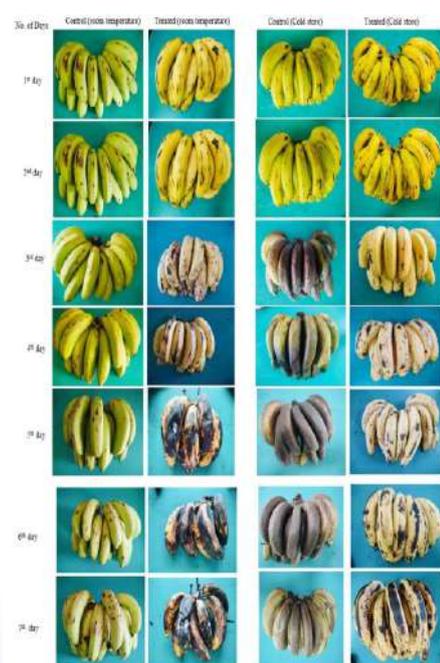


**Fig. 17. 3D model printed from spinach-based food ink**

**Ripening of banana in PCM based chamber and carbon auditing**

The raw bananas were treated for 24, 48, and 72

hours (Fig. 18, 19 and 20) in a ripening chamber using 30 ml of 2-chloroethylphosphonic acid + 3 liters of water + 6 g of NaOH for ethylene gas generation and then evaluated for shelf-life and physicochemical parameters. The 2-chloroethyl phosphonic acid generates ethylene gas that promotes the ripening process. The banana fruits stored at room temperature and in cold storage at 10°C. Further, the quality characteristics in terms of TSS, firmness, physiological loss in weight (PWL), total sugars, vitamin C, titratable acidity (TA), total phenols, total flavonoids, antioxidant activity and PPO activity under different storage conditions of fruits were monitored. The shelf-life of fruits in good condition is about 4 days when treated for 24 hours (Fig. 18). The shelf-life of fruits in good condition is about 4 days when treated for 48 hours and the physical appearance of the banana fruits was clearly indicated in Fig. 19. The treated bananas were fully ripened on the 4<sup>th</sup> day at ambient and cold store conditions, whereas the fruits were hard and spoiled on the 4<sup>th</sup> day for the control fruits stored under the similar storage conditions. The shelf-life of fruits in good condition is about 3 to 4 days when treated for 72 hours. The physical appearance of the banana fruits was clearly indicated in Fig. 20. The treated bananas were fully ripened on the 3<sup>rd</sup> day at ambient condition, and on the 4<sup>th</sup> day for treated bananas at cold store conditions.



**Fig. 18. Bananas after 24 hours treatment**



**Fig. 19. Bananas after 48 hours treatment**



**Fig. 20. Bananas after 72 hours treatment**

### Carbon auditing of chamber

The 1m x 1m x 1.5m fruit ripening chamber utilizes sodium sulfate decahydrate as a phase change material (PCM) within its five-layer composite walls (stainless steel sheet, PCM pouches, stainless steel sheet, insulation, and polypropylene sheet), with cool air circulating between the steel sheets for PCM cooling/charging. With a capacity of approximately 350kg, the chamber's operation and construction contribute to CO<sub>2</sub> emissions.

Over a three-day period, the chamber consumes 60 kWh of electricity (49.2 kg CO<sub>2</sub>), with an additional 5% energy consumption (2.46 kg CO<sub>2</sub>). The construction materials (steel, insulation, and polypropylene) emit 90.51 kg CO<sub>2</sub>. Ethylene production for ripening (0.0053 kg) results in 0.00795 kg CO<sub>2</sub> emissions. Transportation of materials to and from the chamber adds 1.0612 kg CO<sub>2</sub>, and packaging contributes 1 kg CO<sub>2</sub>. Therefore, the total emissions from the ripening chamber are 144.24 kg CO<sub>2</sub>, or approximately 0.144 metric tons CO<sub>2</sub>.

### Extraction of cellulose from rice straw

Initially, the paddy straw is cut into small pieces and thoroughly washed multiple times (4-5 times) using distilled water to remove any surface dirt, dust, and other contaminants. After sufficient times of washing, the pieces of straws were dried under shade and converted into a fine powder using a mechanical grinder. The powdered straw was then passed through a 250-mesh sieve to ensure uniformity in particle size, removing larger, unground particles and obtaining more consistent rice straw powder. About 50 g of straw powder is weighed and placed in a flask and mixed with 20% (w/v) NaOH solution in a ratio of 1:30 and the mixture is then placed in an autoclave at 120 °C under 2 bar pressure for a period of 40 min. Once the autoclave was completed, the flask containing mixture is allowed to cool and filtered using a muslin cloth to remove the dissolved contaminants and residual materials. This process will be repeated (~10 times) to ensure thorough removal of impurities. Further, the material is then washed using distilled water (~8-10 times), to remove any remaining traces of sodium hydroxide. The bleaching process was carried out using 2.5% solution of sodium hypochlorite (NaOCl) as bleaching agent. The bleached cellulose is further washed using distilled water and oven dried at a

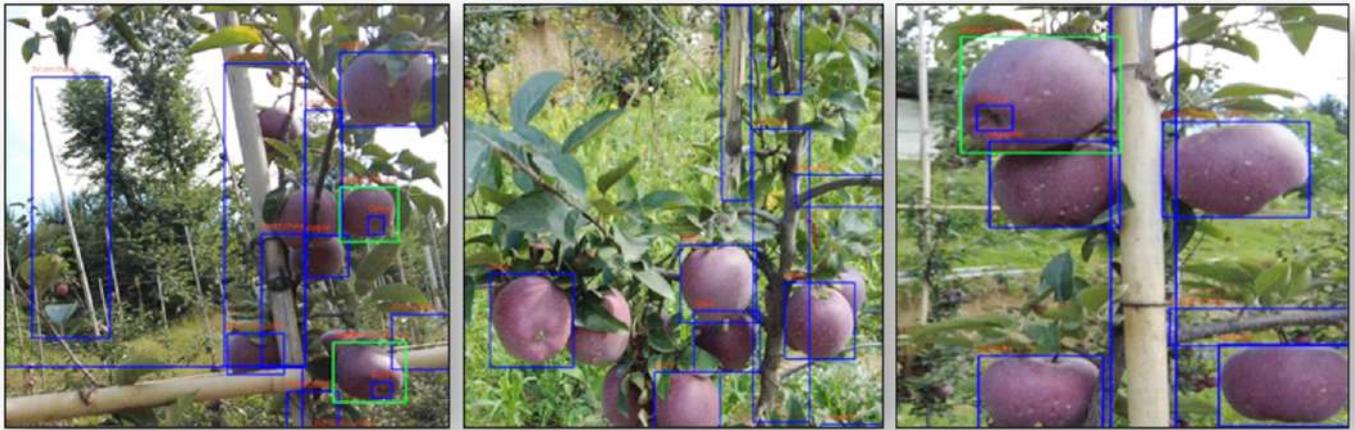
temperature of 45 °C. The drying process continues until the material reaches a constant weight, which is an indicator that all moisture has been removed from the sample. Once the cellulose has been dried, it is ground into a finer powder. The powdered cellulose is then passed through a 72-mesh sieve to ensure uniformity in particle size. Finally, the purified, dried, and finely ground cellulose is carefully sealed in a polyethylene bag to prevent moisture absorption.

### Improved hybrid (AI) detection model for detection of apples and obstacles for robotic apple harvester

The previous model, which was specifically trained for apples, encountered difficulties due to swinging branches, wires, and supporting structures like bamboos or rods. These obstacles interfered with object detection and complicated the process of detaching grasped apples. Keeping these factors in mind models were then developed for improved detection of apples along with obstacles (wires, rods, branches etc). For multiclass detection, the YOLOv8 model was initially trained on 1,999 images and 17,332 instances over 250 epochs, achieving robust overall performance. The model demonstrated a precision (P) of 0.831 for the "apple" class while its recall (R) was 0.737, highlighting its ability to identify the majority of apples present. The mean Average Precision (mAP50) for apples was 0.892. For other classes, such as obstacles, the model achieved similarly strong metrics, with a precision of 89% and a recall of 87%. Notably, the precision for apple detection was even higher, at 93%, ensuring accurate identification in real-world scenarios. In order to optimize the YOLOv8 model, a number of optimization techniques have been used at different steps in the process of developing the model. It comprises data pre-processing, architectural considerations related to the model, and optimization during training and inference. Leveraging ensemble learning to combine strengths of two YOLO versions (v5 and v8) for better detection performance. Integration of segmentation (YOLOv8) and object detection (YOLOv5) capabilities for specific tasks, which is tailored for precise fruit detection. The structured approach to validation and weight saving ensures reliability and scalability for deployment in real-world applications. With all these techniques put together, YOLOv8 model performance improved

significantly with respect to both speed and overall accuracy (97.5%), making it highly effective for

applications like robotic harvesting.

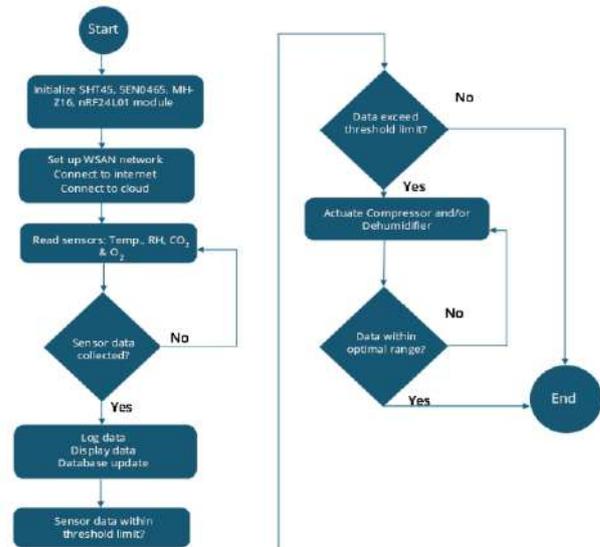


**Fig. 21. Visual results of optimized hybrid Yolov8 detection model**

**Wireless sensor and actuator-based IoT system for real-time monitoring and control of cold room**

A prototype IoT system based on a wireless sensor and actuator network (WSAN) was developed for real-time monitoring and control of cold room conditions. The system includes sensors for monitoring temperature, relative humidity, carbon dioxide, and oxygen levels, as well as actuators for controlling temperature and humidity through a compressor and dehumidifier. The system incorporates multiple sensors and modules, such as a data storage module for storing sensor data and a transceiver module for communication among various nodes. Sensor data is uploaded to the cloud, enabling real-time visualization through an interactive dashboard. Threshold values for controlling the storage environment, such as temperature and humidity, can be configured based on the optimum storage requirements of the

commodity. The operational workflow of the WSAN is illustrated in the flowchart.





**Fig. 22. Visualization of real-time sensor data through the dashboard**

### Peanut based vegan whipping cream

Whipping cream is one of the dairy emulsions commonly used as a topping for fruits, desserts and cake decorations. Nowadays, people are opting for vegan whipping cream instead of dairy cream for dietary reasons, including lactose intolerance, dairy allergies, or adhering to a vegan diet. In order to meet the new age consumer demand for vegan whipping cream that provides a similar texture and function with dairy cream, peanut milk cream obtained as a by-product of peanut milk processing has been utilized to develop peanut based vegan whipped cream. Structurally, whipped cream is a complex emulsion-based foam structure in which partially coalesced fat droplets stabilize air bubbles at the air-water interface. To obtain a stable whipping cream without compromising the texture and function, the process for development of peanut based vegan whipping cream have been standardized. The standardized conditions are refrigerating peanut cream (5°C), whipping with xanthan gum, powdered sugar and a flavouring agent (optional) using a classic mixer system for 3 min. The whipped cream had 110 % overrun, no serum leakage for 2 h at 25°C. It had hardness of 2.56 N, cohesiveness of 0.47 and adhesiveness of 6.75 mJ. In the consumer acceptability study conducted across different age group and background, the product got a good sensory response with overall acceptability score of 4.6 in a 5 point scale.



**Fig. 23. Peanut based vegan whipped cream**

### Process standardization for development of whey-mango beverage

Peanut whey is a byproduct of tofu production and is being discarded after tofu preparation. It is a rich source of phytochemicals, minerals, and protein, that can be used to develop plant protein- and phytochemical-rich drinks with multi-therapeutic benefits which are increasingly gaining attention. Since peanut whey has a distinctive bland taste, and mildly acidic, an attempt was made to develop whey-based mango flavored beverage, which is refreshing and nutraceutical rich. Peanut whey that is left after the coagulation of tofu and unsweetened mango pulp were used for the preparation of whey-mango beverage. Mango pulp in different ratios were added into the whey and mixed well. Citric acid

was added and the content was pasteurised and filled in the sterilized glass bottles. The beverage samples were evaluated for their physicochemical and sensory attributes. Based on sensory attributes, whey-mango beverage sample was standardized. The standardized beverage had TSS of 11.3°B, pH value adjusted to 4, radical scavenging activity of 60.20% DPPH, TPC of 148.26 mg GAE/100mL. The standardized beverage received an overwhelming response in the consumer acceptability study conducted during ICAR-CIPHET IIFA & Kisan Mela 2024.



**Fig. 24. Whey-mango beverage**

### **Evaluation of capacity building training programme for extension professionals**

A capacity-building program to enhance awareness among extension professionals about agro-processing was conducted at ICAR-CIPHET, Ludhiana. During 2024, two training sessions were organized covering 3 ATARI Zones and 16 participants. The programme from 2021-2024 covered a total of 110 participants from 82 Krishi Vigyan Kendras (KVKs) across all ATARI Zones, with the highest participation from ATARI Zone VIII, Pune. The Kirkpatrick model was utilized to evaluate the effectiveness of the program, with a schedule designed to assess both immediate and post-training impacts. The immediate evaluation focused on aspects such as the training environment, the performance of trainers, the delivery of the program, and the learning outcomes. The post-

training evaluation emphasized assessing changes in trainee behaviour and the resulting outcomes. Feedback revealed that over 50% of participants found the training environment conducive to learning, 59% rated the trainers as effective in communicating technologies, and 48% found the learning aids appropriate. Additionally, more than 40% of participants reported an improvement in their knowledge of agro-processing and expressed increased interest in the subject. Following the training, 59% of participants provided feedback about their workplace experiences. Of these, 92% acknowledged that the training equipped them to serve as trainers in agro processing, enabling them to share post-harvest technology knowledge with farmers and colleagues. Moreover, 72% organized post-harvest training programs at their workplaces, and 52% successfully facilitated the development of entrepreneurs in the agro-processing sector.

### **Impact assessment of value-added products: economic feasibility and market insights**

A comprehensive framework was developed to evaluate the impact of value-added products among licensees. Using this framework, the impact of groundnut-based value-added products and makhana kheer mix was assessed. For makhana kheer mix, the economic feasibility analysis indicated a Benefit-Cost (B:C) ratio of 1.35 and a payback period of approximately 5 months. Half of the respondents reported a positive impact on their family income. Licensees in regions where makhana kheer is traditionally popular found a steady market for the product, while in metropolitan areas like Delhi, demand was predominantly observed during festive seasons such as Diwali. In the case of groundnut-based value-added products, the economic feasibility analysis revealed a B:C ratio of 1.94 and a payback period of around 6 months. Similarly, 50% of respondents reported a positive impact on family income. Among them, those associated with gymnasiums and supermarkets indicated a consistent market for the product, while others noted that demand was seasonal. For both value-added products, the adoption of the technology did not significantly impact the creation of productive or non-productive assets. Additionally, it had minimal effect on social factors such as employment generation, as most of the workforce employed was from within households.

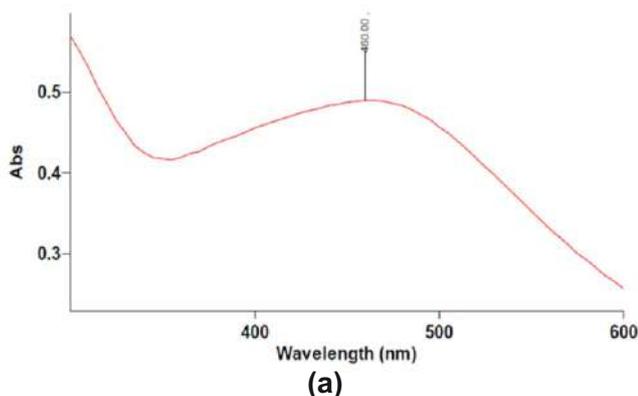
### Impact assessment of makhana popping machine adoption: economic feasibility and challenges

A comprehensive framework was developed to assess the impact of the makhana popping machine among licensees who adopted the technology for production. The economic feasibility analysis revealed a Benefit-Cost (B:C) ratio of 1.10 and a payback period of approximately 7 months. About 33% of respondents reported a positive impact on their family income, with an increase of over 10% compared to their income before adopting the technology. However, the adoption of the technology did not lead to significant changes in the creation of productive or non-productive assets and had minimal influence on social factors such as employment generation. Key challenges identified by the licensees included difficulties in finding markets for the product, competition from other manufacturers, and a lack of effective marketing channels.

### Green synthesized silver nanoparticles-based phase change materials for thermal energy-storage applications

A process protocol for green synthesis of silver

nanoparticles (AgNPs) from *Moringa oleifera* (MO) leaves were optimized in a Microwave Reactor (Make: Anton Paar, Monowave 400 with autosampler type MAS24). The novel method drastically reduced the synthesis time from 24hr using conventional heating methods to just a few minutes. It was observed that the best optimized time-temperature combination for the nanoparticle synthesis was 80°C/10 min. The nanoparticles thus obtained were washed, separated and harvested using a centrifuge at 5000 rpm/10 min. UV-Vis spectrum of the synthesized nanoparticles indicated a peak at near about 460 nm, which confirmed the results, as shown below (Fig. 25. a). The developed nanoparticles (as shown in Fig. 25. b) were used for preparation of the nano-enhanced phase change materials (NePCM) for thermal energy storage in aqueous polyacrylate gels as a base material. Results indicated the significant reduction (up to 42%) in the super-cooling degree of the NePCM during thermal energy storage by phase-transition. The thermal conductivity was enhanced up to 27% as compared to the base materials using the developed nanoparticles.



**Fig. 25. a) UV-Visible spectra of MO-AgNPs and b) Developed nano-particles; (A) Moringa extract (B) Extract mixed with base salt (C) Green synthesized silver nanoparticles**

### BIOTHERMOCOL: Mycelium based packaging material from crop residue

The usage of polystyrene packing is increasing dramatically with so many items being distributed in packaged form and our global population rising. Expanded polystyrene (EPS) or Styrofoam, is a petroleum-based non-recyclable and non-biodegradable foam. Production of polystyrene creates the worst impact on the environment, in terms of energy consumption and greenhouse gas emissions. After harvesting various agricultural

crops, a large quantity of residues, around 500 million tonnes are generated (both on and off farm). After being used in various applications such as cattle feed, animal bedding, cooking fuel, organic manure etc., about 234 million tonnes of residues generated in India is available as surplus every year and major portion of this unused crops residues is burnt in the irrigated areas, where multiple crops are grown annually. Recently researchers have started

focusing on an emerging green and sustainable class; mycelium-based packaging material as a substitute to polystyrene (EPS) or styrofoam to reduce unbearable environmental issues. Hence an attempt was made to convert agricultural residue into mycelium-based packaging material. Agricultural residues (rice straw and wheat straw) obtained locally were processed for size reduction by chopping to obtain desired sizes. The substrate was sterilized in autoclave for required time and inoculated with spawn of desired mushroom. After incubating at desired temperature for 7 days the material was shattered, and then filled into the moulds, and incubated further for 6-7 days under the required conditions. After growth the material was dried at the required temperature and time for proper drying. The products prepared using this technology are biobased, environmentally friendly, biodegradable, fire retardant and hydrophobic in nature, and an excellent replacement to styrofoam/thermocol.



**Fig. 26. Biothermocol**

### Optimization of the process parameters for making hawaijar

Optimization of the process parameters was done using Central Composite Rotatable Designs (CCRD) for all soaking, cooking and fermentation. For soaking, the parameters viz. water ratio (1:2, 1:3 and 1:4), temperature (20, 25, 30°C) and time (15, 20 and 25 h) were taken which consists of 20 experimental runs whereas, the process variables for cooking were cooking pressure (0.5, 1 and 1.5 kg/cm<sup>2</sup>) and time (20, 30 and 40 min), with 13 experimental runs. For fermentation, the parameters were temperature (32, 37 and 42°C), time (72, 96 and 120 h) and old hawaijar (0, 5 and 10

g) with 20 experimental runs. The optimization for parameters for all the unit operations was done against different responses viz. pH, hardness, viscosity, phenolic content, phytic acid, DPPH scavenging activity, protein in vitro digestibility, ammonia content, bacteria population and sensory. A combination of soaking at 25°C for 15 h (water ratio was 1: 2), steaming at 121°C for 40 min at a pressure of 1.5 kg/cm<sup>2</sup> and fermentation at 39 °C and 90 h with old hawaijar of approx. 5.0 g was able to produce good quality hawaijar product.



**Fig. 27. Hawaijar-a fermented North-East product**

### Optimization of super critical fluid extraction of *Tridax procumbens*

This work investigated the efficiency of supercritical fluid extraction (SFE) in obtaining the *Tridax procumbens* extract. The influence of extraction parameters like temperatures (40-60°C), pressures (100-200 bar), and dynamic extraction time (60-120 min) on extraction yield and total phenolic content (TPC) is elucidated using the response surface methodology (Box-Behnken Design). The optimum conditions were found to be 49°C temperature, 115 dynamic extraction time and 148 bar pressure for extraction of extract from the aerial part of *Tridax procumbens*. The model predicted responses with an overall desirability of 0.76 were found to be 15.20 % extraction yield and 61.10 mg GAE/g of total phenolic content. In order to validate the model, the experiments were conducted in triplicate at optimal conditions. The experimental extraction yield and total phenolic content were 14.94% and 62.36 mg GAE/g, respectively. Further characterization of the

SFE extract by GC-MS revealed that among the identified compounds, fatty acids such as oleic acid ( $C_{18}H_{34}O_2$ ), dodecanoic acid ( $C_{12}H_{24}O_2$ ), and n-hexadecanoic acid ( $C_{16}H_{32}O_2$ ) stand out due to their well-documented antimicrobial properties and FT-IR analysis indicates the presence of the hydroxyl

and carbonyl groups noteworthy for their contributions to antioxidant and antimicrobial properties. Overall, the chemical diversity found in *Tridax procumbens* suggests a broad spectrum of biological activities that will endorse its therapeutic potential.

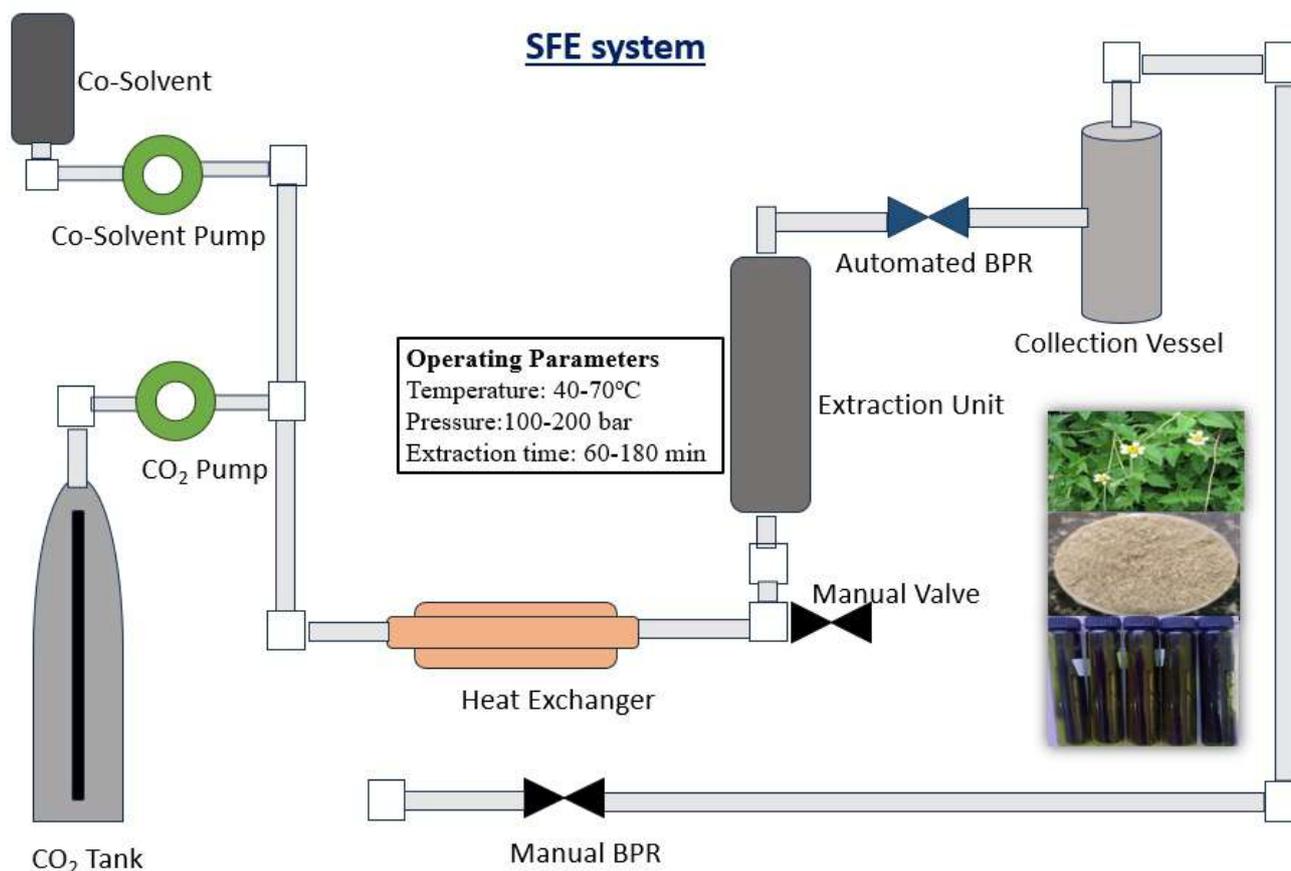
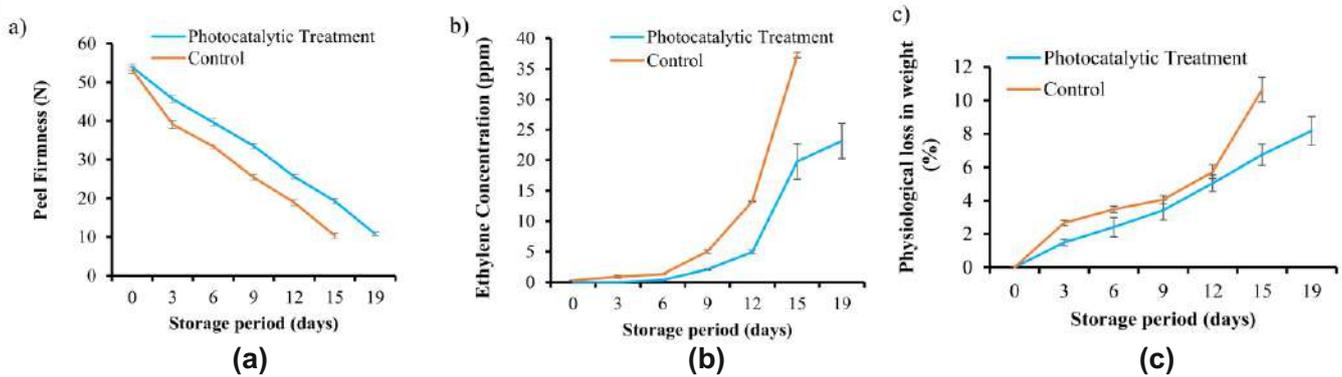


Fig. 28. Supercritical fluid extraction system

### Performance of photocatalytic reactor under cold storage

A photocatalytic reactor consisting of 4 UV lights and photocatalytic substance coated on replaceable sleeves has been developed to degrade the ethylene into carbon dioxide and water. The performance of photocatalytic reactor under cold storage condition (temperature 13-14°C; RH 90-95%) has been evaluated by keeping 500 kg banana of Singapuri cultivar. The fruits were analyzed at 3 days interval for quality parameters during storage and results were compared with control fruits kept under similar conditions. The fruit

stored under photocatalytic treatment showed higher peel firmness as compared to the control fruits. Additionally, the photocatalytic reactor has been found efficient to maintain ethylene concentration below 5 ppm up to 12<sup>th</sup> day of storage. The control fruits showed higher weight loss as compared to the photocatalytic treated guava throughout storage. The photocatalytic reactor efficiently manages the ethylene concentration and quality of guava fruits under cold storage conditions.



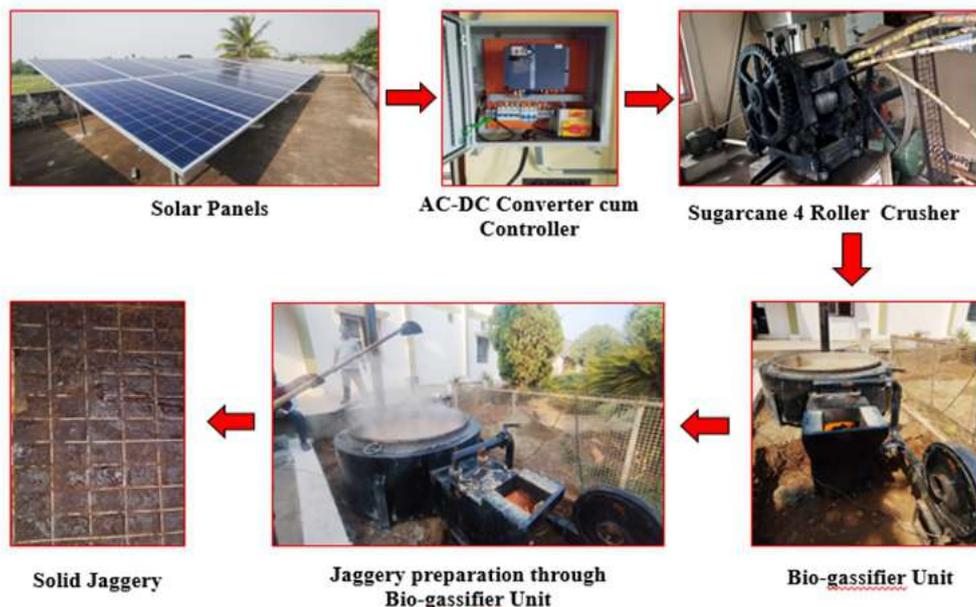
**Fig. 29. The effect of photocatalytic treatment on banana under cold storage a) Peel firmness, b) Ethylene concentration and c) Physiological loss in weight.**

**Machineries/Processes/Products Developed by AICRP-PHET**

**Solar and biomass hybrid jaggery manufacturing unit**

The solar and biomass hybrid jaggery manufacturing unit aimed to address the need for sustainable and efficient solutions for sugarcane processing, particularly focusing on boiling sugarcane juice and jaggery production. To achieve this, a biomass gasifier with a capacity of 2,00,000 Kcal/h was designed and developed for boiling sugarcane juice. In parallel, the energy requirement for a 7.5 hp four-roller sugarcane crusher was calculated, and an estimate was made for the number of solar PV panels required to operate it. As a result, 28 solar PV panels, each with a capacity of 335 Wp, were procured and installed, successfully powering the crusher. Additionally, the fabricated biomass gasifier was tested extensively for

chemical-free jaggery production. Trial runs were conducted, during which data on brix (°) and temperature (°C) were recorded at 30-minute intervals. Bagasse, a byproduct of sugarcane crushing, was utilized as fuel for boiling the sugarcane juice in the biomass gasifier. Initial testing revealed a significant improvement in fuel efficiency; bagasse consumption during jaggery production was reduced to 23% of the cane weight in the biomass gasifier compared to 27% in the traditional furnace. This innovation not only optimized energy use but also demonstrated economic and environmental benefits by reducing waste and enhancing the production process.



**Fig. 30. Manufacturing unit**

### Multi-crop (oilseeds and maize) processing machine

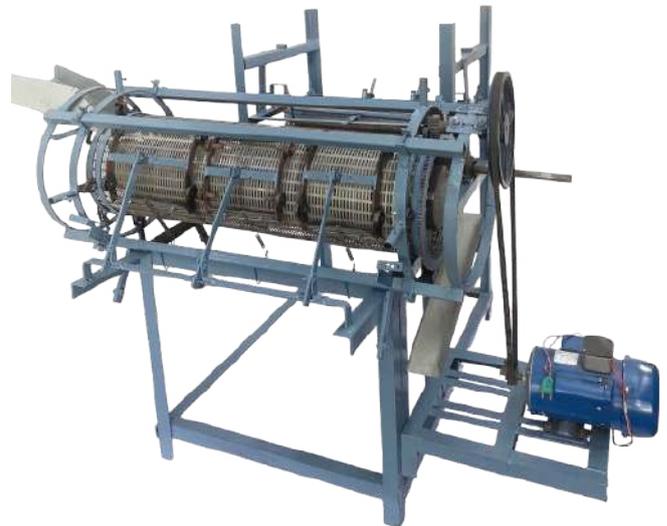
A versatile Multicrop Processing Machine (MCP) was developed to streamline agricultural processing by handling multiple tasks, including groundnut stripping and decortication, castor decortication, maize shelling, and sunflower threshing. The MCP features a compact and portable design, powered by a 0.5 - 1.0 hp single-phase motor, making it suitable for small-scale and mid-scale farming operations. The machine is equipped with concave screens for groundnut decortication and includes three specialized attachments for stripping, shelling, and threshing. It demonstrates impressive performance, processing up to 75 kg of groundnut pods for stripping, 120 kg of groundnut pods for decortication with less than 2% breakage, and handling 250 sunflower heads, 250 maize cobs, and 120 kg of castor pods per hour. Notably, the MCP maintains high processing efficiency, exceeding 98% across all crops, with no visible seed damage. Furthermore, the seed germination rate remains above 95% for all processed seeds, ensuring the integrity and usability of the produce for agricultural purposes. Economically viable, the MCP is priced at just 3-4 times less than the combined cost of separate machines for each crop. This innovation is a significant step towards cost-effective, efficient, and sustainable farming solutions, addressing the needs of diverse agricultural communities.



**Fig. 31. Processing machine**

### King chilli stem removing machine

To enhance efficiency in post-harvest processing, a king chilli stem cutting machine was developed to simplify and accelerate the stem removal process. With a capacity of 25-30 kg per hour, this machine caters to small and medium-scale operations. The compact design requires only a 1 hp motor and a single operator, making it an economical and user-friendly solution. The machine's functionality is based on a rotating perforated drum equipped with a spring-loaded cutting blade on its outer edge. Chillies are fed through a hopper into the drum, where centrifugal force pushes the stems against the perforated surface. The spring-loaded blade efficiently cuts the stems with precision, ensuring minimal wastage while maintaining the quality of the



**Fig. 32. King chilli stem cutting machine**

chillies. Priced at Rs. 38,800, the machine offers a cost-effective alternative to labour-intensive manual processes. It also provides significant environmental benefits, generating an annual carbon credit of 851 kg of CO<sub>2</sub>. The production cost per unit is Rs. 29,000, reflecting its economic viability and sustainability. This innovation addresses key challenges in chilli processing by reducing labour dependency, improving productivity, and promoting eco-friendly practices, thereby contributing to sustainable agricultural development.

### Rotary dryer cum flavor coating machine for the production of coconut chips

To improve the efficiency of coconut chips production, a stainless steel rotary drum drying

machine was developed with a capacity of 7 kg. The machine operates with a 0.5 hp motor rotating at 30 rpm and incorporates a hot air inlet system powered by a 1 kW heating coil with an air velocity of 0.1 m/s. It can produce 5 kg of coconut chips in just 2 hours, significantly enhancing productivity. In comparison, the conventional drying method requires 6 hours and a 4 kW heating coil to produce 10 kg of chips. The new machine achieves a 50% reduction in both drying time and energy consumption, offering substantial operational cost savings and environmental benefits. The optimized drying process ensures consistent chip quality while maintaining a lower energy footprint. This energy-efficient and time-saving innovation is particularly beneficial for small-scale processors, addressing their need for a cost-effective and reliable solution for coconut chip production. By streamlining operations and reducing energy usage, the machine promotes sustainability while improving overall productivity in the coconut processing sector.



**Fig. 33. Rotary dryer cum flavor coating machine**

#### **Nannari root cutting and core separation unit**

A specialized Nannari root cutting and core separator unit was developed to streamline the processing of nannari roots, enhancing efficiency and reducing manual labour. The machine

comprises a hopper, rollers, a cutting blade, and a core separator. Powered by a 1 hp three-phase motor coupled with a differential gearbox (1:12 ratio) and a grooved pulley connected to the main shaft, the unit ensures reliable and smooth operation. Nannari roots are cut into 25 mm pieces using a sharp knife attached to an eccentric unit. These cut pieces are then directed to the core separator unit, where a needle, operating through a reciprocating mechanism, effectively pushes out



**Fig. 34. Nannari root cutting**

the core of the root. Both the separated cores and root pieces are collected at the discharge outlet, ensuring a clean and efficient process. With a capacity of 50 kg/h, this unit is well-suited for small to medium-scale operations and can be modified to handle larger quantities as needed. The approximate cost of the machine is Rs. 1,50,000, making it an economical solution for processing nannari roots. This innovative equipment not only saves time and labour but also ensures precision and consistency in root processing, contributing to improved productivity and product quality.

#### **Popped rice – husk separation machine**

To enhance the efficiency of popped rice production, a husk separation machine was developed with a capacity of  $65 \pm 5$  kg/h and an

impressive efficiency of 99%. This machine is designed to separate husk from popped rice, making it a vital tool for Self-Help Groups (SHGs) and Farmer Producer Organizations (FPOs), especially during festival seasons like Dussehra and Diwali. The machine is composed of key components such as a hopper, perforated cylindrical sieve, rotating blades with a nylon brush, bearing, shaft, pulley, and belts, all powered by a 1 hp single-phase electric motor. It operates with minimal manpower, requiring only one operator for efficient functioning. With a cost of Rs. 35,000, the machine offers an affordable solution for small-scale rice processors, reducing manual labour while maintaining high quality. The production cost for separating one kilogram of popped paddy is just Rs. 1.00, making it a cost-effective choice for local producers. This innovation supports local communities by improving efficiency in rice processing and enhancing the quality of popped

rice products, contributing to the economic development of SHGs and FPOs. The machine's ease of use, low operational cost, and high efficiency make it an essential tool for sustainable small-scale rice production.



**Fig. 35. Popped rice – husk separation machine**

### Cherry processing technologies: Pitter and Grader

To enhance the efficiency and quality of cherry processing, two essential machines—the Cherry Pitter and Cherry Grader—have been developed, each serving a crucial role in the value chain of cherry production. The Cherry Pitter is designed for the de-stoning of cherries with a capacity of 30 kg per hour. With an efficiency of 72.7%, the machine is powered by a 0.25 hp motor with a reduction gear and weighs 30 kg. Priced at Rs. 0.30 lakh, it offers an effective solution for the rapid removal of pits, streamlining the cherry processing workflow. The Cherry Grader, with a higher capacity of 600 kg per hour, is built for sorting cherries by size and quality.

This machine is powered by a 2 hp motor and operates with an impressive efficiency of 96.7%. Weighing 110 kg and costing Rs. 2.30 lakh, it ensures that cherries are graded to the desired standards, enhancing product uniformity and marketability. Both machines contribute significantly to the cherry processing value chain, improving productivity and reducing manual labour. The Cherry Pitter ensures quick de-stoning, while the Cherry Grader guarantees consistent product quality, making both machines integral to the efficient handling and processing of cherries.



**Fig. 36. Pitter**



**Fig. 37. Grader**

### Jackfruit seed peeler

A jackfruit seed peeling machine with a capacity of 25 kg/h was developed to efficiently remove the peel from jackfruit seeds. The machine, costing Rs. 43,250, is designed to operate with minimal manpower (only 1 person) and requires 0.5 hp of power. The design consists of a perforated cylindrical mesh, a hollow cylinder with a base plate, a rotating disc with a perforated sheet, a connecting shaft, a power transmission unit, an outlet chute, and a frame assembly. The rotating disc generates centrifugal force, which aids in peeling the seeds. The optimal operation conditions were found to be a disc speed/frequency of 33.0301 Hz and an operation time of 1.14783 minutes. Under these conditions, the peeling efficiency reached an impressive 97.0785%, with material loss at 0.607% and seed damage at 2.2448%. The machine has an operational cost of Rs. 44.64 per hour, and the benefit-cost ratio is calculated at 1.84:1, highlighting its cost-effectiveness. This machine provides a practical and efficient solution for peeling jackfruit seeds, offering significant benefits in terms of both productivity and cost.



**Fig. 38. Jackfruit seed peeler**

### Accelerated aging of cocoa mucilage wine through hydrodynamic cavitation

The development of hydrodynamic cavitation (HC) technology for accelerating the aging process of cocoa mucilage wine offers a promising method for

enhancing the quality and flavor profile of the wine. The cocoa wine was prepared using a protocol developed under the AICRP on PHET at the Tavanur centre. The HC reactor designed for this purpose consists of several components, including a feed tank, storage tank, ball valve, AC motor, pressure gauge, galvanized steel pipe, and various venturi systems such as slit, elliptical, and orifice types. Optimization of key process parameters was



**Fig. 39. Hydrodynamic cavitation (HC) technology**

carried out to fine-tune the machine's performance. Factors such as the type of venturi system (slit), pressure (3.5 bar), and time of flow (46 minutes) were systematically adjusted to achieve the best results. The optimized machine condition exhibited a maximum capacity of 10 litres, with an energy release of 11.06 J/ml, providing an effective means for accelerated aging. In terms of product quality, the total phenolic content at the optimized condition was measured at 321.437 mg GAE/100g, indicating a significant enhancement in the antioxidant properties and overall quality of the cocoa mucilage wine. This innovation in the use of hydrodynamic cavitation not only reduces the aging time but also improves the chemical composition of the wine, offering an efficient and scalable solution for the cocoa wine industry.

### Continuous type cassava peeler for small scale processing

The developed tapioca peeler addresses the challenges of manual peeling, which remains the most labour-intensive and time-consuming step in tapioca processing. With a capacity of 200-250 kg per hour (equivalent to 500-750 cassava tubers of varying sizes), the peeler significantly improves efficiency in processing. The machine is designed to remove the peel from fresh cassava tubers for further processing, offering an automated solution to a traditionally manual task that often involves women in small-scale operations. This innovation requires minimal labour, with a power consumption of 0.42 kW per hour, and operates with a production cost of Rs. 0.45 per kg. The peeler can accommodate cassava tubers with diameters ranging from 35 mm to 110 mm, making it versatile for different sizes of tubers. The investment cost for the peeler is Rs. 1 Lakh, and it contributes to a reduction in carbon emissions, offering a carbon credit of 473 kg of CO<sub>2</sub>. This machine reduces the labour required for peeling, improving productivity and lowering operating costs, with the potential to peel up to 200 kg of tubers per day with an 8-hour operation per person. It is a cost-effective solution that boosts productivity while also being environmentally friendly.



Fig. 40. Cassava peeler

### Machineries/Processes/Products Developed by AICRP-PEASEM

#### Flexible check dam for the conservation of water and check soil erosion

UAS, Raichur center has developed flexible check dam for the conservation of water and check soil erosion. The flexible check dam is easy to construct and install at remote places using locally available materials such as clay and sand. It creates a potential water source for the benefit of farmers in rain-fed agroecosystems and provides supplemental irrigation to enhance crop productivity. The flexible dam is a rectangular weir type with end contraction from both sides. The FRP of Block size (0.15 m × 0.15 m × 0.15 m) filled with excavated clay and gully-bed sand is used as the material for the construction. The total cost of the construction is Rs. 2,16,500, and the cost of the water storage is 0.24 Rs. /m<sup>3</sup> (Considering the 10-year life of the check dam). The catchment area covers approximately 50 hectares with a perimeter of about 4 km. The maximum water storage capacity per runoff event, assuming the weir is suppressed, is 540 m<sup>3</sup>. The water storage dimensions include a length of 200 m, a depth of 1.0 m, and a minimum width of 5.4 m. The anticipated peak runoff rate is 1.22 m<sup>3</sup>/s, and the total harvestable runoff volume is 1,39,500 m<sup>3</sup> per year, allowing for a maximum of 258 storage cycles annually.

**Cost of Construction:** The total cost for the FRP block fabrication and check dam construction is Rs. 2,16,500, comprising Rs. 1,84,000 for raw materials, Rs. 20,000 for site clearing and earthwork, Rs. 7,500 for labour, Rs. 5,000 for miscellaneous expenses, and Rs. 1,00,000 for 10 years of maintenance at Rs. 10,000 per year, resulting in a water storage cost of Rs. 0.24 per cubic meter, assuming a 10-year useful life for the check dam.

**Carbon Auditing:** Total CO<sub>2</sub> emission for the construction of FRP check dam was 2981.51 kg CO<sub>2</sub> eq whereas for the construction of RCC check dam 8078.30 kg CO<sub>2</sub> eq. Comparing the FRP check dam with RCC check dam the reduced carbon emission of FRP structure is equivalent to the CO<sub>2</sub> absorbed by 232 trees in their lifetime.



Fig. 41. Dam for the conservation of water and check soil erosion

### Renewable energy-based fodder dryer and winter protection shelter for goats

The renewable energy-based fodder dryer and winter protection shelter for goats was developed by ICAR-CIRG Makhdoom. This structure, designed for goat kid housing and fodder drying, measures 22 x 11 feet and accommodates 40 goat kids aged 6-9 months. It features plastic panels for thermal insulation during winter, providing a cost-effective solution for sheltering goats while efficiently drying fodder. A trial was conducted to evaluate the drying of green biomass (*Cenchrus spp.*), which initially had a moisture content of

83.46% and a dry matter content of 16.54% (wet basis). The drying performance of a polyhouse solar dryer (S1) was compared to open sun drying (S2) and shade drying (S3). The polyhouse solar dryer achieved a maximum air temperature increase of 17°C above ambient levels. After 59 hours of drying, the moisture content of the biomass was reduced to 9% in the polyhouse solar dryer (S1), while open sun drying (S2) and shade drying (S3) resulted in moisture contents of 26.5% and 24%, respectively.





Fig. 42. Shelter for goats

### Machinery/Process Developed by CRP on SA Makhana seed collection system

Traditionally, makhana is cultivated in stagnant water bodies with a depth of 0.5-2 m. Mature seeds fall to the pond bed and are manually collected, which is labour-intensive and time-consuming. To address this, a mechanized makhana seed collection system is developed by ICAR-CIPHET, Ludhiana. The system features a floating base with a self-priming centrifugal pump, collection chute, seed separation mechanism, hydraulic lift, and an outboard motor for movement. The pump sucks seeds, mud, and water from the pond bottom through the collection chute, discharging the material onto a sieve for separation. Mud and debris are returned to the pond, while the cleaned makhana seeds are collected. This solution aims to reduce labour, increase efficiency, and enhance seed collection capacity. The makhana seed collection system consists of a float, collection chute, hydraulic system, screening assembly, centrifugal pump and outboard motor propeller. The float, an aluminium alloy boat-like structure, houses all devices and is propelled across the pond by the outboard motor. A trapezoidal collection chute,

positioned at the pond bottom and adjustable via a hydraulic cylinder controlled by a manually operated pump, is connected to a centrifugal pump via a flexible pipe. The chute is covered with a wire mesh to collect seeds while filtering debris. The centrifugal pump, a custom self-priming pump powered by a gasoline engine, lifts the collected material. A screening assembly, comprising a rectangular deck with a perforated metal sheet, further filters water, mud, and debris, leaving only the makhana seeds. The outboard motor propeller enables the system to move across the pond at speeds ranging from 3 to 15 m/min. The collection system works by creating a suction head to lift a slurry of mud, seeds, water, and debris from the pond bottom, discharging it onto a screen for separation based on seed size and float properties. Key factors include the design of the suction chute for uniform pressure, its height from the seed bed, the suction head generated by the pump, accurate depth adjustment, system speed, and operator skill. The system has been fabricated and is undergoing field evaluation.



Fig. 43. Makhana seed collection system

### Mechanical method for the enrichment of dietary fibre from pea pods

Peas (*Pisum sativum* L.) is the second most widely grown legume globally. While the peas are processed into forms like frozen, dried, and canned, the outer pods, which make up 30-55% of the crop's weight, are often discarded. These pods, though rich in fibre, carbohydrates, proteins, and bioactive compounds are typically treated as waste, contributing to environmental pollution, but could be used for potential food applications. Considering the vast amount of scientific evidence that confirms the numerous and diverse health benefits of dietary fibre, as well as the risks linked to a fiber-deficient diet, optimizing fibre intake in our diets is a crucial public health strategy to enhance both metabolic and overall well-being. Presently fibre is extracted using chemical methods and to avoid the use of harsh chemicals, the present study has undertaken to optimize the process technology for the enrichment of dietary fibre from pea pods through mechanical techniques. The fresh pea pods were blanched at 95°C for 3 minutes, then dried in a tray dryer at 60°C for about 24 h. Once dried, they were ground using a lab-scale mixer and grinder. The

total dietary fibre content (TDF) of the pea pod powder (PPP) was approximately 40-43%, as estimated using a Megazyme kit and protein content was in the range of 13-15%. To enhance the dietary fibre content using mechanical means, various milling techniques such as hammer mill, attrition mill, and pin mill were used to grind the sample. Effect of sieving using sieves of different mesh size was also studied. Further, the effect of the speed (2000 to 18,000 rpm) of the pin mill was analysed on the TDF content. The content of TDF of the sample milled at different speeds and after air classification ranged from 62-68% with yield of 21.8% - 93% in the coarse fractions of PPP. On the basis of results obtained, the fine fraction (C1) and C3 coarse fraction obtained after air classification showed about 42 and 62%, increment in protein content and TDF content, respectively. The standardized method include due of milling, sieving, and air classification. Therefore, both C1 and C3 fractions obtained could find applications for health foods/nutraceutical purposes.



Fig. 44. Fibre from pea pods

### Extraction of glucosinolates from moringa leaves and seeds

*Moringa oleifera* is a miracle tree due to its rich source of certain macro and micro nutrients of great importance in human nutrition. Its seed contain 19-47% oil, 10-52% proteins and 2.5-20% glucosinolates. The tree contains important bioactive compounds that confer its pharmacological properties. Antioxidant activity of the plant is attributed to the presence of flavonoids, phenolic acids, carotenoids, and tocopherols. Other

secondary metabolites of *Moringa oleifera* are glucosinolates, which are present throughout the entire tree with both leaves and seeds containing the highest content of these compounds. The solvent extraction method has been chosen to extract the glucosinolates. Before the extraction process the components present in moringa leaves and seeds were identified by GC-MS and LC-MS analysis.

### Pre-treatment for Myrosinase Inactivation

Myrosinase inactivation, crucial for preserving glucosinolates by preventing their breakdown into undesirable compounds, was achieved through various pre-treatments. Heat treatment of seeds at 60-80°C for 5-15 minutes showed increasing glucosinolate yields up to 0.513 mg/g at 60°C for 15 minutes, with a peak of 0.665 mg/g at 70°C for 10 minutes before declining. Cold treatment using liquid nitrogen yielded a higher maximum glucomoringin content of 0.992 mg/g. Ultrasonic assisted extraction (UAE) proved most effective, achieving 4.244 mg/g with a 15-minute extraction at 60°C and a 1:5 sample-to-solvent ratio. Microwave assisted extraction (MAE) optimized at 250W for 10 minutes at 70°C yielded 2.258 mg/g of glucomoringin. Both UAE and MAE extracts were tested for antioxidant, anticancer, and antibacterial activity. Results demonstrates that both UAE and MAE are effective methods for extracting bioactive compounds from *Moringa oleifera* seeds. However, UAE showed higher yields of glucomoringin, greater antioxidant, anticancer, and antibacterial activities, and is thus a superior method for the extraction of these compounds. Further, preparative HPLC was used to purify glucomoringin, yielding a highly pure sample with a 99.5% purity and a retention time of 11.9 min. The purified glucomoringin was then stored under controlled conditions to maintain its stability.

### Extraction of starch and protein from tamarind seeds

Tamarind seeds, composed of approximately 25% testa and 75% kernel, are processed to extract starch, a valuable product widely used in textile, adhesive, and plywood industries. The extraction process involves roasting the seeds in a roaster, decorticating them to remove the skin, and grinding them into smaller pieces, followed by pulverization to obtain starch, yielding around 60%. Starch extraction was further optimized using microwave treatment at 900 W, varying exposure times, while oil removal and starch content estimation were conducted using solvent extraction and the anthrone method. For protein and starch separation, defatted tamarind powder was blended with water, ethanol, and NaOH, followed by centrifugation, filtration, and washing. The extracted starch was dried at 50°C, whereas the protein fraction was precipitated with chilled acetone, centrifuged at 5000 rpm, and dried at 35°C. Additionally, infrared heating (10-60 min) and moisture-conditioning (10-40%) were applied to modify the functional properties of native tamarind seed starch, significantly enhancing water and oil absorption capacities, swelling power, and solubility. The optimal conditions for starch modification were determined to be 25.12 g/100 g starch with 60 min of infrared heating, improving its industrial applicability.



Fig. 45. Extraction of starch and protein from tamarind seeds

### Preparation of edible bio-film using tamarind seed starch

Tamarind seed starch (3-5%, w/w) was dispersed in 100 ml of distilled water and stirred for 5 min at room temperature. The dispersion was heated at 85°C in a water bath, for 30 min to induce starch gelatinization and cooled down to room temperature. Glycerol (2-5 %, for each gram of starch) and sorbitol are most commonly used plasticizers for preparation of edible films and glycerol is the mostly preferred for starch-based films. The suspension was heated at 90°C for 10 min. This mixture was cooled down to room temperature (28-32°C). Edible film was prepared by evaporating 40±1.5 ml of prepared edible solution casted on a petri plate by using the oven at 65°C for 4 to 5 h. Prepared films were tested for physical, mechanical, moisture barrier, and light barrier. Also, optimized edible film parameters by using Design Expert software. Optimal conditions for edible film were determined to be 4.98 % starch and 4.57 % glycerol, with a desirability factor of 0.911. Edible film was then produced using these optimized parameters and determine various characteristics including water vapor permeability, oxygen permeability and storage studies.

Film thickness, opacity values, and water solubility increasing with higher starch and glycerol content. Moreover, films containing higher starch concentrations and higher glycerol content exhibiting greater tensile strength and elongation at break, respectively. Films with higher starch and



**Fig. 46. Optimized edible film**

glycerol concentrations showed improved barrier effects against UV radiation. Water vapor permeability (WVP) and oxygen permeability decreased with increased film thickness. The relatively low WVP and oxygen permeability values indicate good barrier properties of the optimized films. To evaluate practical applications, the optimized film-forming solution was used to coat apples and tomatoes. Coated fruits showed extended shelf life compared to uncoated controls, both at ambient temperature and under cold storage conditions.

## AWARDS AND RECOGNITION

Name of the Awardee	Name of Award
Arvind Kumar Ahlawat	Lifetime Achievement Award by Hindustan Agricultural Research Welfare Society, 2024
Chandan Solanki	Best Oral Presentation on National Symposia on Food Processing 4.0: Innovation and Sustainability held on 30 April 2024 at Department of Food Science & Technology, Punjab Agricultural University, Ludhiana
	Best Oral Presentation on a two-day “National Consultation: Food System for Sustainability & Profitability of Millets” on 5-6 October 2024 at RLBCAU, Jhansi.
	Best Article Award in Agriculture and Food e-Newsletter
Gagandeep Singh Chandan Solanki Sukhmanjot Kaur Manju Bala	Best Poster Presentation on a two-day “National Consultation: Food System for Sustainability & Profitability of Millets” on 5-6 October 2024 at RLBCAU, Jhansi.
Guru P. N.	‘Best Scientist Award’ of ICAR-CIPHET for the year 2024, presented on 36 <sup>th</sup> Foundation Day of the institute.
	Technology certification for Visible Light Insect Trap awarded by ICAR during during 15-16 July, 2024
	Best Oral Presentation (second position) in the Indian ecological society international conference 2024 (IESIC-2024) organised by PAU, Ludhiana during 12-15 November 2024.
	First Prize in poster presentation entitled ‘Post-Harvest Mechanization, Storage and Insect Management in Makhana for Enhanced Quality and Nutrition’ in National seminar cum exhibition on makhana and allied crops (NRCM-NASMAC 2024) held on 17 October 2024 at NRCM, Darbhanga.
Pawandeep Kaur Sandhu Mridula D. Simran Arora Guru P. N. R. K. Vishwakarma	Third Prize in poster presentation entitled “Impact of extrusion and moisture on nutritional, physical, functional, and sensory quality of extruded snacks enriched with makhana by-products” in National Seminar-cum-Exhibition on Makhana and Allied Aquatic Crops-2024 (NRCM-NASMAC 2024) held on 17 <sup>th</sup> October 2024 at ICAR-National Research Centre for Makhana, Darbhanga, Bihar.
Rakesh Sharda	Best Poster Award “Nutrient Film Technique: A viable option to raise leafy vegetables using brackish water” awarded by Global Soils Conference 2024 at NASC Complex New Delhi
Shaghaf Kaukab	Young Scientist Award from 12 <sup>th</sup> Edition of International Academic Achievements and Awards for contribution and Honourable Achievement in Innovative Research.
Shivani Manju Bala Deepika Goswami Surya Tushir	Third Prize in poster presentation entitled “Bioactive potential of Centella asiatica: A review on advancements in phytochemical extraction and their applications in health benefits” in National Seminar-cum-Exhibition on Makhana and Allied Aquatic Crops-2024 (NRCM-NASMAC 2024) held on 17 <sup>th</sup> October 2024 at ICAR-National Research Centre for Makhana, Darbhanga, Bihar.



Name of the awardee	Name of award
Swati Sethi	Outstanding Researcher in Food Technology category in Agricultural Sciences discipline conferred by Venus International Foundation for 10 <sup>th</sup> Venus International Research Awards – VIRA 2024. Best oral presentation award for paper entitled “Characterization of water chestnut starch” in National Seminar-cum-Exhibition on Makhana and Allied Aquatic Crops – 2024 at ICAR-NRC for Makhana, Darbhanga, Bihar on 17 <sup>th</sup> October 2024.
Thingujam Bidalakshmi Devi	Received IEI Young Engineer’s Award 2024-2025 in Agricultural Engineering discipline conferred by The Institute of Engineers (India) during 36th National Convention of Agricultural Engineers to be held at Raipur during August 29-30, 2024.
Urhe Sumit Bhausahab	Best Poster Presentation Award for Intervention of Biosensor for aflatoxin B1 detection in Maize) awarded by National Symposia on Food Processing 4.0: Innovation and Sustainability held at Department of Food Science & Technology, Punjab Agricultural University, Ludhiana, on Date: 30 April 2024.

## Academic Excellence

### Ph D

Name of Awardee	Name of Award
Ravi Prakash	Awarded Best thesis of the year entitled “Design and Development of phase change materials-based milking cum cooling pail” by Indian Agricultural Universities Association Outstanding Ph.D. Thesis Award 2024
Shilpa S Selvan	Awarded best Ph. D. Thesis entitled “Development of a sensing system for monitoring the quality deterioration in pearl millet grains during storage” by Pragati International Scientific Research Foundation in 2024.
Surya Tushir	Awarded PhD in Microbiology from Maharshi Dayanand University Rohtak on 27 September 2024 for thesis entitled “Biological interventions for enhancing protein recovery from de-oiled rice bran”

## Recognition

### 10 years & 25 Years Service Completion Awards at ICAR-CIPHET

Name of the Official	Designation
<b>10 Years Service</b>	
Dr. Ranjit Singh	Head, ToT Division, Head (Act.) AST Division
Dr. Swati Sethi	Senior Scientist
Dr. Dhritiman Saha	Senior Scientist
Dr. Chandan Solanki	Senior Scientist
<b>25 Years Service</b>	
Sh. Iqbal Singh	Assistant
Smt. Sunita Rana	Upper Division Clerk
Sh. R K Yadav	Upper Division Clerk
Sh. Vishal Kumar	Technical Officer
Sh. Beant Singh	Technical Officer
Sh. Jaswinder Singh	Technical Officer
Sh. Jagtar Singh	Technical Officer
Sh. Pawan Kumar	Technical Officer

## TECHNOLOGY COMMERCIALIZED

The institute has commercialized 07 technologies to 07 licencees, generating a total revenue of 9.0 lakh during 2024.

Technology	Name of firm	Date of licensing	Licensing fee (Rs.)
Visible light insect trap	M/s Parashar Agrotech Bio Pvt Ltd S15/2-14-4-5, Mohankunj Apartment, Ghousabad, Varanasi - 221002	28 Mar 2024	4,00,000/-
Process for preparation of fat free flavoured makhana	M/s Britwell Foods & Beverage Private Limited, #102, Shankar Sadan Apartment, Patna-800013	23 April 2024	25,000/-
Cereal-gluten free pasta with semi-popped makhana	M/s Britwell Foods & Beverage Private Limited, #102, Shankar Sadan Apartment, Patna-800013	24 April 2024	25,000/-
Ready to constitute makhana kheer mix	M/s Britwell Foods & Beverage Private Limited, #102, Shankar Sadan Apartment, Patna-800013	25 April 2024	50,000/-
Pearl millet based composite extrudates	Mr. Navjot Singh Maan, H.No. 10A-11A, Near Disposal Ropar, New Hargobind Nagar, Ropar, Rupnagar, Ropar,Punjab-140001	10 June 2024	50,000/-
Process technology for the extraction of hesperidin from immature dropped kinnow fruits	M/s BNK Agri Foods Private Limited, Omaxe Riveria, Flat No-Congo-B-104, Omaxe Riviera, Pant Nagar Nainital Highway, Omaxe Riviera, Rudrapur, Udham Singh Nagar, Uttarakhand -263153	23 Aug 2024	3,00,000/-
Process for preparation of makhana puffs	M/s Arihant International, Block-A, 35, Industrial Area, Hambran, Ludhiana (Pb.)-141102.	31 Aug 2024	50,000/-





# PATENT

## Patent Granted

Title	Application/ Registration No.	Inventors	Date of grant	Patent number
Mechanized system for removing stalks of dry red chillies ( <i>Capsicum Annum L.</i> )	201811044800	Kirti Jalgaonkar Manoj Mahawar R.K. Vishwakarma	01 Feb 2024	506110
Grader for oblong and round fruits and vegetables	201611018794	R.K. Vishwakarma V.E. Nambi R.K. Gupta Ramesh Kumar	14 Mar 2024	525353
Cool tower for production of microcapsules from high melting fats and waxes	202111014302	K. Narsaiah	23 April 2024	534205
Process for producing low-fat, high-fibre processed meat products using food industry by-products	201911049376	Yogesh Kumar K. Narsaiah R.K. Singh Sandeep Mann R.K. Vishwakarma	02 April 2024	531519
Process for preparation of rose petal jam	202011021332	Mridula D. Deepika Goswami R.K. Vishwakarma Akhoon A. Bashir Indore Navnath R.K. Singh	27 May 2024	539375

## Patent Filed

Title	Application/ Registration No.	Inventors	Date of filing
Photocatalytic reactor for ethylene degradation	202411005249	Bhupendra M Ghodki Poonam Choudhary	25 Jan 2024
Compact moisture reduction unit for honey	202411033338	Sandeep Mann Renu Balakrishnan	26 April 2024
Table-top vacuum fryer	202411038348	Swati Sethi Pankaj Kumar	16 May 2024
Makhana seed collection system	202411071081	R.K.Vishwakarma Sukhwinder Singh Sekhon Guru P.N. Nachiket Kotwaliwale	20 Sep 2024
Hand operated cocoa pod breaker (AICRP- PHET)	202411079887	Rangaraju Visvanathan R. Arulmari, Parish Ashok Yadav	21 Oct 2024



**Design registration granted**

Title	Application/Registration No.	Inventors	Date of registration	Design no.
Photocatalytic reactor for ethylene degradation	411658-001	Bhupendra M Ghodki Poonam Choudhary	16 May 2024	411658-001
Visible light insect trap	411678-001	Guru P.N. D. Saha Yogesh Kalnar, Virinder Kumar Manju Bala Nachiket Kotwaliwale	08 Aug 2024	411678-001

**Copyright Registered**

Title	Registration No.	Authors	Date of Registration
भा.कृ.अनु.प.- सीफेट के मार्गदर्शन एवं तकनीकी सहयोग से सफल कुछ उद्यमी	CF-5668/2024	Alka Sharma Deep Narayan Yadav Guru P.N. Shyam Narayan Jha Jaspreet Singh Khwairakpam Bembem Nachiket Kotwaliwale Rahul Kumar Anurag Rajesh Kumar Vishwakarma Ranjeet Singh Renu Balakrishnan Rupinder Kaur Sachin Mittal Sandeep Mann	10 May 2024



Title	Registration No.	Authors	Date of Registration
भा.कृ.अनु.प.- सीफेट द्वारा विकसित मखाना प्रसंस्करण प्रौद्योगिकियाँ	CF-5715/2024	Deep Narayan Yadav Guru P.N. Indu Shekhar Singh Khwairakpam Bembem Mridula Devi Nachiket Kotwaliwale Rajesh Kumar Vishwakarma Ranjeet Singh Renu Balakrishnan Shyam Narayan Jha	19 July 2024
Makhana processing technologies by ICAR - CIPHET	CF-5799/2024	Deep Narayan Yadav Guru P.N. Indu Shekhar Singh Khwairakpam Bembem Mridula Devi Nachiket Kotwaliwale Rajesh Kumar Vishwakarma Ranjeet Singh Renu Balakrishnan Shyam Narayan Jha	22 Nov 2024

### Copyright Filed

Title	Diary No.	Authors	Date of filing
Near infrared spectral dataset for detection and quantification of maize flour adulteration in chickpea flour	31680/2024-CO/L	Manju Bala Swati Sethi Sanjula Sharma Mridula D. Gurpreet Kaur Dhritiman Saha Nachiket Kotwaliwale	10 Oct 2024
Stereodepth-based detection and localization module for apples	36556/2024-CO/SW	Shagaf Kaukab Yogesh B. Kalnar K. Narsaiah Bhupendra M. Ghodki	21 Nov 2024

# LINKAGES AND COLLABORATIONS

## MoUs Signed

Universities/ Institutions	Date of signing
M/s Parashar Agrotech Bio Pvt. Ltd., S15/2-14-4-5, Mohankunj Ghausabad, Varanasi, Uttar Pradesh	14 Feb 2024
DAV College, Abohar (Punjab)	28 Feb 2024
Globus Warehousing & Trading Pvt. Ltd. (GWTPL), I-11, Green Park Extension, New Delhi	15 Mar 2024
M/s Renuka Bio Farms LLP, Routhu Suramala Village, Thottambedu Mandal, Tirupati-District, Andhra Pradesh	15 July 2024
Mera Farmhouse, Plot 379, Industrial Area, Phase II, Chandigarh	12 Aug 2024
Panjab University, Chandigarh	18 Dec 2024



## ICAR certified technology

'Visible Light Insect Trap' (Technology code- 201717776254644) developed by Guru P. N., D. Saha, Y. B. Kalnar, V. Kumar, M. Bala, N. Kotwaliwale, during ICAR Foundation Day held on 16 July 2024.



# POST-HARVEST MACHINERY & EQUIPMENT TESTING CENTRE

The PHMETS tested 57 machines from 1 Jan-31 Dec 2024, generating a total testing fee of around Rs. 1.36 Crore.

Time Period	January 1 <sup>st</sup> , 2024, to December 31 <sup>st</sup> , 2024
No. of applications received	65
No. of test reports issued	57
Total revenue generated	Rs 1,35,88,842/-

The draft test code of following machines has been prepared.

1. Arecanut Dehusker
2. Juice extraction machine
3. Dewatering machine

## Machines tested at PHMETC from 1 January 2024 -31 December 2024

S. No	Name of machine	No. of machines tested
1	Potato grader	03
2	Rubber Roll Sheller cum Polisher	05
3	Rice mill polisher cum pulverizer	01
4	Cleaner cum grader	04
5	Papad making machine	01
6	Mini Rice Mill (Tractor operated)	04
7	Oil Mill	08
8	Pulveriser/ Flour Mill	08
9	Walnut peeling machine	01
10	Groundnut decorticator	02
11	Urea Briquette machine	01
12	Paper plate and dona machine	01
13	Apple grader	02
14	Spiral Separator	01
15	Cowdung log making machine	01
16	Sugar Juice machine	02
17	Rice Polisher	01
18	Seed Processing Plant	02
19	Destoner	02
20	Potato waffers Machine	01
21	Multigrain Drier Machine	01
22	Mini Dal Mill	01
23	Indented Cylinder Grader	02
24	Specific Gravity Separator	01
25	Round grader	01
	<b>Total</b>	<b>57</b>



## FOOD TESTING LABORATORY

The Ministry of Food Processing Industries (MoFPI) in New Delhi funds a Food Testing Laboratory equipped with basic and semi-advanced technology for food analysis and safety assessment. Food Testing Laboratory is ISO/IEC 17025:2017 Accredited Testing Laboratory vide Certificate number TC-12253. This lab provides food testing services to various stakeholders, including entrepreneurs with validated protocols for parameters like water quality, fat, protein, fiber, and mineral content. It caters to processors, entrepreneurs, SMEs, and industry needs at reasonable costs. In 2024, the laboratory processed numerous commercial samples, generating Rs. 9.07 lakh in revenue from testing and training activities. The onsite surveillance audit by NABL was carried out on November 9-10, 2024. Two NABL Assessors were appointed by NABL and the laboratory and could successfully complete the process within the specified time.





## HUMAN RESOURCE DEVELOPMENT AND CAPACITY BUILDING PROGRAMME ATTENDED

Scientific Staff	Title of Programme	Organized by	Duration
Dr. Abhinav Dubey	Image processing for analysis of agri-food commodities using MATLAB (online)	ICAR-CIPHET, Ludhiana	08-14 Jan 2024
	Carbon auditing of agricultural and allied systems activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
Dr. Dhritiman Saha	Residential training programme on "Responsible AI: Concepts Applications and Ethical Consideration"	C-DAC, Mohali	18-22 Nov 2024
Dr. Guru P N	Post harvest management and storage techniques	NIPHM, Hyderabad	16-18 Dec 2024
Dr. Indore Navnath Sakharam	Carbon auditing of agricultural and allied systems activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
	Training programme on "Python"	ICAR-IASRI, New Delhi	02-08 Aug 2024
Dr. Leena Kumari	Development of AI based Android Applications (online)	IASRI, New Delhi	05-25 Mar 2024
Dr. Pankaj Kumar	Carbon auditing of agricultural and allied systems activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
Dr. Poonam	Role of PT and ILC in quality assurance & maintaining accreditation as per the ISO: 17025, 2017	NIPHM, Hyderabad	10 Jan 2024
	Genome editing technologies in crop	IIRR, Rajender Nagar, Hyderabad	14-23 Oct 2024
Dr. Rahul Kumar Anurag	Workshop cum brainstorming session for technical committee members of the FAD committee of BIS	NITS, Noida	22 July 2024
	DST sponsored training programme on "Leadership development programme for scientists"	ASCI, Hyderabad	14-18 Oct 2024
Dr. Ramesh Chand Kasana	Workshop cum brainstorming session for technical committee members of the FAD committee of BIS	NITS, Noida	20 Aug 2024
	DST sponsored training programme on "Leadership development programme for scientists"	ASCI, Hyderabad	14-18 Oct 2024

Scientific Staff	Title of Programme	Organized by	Duration
Dr. Ravi Prakash	Workshop cum brainstorming session for technical committee members of the FAD committee of BIS	NITS, Noida	20 Aug 2024
Dr. Ritu Bharat Kukde	Multivariate data analysis using R	ICAR-NAARM, Hyderabad	22-26 July 2024
Er. Shaghaf Kaukab	Multivariate data analysis using R	ICAR-NAARM, Hyderabad	22-26 July 2024
Dr. Shrikrishna S Nishani	Image processing for analysis of agri-food commodities using MATLAB (online)	ICAR-CIPHET, Ludhiana	08-14 Jan 2024
	Post harvest management and storage techniques	NIPHM, Hyderabad	16-18 Dec 2024
Dr. Soumya Subhashree Mohapatra	Current methodologies for water footprints estimation & techniques for water saving (online)	ICAR-IIWM, Bhubaneswar, Odisha	18-20 Mar 2024
	Carbon auditing of agricultural and allied systems activities (online)	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
	Multivariate data analysis using R	ICAR-NAARM, Hyderabad	22-26 July 2024
Dr. Thingujam Bidyalakshami Devi	Multivariate data analysis using R	ICAR-NAARM, Hyderabad	22-26 July 2024
Er. Thongam Sunita Devi	Advances in mobile application development	ICAR-NAARM, Hyderabad	05-09 Aug 2024
Dr. Urhe Sumit Bhausahab	Carbon auditing of agricultural and allied systems activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
Dr. Vikas Kumar	Role of PT and ILC in quality assurance & maintaining accreditation as per the ISO: 17025: 2017	NIPHM, Hyderabad	10 Jan 2024
	ICAR sponsored winter school on "Harnessing recent advances in high-value compound development & seaweed biomass utilization for human wellbeing propelling Atmanirbhar Swasth Bharat & empowering farmers"	ICAR-CMFRI, Kochi	15 Feb- 06 Mar 2024
	Laboratory quality management and internal audit as per IS/ISO/IEC 17025: 2017	NITS, BIS, Noida	17-20 Feb 2024

Administrative Staff	Title of Programme	Organized by	Duration
Ms. Anuradha	Training programme of the newly recruited AO's & FAO's	ISTM, Delhi and AJNIFM, Faridabad	01-30 June 2024
Sh. Ashwani Kumar	Regional Workshop on eHRMS 2.0	CPRI, Shimla	24 June 2024
Smt. Jasvir Kaur			
Sh. R C Meena	Regional Workshop on eHRMS 2.0	CPRI, Shimla	24 May 2024



## HRD PROGRAMME ORGANIZED

Training Title	Number of Participants	Duration
<b>ICAR's HRD Training</b>		
Carbon auditing of agricultural and allied systems activities	26	21-23 May 2024
FRP Fabrication and Testing	20	10-12 Dec 2024
<b>Capacity Building Programme</b>		
Microencapsulation of Neem oil under senior fellowship award of "C V Raman International Fellowship for African Researchers	01	23 Jan-22 Feb 2024
Post-Harvest Management of Agricultural Produce	28	04-08 Mar 2024
Hands-on Training for VDK managers and SHG members on "Processing, testing and quality assurance of pickles from selected crops" of CGMFP Federation, Raipur	08	22-28 April 2024
Online training programme on "Value Chain Management of Agricultural Commodities for Income Enhancement of Stakeholders" in collaboration with MANAGE.	43	21-23 Aug 2024
Capacity building on Post-harvest Technology of Fruits, Vegetables & Millets	16	26 Nov-05 Dec 2024
<b>Entrepreneur Development Programme</b>		
Valorization of fruits and by-products through primary and secondary processing	05	23-25 Jan 2024
Valorization of by-products of food processing: Waste to wealth approach	04	20-22 Feb 2024
Processing of food grains (corn)	06	04-06 Mar 2024
'Entrepreneurship Development in Bakery Products	50	21 Aug 2024
Millet processing and value addition	01	09-13 Sep 2024
Millet based bakery products	03	27-29 Sep 2024
Conventional & Cryogenic Grinding of Spices	03	10-12 Sep 2024
<b>ATMA Sponsored Farmers Training/ Farmers Training</b>		
SMART, Jalgaon sponsored farmers training on "Post-harvest Management of Agricultural Produce	23	01-05 Jan 2024
Post-harvest management of agricultural produce' for farmers from Chandrapur, Maharashtra	23	19-23 Feb 2024
Post-Harvest Management of Agricultural Produce' for farmers from Buldana, Maharashtra	25	11-15 Mar 2024
Post Harvest Management of Agricultural Produce for farmers from Wardha, Maharashtra	26	18-22 Mar 2024
Application of Plasticulture in Agriculture	50	30 July 2024
Application of Plasticulture in Agriculture	30	07 Aug 2024
Importance of protected cultivation in agriculture	24	28-30 Aug 2024
ATMA, Gaya (Bihar) sponsored farmers training on "Post-harvest Management of Agricultural Produce'	22	15-19 Dec 2024
<b>Sponsored training programme under ICAR-DoCA</b>		
Sample Analysis Procedures: Tools and Techniques for Selected Pulses	20	05-07 June 2024
<b>Students Training</b>		
Advanced Microbiological and Biochemical Techniques for Improving the Analytical & Technical Skill of Post Graduate Students (Sponsored by SERB)	20	18-27 Mar 2024



## AGRI BUSINESS INCUBATION (ABI)

The Institute's Agribusiness Incubation Program (ABI) has provided numerous training sessions, business meetings and awareness/sensitization programs, in addition to incubating startups. In

2024, the ABI center held four sensitization programs, two business meetings and supported the incubation of several entrepreneurs.

### Sensitization Programs Organized

Title	Date	No. of Participants
Sensitization cum awareness program on "Agribusiness and Entrepreneurship Development through Agro Processing" at Ropar, Punjab	26 April 2024	50 Women
Awareness cum training program on bakery processing at Nurpur Bedi, Punjab	10 May 2024	100 women and FPO members
Sensitization cum awareness program on "Agribusiness and Entrepreneurship Development through Agro Processing at Vill Dalla, Mohali, Punjab	24 May 2024	50 Women and FPO Members



### Industry Interface Meetings

Title	Date
FCI-Rice Milling Industry-Research Institution Synergy for Innovations in Rice Milling	04 Oct 2024
ICAR Technologies for Textile Industry - Cotton & Other Natural Fibers	04 Oct 2024



### Incubation Provided

Title	Contracting Party	Duration
Agri-waste management & Mentorship	Dr. Girish Sapra (PSCST), Green Bridge Pvt Ltd.	April 2024 (ongoing)
Millet processing	Sh. Lokesh Gupta, 83 Dana Mandi Jalandhar Bypass, Ludhiana	May 2024 (ongoing)
Oilseed processing for oil expelling	Mr. Gurwinder Singh M/s 5AB Agro, Ludhiana	Oct 2024 (ongoing)
Oilseed processing for oil expelling	Mr. Harsimran Singh M/s Labh Singh and Sons, Ludhiana	Oct 2024 (ongoing)
Animal feed pellets	Mr. Sunil Kumar Goel, Ludhiana	Oct 2024 (ongoing)



## EXTENSION ACTIVITIES

### Training on Good Storage Practices

During 29-31<sup>st</sup> January 2024, a training on "Good Storage Practices" was organized by ICAR-CIPHET, Ludhiana in collaboration with CGMFPFed., Raipur at RTRTC, Raipur. A total 68 participants attended the training who were generally warehouse managers, cold storage managers and interns. Dr. Sandeep Mann (Principal Scientist & Head, AS&EC division), Dr. Guru P. N. (Scientist, FG&OP division), Dr. Gurjeet Kaur (SRF) and Dr. Sumit Grover (SRF) from ICAR-CIPHET were present during the training. Various sessions on Good Storage Practices including modern storage protocols, packaging, factors

affecting safe storage, cold storage and fire safety for scientific and safe storage of commodities in relation to minor forest produce (MFP) were discussed during three days. Several observations were recorded during the interaction with participants, Mr. Anil Rai, Managing Director, Mr. B. Ananda Babu, Additional Managing Director, Mr. Hemant Pandey, IFS (Procurement Specialist) and other senior staff of CGMFPFed. The CIPHET team along with trainees visited local warehouses and FCI godowns and gave some recommendations for safe storage of different commodities.



### Processing and Marketing of Honey

FFP Team organized the training and demonstration at ICAR-CIPHET, Ludhiana for the beekeepers from Pathankot, Punjab on honey processing through modern methods, quality

analysis, packaging and labelling etc. The FFP team also gave the technical guidance to the beekeepers for quality testing of honey on 23 January 2024.



The Farmer Interest Group (FIG) from Dhuri, Sangrur paid a visit to ICAR-CIPHET, Ludhiana for a hands-on training session on honey processing. During the visit, the team provided valuable guidance and motivation to beekeepers, urging them to embrace modern techniques facilitated by honey processing plants. The training stressed the importance of moisture reduction in compliance with FSSAI, AGMARK, and BIS standards, while also highlighting key aspects like packaging, labelling, and brand development. Detailed

discussions focussed on honey quality parameters, the FSSAI registration procedure, and effective marketing strategies aimed at enhancing the retail sales of packaged honey. Moreover, the team encouraged farmers to establish small-scale honey processing units through customized hiring arrangements. Subsequently, a honey processing unit with a capacity of 25-30 kg per batch was handed over to the FIG, empowering them to further their honey processing endeavours.



### Chemical Free Jaggery Production and Agro-processing

Training was given the 8 members of Farmers Producer Organization (FPOs), Kisan Junction Farmer Producer Company on 12-13 March 2024 related to chemical free jaggery production and

agro processing. Live demonstration related to various cleaning, grading and processing equipment in the APC was given to FPO members at ICAR-CIPHET, Ludhiana.





### Senior fellowship Under CV Raman Fellowship for African Researchers

One month of senior fellowship training on Microencapsulation of neem oil under the CV Raman Fellowship for African countries from 23.01.2024 to 22.02.2024, for Prof. Aziza from the National Institute of Agronomy, Tunisia. DST and FICCI, India under CV Raman Fellowship for African Researchers funded the training.



### ICAR-CIPHET Welcomes ASEAN Delegates for 10-Day International Training

The ten-day international training programme titled “Capacity Building on Post-Harvest Technology of Fruits, Vegetables, and Millets” is inaugurated on 26<sup>th</sup> November 2024 at ICAR CIPHET Ludhiana. The programme is designed for 16 international participants from ASEAN member states, including Brunei Darussalam, Myanmar, Cambodia, Indonesia, Laos, Malaysia, the Philippines, and Thailand from 26<sup>th</sup> November to 5<sup>th</sup> December 2024. This initiative is a collaboration

between the Government of India and the Association of Southeast Asian Nations (ASEAN). The participants represent various departments under the agricultural ministries of their respective countries. Director ICAR CIPHET Ludhiana welcomed all the delegates and gave an overview of the ASEAN training program. This training program aims to enhance regional collaboration and knowledge sharing on post harvest technology and mechanization solutions for value addition and food security. With a focus on fruits, vegetables, and millets, the program will offer insights into innovative technologies and sustainable practices to improve the shelf life and quality of produce, reduce post-harvest losses, and ensure food safety. The training programme includes lectures, practicals, demonstration visits (Chandigarh, Abohar), labs and local food processing industry (Ludhiana) These ASEAN countries exhibit diverse agro-climatic conditions that enable the production of a wide variety of fruits, vegetables, and millets. These crops not only contribute to food security in their respective countries but also serve as a source of income for millions of small holder farmers.





### ICAR-CIPHET-IIFA and Kisan Mela 2024

The CIPHET-IIFA & Kisan Mela 2024, held from October 3-5, showcased post-harvest and value-addition techniques and innovative products through approximately 70 stalls representing institutions like ICAR-CIPHET, NINFET, IIMR, CIRCOT, NIFTEM, PAU, and GADVASU, alongside farmers and entrepreneurs. The event offered visitors the chance to explore and purchase value-added products, including gluten-free bakery items,

millet-based products, and handicrafts. Featuring Industry Interface Meets, live drone application demonstrations, knowledge sharing, networking, and business exploration, the Mela also included Kisan Goshthi and Industry Interface Meetings, fostering partnerships between agricultural processing and farming communities and attracting key figures from the agricultural and agro-processing sectors.



### Participation in Exhibitions

Programme Title	Venue	Duration
National Natural Fibre Festival	ICAR-National Institute of Natural Fibre Engineering and Technology, Kolkata	02-04 Jan 2024
'India Agri Progress Expo-2024' organized by Udan Media and Communication Pvt. Ltd. Ludhiana	Ludhiana Exhibition Centre, G.T. Road, Sahnewal, Ludhiana	19-21 Jan 2024
'Environment Conservation Fair-2024' organized by Society for Conservation & Healing of Environment (SOCH)	Nehru Rose Garden, Ludhiana	03-04 Feb 2024
'Regional Agriculture Fair for Eastern Region 2024'	Krishi Vigyan Kendra Campus, Diyankel, Torpa, Khunti, Ranchi, Jharkhand	03-05 Feb 2024
North Zone Regional Agricultural Fair	Rani Lakshmi Bhai Central Agricultural University, Jhansi	08-10 Feb 2024
Kisan Mela/Pashu Palan Mela	Punjab Agricultural University/Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	14-15 Mar 2024
96 <sup>th</sup> ICAR Foundation Day	Dr. C Subramaniam ICAR Convention Centre, New Delhi	15-16 July 2024
Kisan Mela/Pashu Palan Mela	Punjab Agricultural University/Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	13-14 Sep 2024
International Exhibition on Agriculture Machinery & Dairy Technology	Ludhiana Exhibition Centre, G.T. Road, Sahnewal, Ludhiana	05-08 Dec 2024

## SCHEDULE CASTE SUB PLAN (SCSP)

The ICAR-CIPHET SCSP scheme aims to improve the socio-economic status of the Scheduled Caste community by providing training and capacity-

building programs focused on agricultural produce processing for SC farmers, farm women and youth.

Title of Training/Program/Activities carried out under SCSP	Location	No. of Participants	Duration
Skill Development Training Programme on "Processing and Value addition of Cereals" Under Scheduled Caste Sub Plan (SCSP) for four villages Mohan Majra, Rampur Phasa, Bahrapur Bet and Mehtot under Chamkaur Sahib Tehsil of Ropar District of Punjab.	ICAR-CIPHET, Ludhiana	50	29-31 Jan 2024
Skill Development Training Programme on 'Processing of Groundnut for milk and tofu'.	ICAR-CIPHET, Ludhiana	37	13 Feb 2024
Skill Development Training Programme on 'Processing of Groundnut for milk and tofu.'	ICAR-CIPHET, Ludhiana	202	06 Mar 2024
Skill Development Training Programme on 'Primary processing and value addition of cereals and spices'.	ICAR-CIPHET, Ludhiana	50	06-08 Mar 2024
Skill Development Training Programme on 'Protected cultivation and distributed package of practices and seed material'.	ICAR-CIPHET, Ludhiana	60	12 Mar 2024
Skill Development Training Programme on 'Protected cultivation of horticulture crops'.	ICAR-CIPHET, Regional Station, Abohar	25	26-28 June 2024
Skill Development Training Programme on 'Entrepreneurship development for bakery products' under SCSP Scheme.	ICAR-CIPHET, Ludhiana	50	21 Aug 2024
Skill Development Training Programme on 'Engineering and technological interventions for safe storage of food grains'.	Chapra Village, Ludhiana district and ICAR-CIPHET, Ludhiana	53	24-26 Sep 2024
Field Exposure visit training IIFA-2024 for SC farmers from five districts of Punjab (Ludhiana, Moga, Barnala, Fatehgarh Sahib and Fazilka)	ICAR-CIPHET, Ludhiana	3331	03-05 Oct 2024



# VISITORS

## Officials

Designation/Address of Visitors	Number of visitors	Date
Deputy General Manager, Maharashtra State Agricultural Marketing Board (MSAMB), Nagpur, Maharashtra	1	07 Feb 2024
Project Officer, MAGNET, Pune, Maharashtra	1	07 Feb 2024
IGMRI, PAU Campus, Ludhiana	18	19 Feb 2024
Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	20	26 Feb 2024
Dr. Digvir Jayas Vice Chancellor, University of Lethbridge, Canada	1	28 Feb 2024
Dr. Dharmendra Saraswat Professor, Purdue University, USA	1	15-16 April 2024
Dr. Santosh Kumar Pitla Associate Professor, University of Nebraska Lincoln, USA	1	15-16 April 2024
STRY Trainees, PAMETI	17	19 April 2024
Scientist-C, Bureau of Indian Standards, New Delhi	1	21 June 2024
Agriculture Development Officers (ADOs), Gurdaspur and Ferozpur	30	18 July 2024
Agriculture Development Officers (ADOs), Taran Taran	25	22 July 2024
Ex-Joint Director, Department of Agriculture, Punjab	2	01 Aug 2024
Secretary Agriculture, Punjab Mr. Balaji Joshi (IAS)	1	12 Nov 2024



## Farmers

Farmer's Group	Number of visitors	Date
ATMA PP Hanumangarh, Rajasthan	42	09 Feb 2024
Farmers Exposure Visit, Bidar, Karnataka	25	26 Feb 2024
Farmers Exposure Visit ATMA, Jalandhar	10	05 Mar 2024
Progressive Farmers, Jind, Haryana	20	08 Mar 2024
SCSP Farmers visit, Fazilka	23	19 Mar 2024
Exposure visit of Entrepreneurs from Amritsar	3	19 April 2024
Entrepreneurs from Pathankot, Punjab	2	28 Nov 2024

## Student's Educational Visits

Address of Visitors	Number of visitors	Date
Acharaya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya	55	04 Jan 2024
Kerala Agricultural University, Kerala	108	22 Jan 2024
College of Horticulture, Junagarh Agricultural University, Junagarh, Gujarat	65	13 Feb 2024
Kerala Agricultural University, Kerala	179	17 Feb 2024
National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Thanjavur	60	16 Mar 2024
PCTE, Ludhiana, Punjab	26	20 Mar 2024
Veer Chandra Singh Garhwali Uttarakhand University of Horticulture and Forestry (VCSGUUHF), Uttarakhand	28	02 April 2024
College of Community Science, Tura, Meghalaya	16	03 May 2024
Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, UP	22	05 June 2024
Jawaharlal Nehru Krishi Vishwa Vidhyalaya (JNKVV), Jabalpur, Madhya Pradesh	26	15 June 2024
College of Agriculture, Ballawal Saunkhri, Punjab	33	14 Aug 2024
College of Horticulture, Dr Y.S.R. Horticultural University, Andhra Pradesh	27	22 Oct 2024
Punjab Agricultural University, Ludhiana	09	28 Nov 2024
Chattarpati Shivaji Maharaj Krishi Vigyan, MPKV, Rahuri, Maharashtra	45	03 Dec 2024

# EVENTS ORGANIZED

## Republic Day Celebration

On January 26, 2024, ICAR-CIPHET celebrated India's 74<sup>th</sup> Republic Day, a significant occasion commemorating the day the Indian Constitution came into effect. The institute's Director, Dr. Nachiket Kotwaliwale, presided over the ceremonial flag hoisting, a moment of national pride, and delivered an address to the assembled staff, underscoring the importance of the day. The

celebration extended beyond the formal ceremony, as the institute's staff and their families participated in a range of cultural and sporting events, fostering a sense of community and shared national spirit. This multifaceted commemoration served to both honour the nation's democratic foundation and provide an opportunity for the ICAR-CIPHET community to come together in celebration.



## International Yoga Day 2024

ICAR-CIPHET, Ludhiana, along with its Abohar station, ICAR-ATARI Zone-1 Ludhiana, ICAR-NRC on Makhana, Darbhanga and Yog Bharti, Ludhiana jointly observed International Yoga Day 2024 on June 21<sup>st</sup>. The event was held in a hybrid format with approximately 110 participants attending in person

including scientific, administrative, technical and support staff, students and other citizens from the three institutes. Around 20 more participants from the ICAR-CIPHET Regional Station, ICAR-NRC on Makhana, and other locations joined the program online.



## Independence Day

On August 15, 2024, ICAR-CIPHET commemorated India's 77th Independence Day with celebratory events held across its Ludhiana and Abohar campuses. The focal point of the Ludhiana campus festivities was the flag-hoisting ceremony conducted by Director Dr. Nachiket Kotwaliwale, who subsequently addressed the institute's staff. In his address, Dr. Kotwaliwale reflected on the institute's achievements over the preceding year, acknowledging the collective efforts that contributed to its progress. Furthermore,

he underscored the critical significance of post-harvest management in ensuring food security and reducing waste. He also stressed the importance of fostering a clean, healthy, and hygienic working environment, highlighting its role in promoting the well-being of the staff and the overall efficiency of the institute. The observance served as a moment to reaffirm the institute's commitment to national development and its dedication to scientific advancement in the agricultural sector.



## Vigilance Awareness Week

ICAR-CIPHET, Ludhiana and Abohar Campus observed the Vigilance Awareness week and organized different activities during 28 October – 3 November 2024, with the theme “Culture of Integrity for Nations Prosperity”. The week started with display of banners, the pledge taking ceremony, led by Dr. Nachiket Kotwaliwale, Director ICAR-CIPHET, Ludhiana and all the scientific, technical and administrative staff of both the campuses of the institute participated. All the employees took e-pledge also. A slogan competition for staff and a poster competition for trainee students visiting ICAR-CIPHET was organized. During this week

different activities were organized at Abohar and Fazilka. KVK Fazilka, RS, CIPHET Abohar, organized an awareness program on 28 Oct 2024 for 252 college students (Male 82 and Female 170) of DAV College, Abohar. They also organized a Gram Sabha on 29 Oct 2024 for farmers to create awareness among rural people and 147 farmers including 140 male and 07 female participated in it. The programme was coordinated by Dr. Manju Bala, Vigilance Officer, Dr. Khwairakpam Bembem, Scientist, Ms. Anuradha, AO, and Sh. Permod Sharma, FAO, ICAR-CIPHET, Ludhiana.



### Annual Workshop of the AICRP on PEASEM

The XX Annual Workshop of the AICRP on PEASEM took place at SKUAST-K, Srinagar, from 14 to 16 October 2024. The inauguration session featured Dr. S. N. Jha, DDG (Agricultural Engineering) as the Guest of Honour with Professor Nazir Ahmad Ganai, Hon'ble Vice Chancellor of SKUAST-K, Srinagar serving as the Chief Guest. Dr. K Narsaiah, ADG (PE) was serving as Special

Guest, along with expert members Dr. Pitam Chandra, Dr. T.B.S. Rajput, Dr. KVR Rao. During the workshop, progress reports and new technical programs from all 14 AICRP on PEASEM centres were presented and discussed. JAU, Junagadh received the best centre award, while ICAR-CIFA, Bhubaneswar, received the runner-up award for this year.



### International Day of Awareness of Food Loss and Waste

Nachiket Kotwaliwale, Manju Bala and Chandan Solanki conducted an awareness programme on food loss and waste management for employees of Vardhman Textiles Ltd, Ludhiana on 28<sup>th</sup> September

2024 to celebrate International Day of Awareness of Food Loss and Waste (IDAFWLW) by ICAR-CIPHET, Ludhiana under the project on sensitizing stakeholders to minimize food loss and waste.



# SWACHH BHARAT ABHIYAN

In 2024, ICAR-CIPHET, Ludhiana, organized numerous Swachh Bharat Mission events promoting cleanliness and sustainability. During Swachhta Hi Sewa Pakhwada (September 15 - October 2), the institute focused on "Swabhav Swachhata - Sanskaar Swachhata" through community runs, school awareness campaigns, beautification projects, and mega cleanliness drives, culminating in Swachh Bharat Diwas celebrations. The Swachhta Pakhwada (December

16-31) featured a pledge ceremony, daily cleanliness drives, plantation activities, waste management awareness, post-harvest technology demonstrations, and innovative campaigns like lab cleanliness competitions and walkathons, concluding with a program highlighting achievements. These initiatives enhanced cleanliness, raised awareness, and inspired community participation in environmental conservation.



## हिन्दी पखवाड़ा/कार्यशाला

प्रत्येक वर्ष की भांति, संस्थान में इस वर्ष दिनांक 14 से 28 सितम्बर 2024 तक राजभाषा हिन्दी पखवाड़ा मनाया गया। समारोह का उद्घाटन दिनांक 14 सितम्बर 2024 को डॉ. आर. के विश्वकर्मा, माननीय प्रभारी निदेशक, भा.कृ.अनु.प.–सीफेट, लुधियाना के कर कमलों द्वारा किया गया। इस अवसर पर वैज्ञानिक एवं स्टाफ सदस्यों को सम्बोधित करते हुए उन्होंने हिन्दी के प्रचार-प्रसार के लिए दिनचर्या में सरल शब्दों के प्रयोग पर जोर दिया। उन्होंने भा.कृ.अनु.प.–सीफेट, लुधियाना में वैज्ञानिक एवं प्रशासनिक कार्यों में हो रहे हिन्दी के उपयोग की सराहना की एवं प्रतियोगिताओं में बढ़-चढ़ कर भाग लेने का आह्वान किया। उन्होंने संस्थान के समस्त वैज्ञानिकों से अनुरोध किया कि वे अपने शोध-पत्रों को हिन्दी भाषा में प्रकाशित करने पर जोर दें। डॉ. अभिनव दुबे, वैज्ञानिक ने उद्घाटन समारोह का संचालन किया। इस अवसर पर संस्थान की हिन्दी पखवाड़ा समिति के सदस्य श्रीमती जसवीर कौर ने पखवाड़े के दौरान 15 दिनों तक चलने वाली विभिन्न प्रतियोगिताओं एवं कार्यक्रमों की रूपरेखा बताई। हिन्दी पखवाड़ा के दौरान 11 अलग-अलग प्रतियोगिताएँ जैसे कंप्यूटर पर हिन्दी टाइपिंग, पोस्टर प्रतियोगिता, हिन्दी अनुवाद प्रतियोगिता, हिन्दी निबंध प्रतियोगिता, हिन्दी टिप्पणी एवं प्रारूप लेखन, हिन्दी टिप्पणी एवं प्रारूप लेखन, हिन्दी काव्य पाठ, तत्काल भाषण प्रतियोगिता, विज्ञान संबंधी शोध पत्र एवं चित्र देखकर कहानी लिखो विभिन्न संयोजकों एवं सह-संयोजकों के सहयोग से करवाई गई, जिनमें 3 प्रतियोगिताएँ भा.कृ.अनु.प.–सीफेट लुधियाना एवं अबोहर में अलग अलग आयोजित की गईं, जैसे कंप्यूटर पर हिन्दी टाइपिंग, पोस्टर

प्रतियोगिता, हिन्दी अनुवाद प्रतियोगिता आयोजित की गई एवं 08 प्रतियोगिताएँ संयुक्त रूप से आयोजित की गईं। इसमें कुछ प्रतियोगिताएँ सभी वर्गों के अधिकारियों एवं कर्मचारियों के लिए थी एवं कुछ प्रतियोगिताएँ वर्ग विशेष अधिकारियों एवं कर्मचारियों के लिए थी। राजभाषा हिन्दी पखवाड़ा के अन्तर्गत आयोजित सभी प्रतियोगिताओं में संस्थान के सभी अधिकारियों एवं कर्मचारियों ने बढ़-चढ़कर हिस्सा लिया। दिनांक 01.10.2024 को डॉ. नचिकेत कोतवालीवाले, निदेशक, सीफेट, लुधियाना एवं मुख्य अतिथि श्री महेश कुमार मीणा, स्नातकोत्तर शिक्षक (हिन्दी), केन्द्रीय विद्यालय, बड़ोवाल छावनी द्वारा प्रतियोगिताओं के विजेताओं को पुरस्कार प्रदान किये गये। इसके अतिरिक्त संस्थान में हिन्दी में किये गये कार्यों का मूल्यांकन कर संस्थान के कर्मचारियों को भी पुरस्कृत किया गया एवं अधिक से अधिक हिन्दी में कार्य करने के लिए सभी को प्रोत्साहित किया गया। निदेशक महोदय ने व्यक्त किया कि हिन्दी पखवाड़े को त्योहार के रूप में मनाने से हिन्दी सशक्त एवं साम्प्रदायिक होगी। राजभाषा हिन्दी पखवाड़ा कि अध्यक्ष डॉ. दीपिका गोस्वामी ने हिन्दी पखवाड़ा का सफल आयोजन किया एवं सुश्री अनुराधा, प्रशासनिक अधिकारी ने समापन समारोह का समन्वयन किया। राजभाषा हिन्दी पखवाड़ा समिति-2024 के सदस्य डॉ. दीपिका गोस्वामी, डॉ. विकास कुमार, डॉ. अभिनव दुबे, श्री मोहित सिक्का, श्री एस.एस.वर्मा, श्रीमती जसवीर कौर, श्रीमती रूपिन्दर कौर, श्री देविन्दर कुमार एवं सुश्री अनुराधा ने कार्यक्रम के आयोजन में महत्वपूर्ण योगदान दिया।



वर्ष 2024 के दौरान सीफेट में आयोजित राजभाषा हिंदी की तिमाही कार्यशालाओं का विवरण

तिमाही (आयोजन तिथि)	विषय वस्तु	आमंत्रित वक्ता
जनवरी-मार्च 2024 (05.02.2024)	वैश्विक परिदृश्य में राजभाषा हिंदी एवं इसके वैश्विककरण की संभावनाएं एवं चुनौतियाँ	श्रीमती सुषमा मल्हौत्रा क्वींस कॉलेज, सिटी यूनिवर्सिटी न्यूयॉर्क
अप्रैल-जून 2024 (27.06.2024)	कार्यालय उपयोग में राजभाषा हिंदी	डॉ. नीरोत्तमा शर्मा एसोसिएट प्रोफेसर मालवा सेंट्रल कॉलेज ऑफ एजुकेशन (पंजाब विश्वविद्यालय चंडीगढ़), लुधियाना
जुलाई-सितम्बर 2024 (16.08.2024)	राजभाषा हिंदी: कल, और कल	श्री अनिल गुप्ता सेवानिवृत्त, मंडलप्रबंधक साधारण बीमा निगर, लुधियाना
अक्टूबर-दिसम्बर 2024 (25.11.2024)	स्वास्थ्य और अध्यात्म: वैज्ञानिक दृष्टिकोण	डॉ. तीर्थकर देब प्रोफेसर एवं प्रभागाध्यक्ष फार्माकोलॉजी, आल इंडिया इंस्टीट्यूट ऑफ मेडिकल साइंसेज (एम्स), कल्याणी, कोलकाता



# KRISHI VIGYAN KENDRA (KVK), FAZILKA, PUNJAB

Established in 2016 under ICAR-CIPHET, KVK Fazilka serves five blocks and conducted 133 events in 2024, benefiting 3,533 participants. Key activities included vocational and on-campus training, farmer-scientist interactions, awareness

programs, and workshops. New initiatives at the KVK include seed production of wheat and mustard, introduction of natural farming, establishment of a Poshan Vatica and other units and promoting entrepreneurial development.

## Trainings Organized

### Vocational Trainings

Sr. No	Programme Title	Number of Participants	Duration
1	Masala making sponsored by RGR cell PAU	42	15-16 Feb 2024
2	Training on beekeeping	29	20-22 Feb 2024
3	Training for farm women on value addition of fruits and vegetables	60	10-15 June 2024
4	Vocational training on agri-entrepreneurship turning farming into business at Khalsa College	110	09-13 Sep 2024
5	Training on processing & marketing techniques of seasonal fruits/vegetables and input distribution under SCSP Scheme	25	09-13 Sep 2024
6	Training on organic farming practices and certification at DAV College, Abohar	90	17-21 Sep 2024



## On-Campus Trainings

Sr. No	Programme Title	Number of Participants	Date & Duration
1	Training on fruit drop and disorders of kinnow	20	20 March 2024
2	Summer season vegetables production technology	24	19 April 2024
3	CRM training	30	02-04 Sep 2024
4	CRM training	30	05-07 Sep 2024
5	Renewable energy technologies and energy efficiency practices	40	04 Sep 2024
6	Renewable energy technologies and energy efficiency practices	45	05 Sep 2024
7	SCSP training on nursery management	19	25-26 Sep 2024
8	Training on rabi crop production techniques	33	22 Oct 2024



## Off-Campus Trainings

Sr. No	Programme Title	Number of Participants	Duration
1.	Poshan vatica at Kundal	50	26 Feb 2024
2.	Vermicompost training at Chirag Dhani	21	20 June 2024
3.	Kharif production training	40	21 June 2024
4.	Training on pickle making at Raipura	43	02 July 2024
5.	Training on value addition of milk and milk products at Dhrangwala	38	04 July 2024
6.	One day animal feed management and health camp at Pir Bakash Chauhan, Jalalabad	110	29 Aug 2024
7.	Vermicompost training at Aliana	25	08 Oct 2024
8.	Processing & value addition of citrus at Jandwala Hanwanta	30	28 Oct 2024
9.	Rabi production technology	34	22 Oct 2024



### Extension Trainings

Sr. No	Programme Title	Number of Participants	Duration
1.	Development of low-cost balance diet for children	30	21-22 Nov 2024
2.	Value addition of millets	30	23-24 Nov 2024

### Programs conducted under SCSP Scheme

Sr. No.	Date	Training	Total Candidates
1	11-15 March 2024	SCSP training on "Value addition and processing" under SCSP scheme	292
2	10-15 June 2024	SCSP training for farm women on value addition of fruits and vegetables	60
3	26-28 June 2024	SCSP training	25
4	29 Aug 2024	One day animal feed management at Pir Bakash, Jalalabad under SCSP	100
5	9-13 Sep 2024	SCSP training on processing & marketing techniques of seasonal fruits/vegetables and input distribution under SCSP scheme	25
6	25-26 Sep 2024	SCSP training on nursery management	19
7	28 Nov 2024	SCSP program by NBPGR in collaboration with Krishi Vigyan Kendra, Fazilka	200
8	04 Dec2024	Wheat seed distribution under SCSP scheme	190

## Extension Activities

### Exhibitions

Sr. no.	Programme title	Venue	Duration
1	Exhibition at ICAT-ATARI, Zone-1, Ludhiana Foundation Day	ICAT-ATARI, Zone-1, Ludhiana	11 Jan 2024
2	Exhibition in kinnow fair	PAU, Regional Station, Abohar	23-24 Jan 2024
3	Exhibition in ber fair	ICAR-CIAH, Bikaner	08 March 2024
4	Exhibition in IIFA Kisan Mela	ICAR-CIPHET, Ludhiana	03-05 Oct 2024

### Stakeholder/ officer/ farmer/ exposure visits

Sr. no.	Address of visitors	Number of visitors	Date
1.	Punjab Agro, Alamgarh	25	13 March 2024
2.	Punjab Agro, Alamgarh	25	12 June 2024
3.	Punjab Agro, Alamgarh	25	14 Sep 2024
4.	SAVPL Fazilka	30	03 Sep 2024
5.	SAVPL Fazilka	30	06 Sep 2024
6.	ICAR-CIPHET, Ludhiana (IIFA 2024)	450	03-05 Oct 2024

### Celebration of Important Events

Sr. No	Name of Activity	Date	Venue	Participants
1	Ber fair tour	08 Feb 2024	Bikaner	05
2	International Women Day	08 March 2024	Chirag Dhani	110
3	Celebrated Environment Day	06 June 2024	CIPHET Premises	95
4	Celebration of ICAR Foundation Day	16 July 2024	CIPHET Premises	65
5	PM program release of 109 variety	11 Aug 2024	CIPHET Premises	42
6	Celebration of Independence Day	15 Aug 2024	CIPHET Premises	70
7	Tree plantation program	21 Aug 2024	CIPHET Premises	26
8	Tree planation at KVK premises	29 Aug 2024	CIPHET Premises	30
9	Tree plantation Ek Ped Maa Ke Naam	17 Sep 2024	KVK Premises	15
10	CIPHET IIFA 2024	03-05 Oct 2024	Ludhiana	450

### Other Awareness Programs conducted in 2024-25

Sr. No	Name of Activity	Date	Venue	Participants
1	Awareness program on milk adulteration	08 July 2024	Khippawali	10
2	Awareness program on pest survilence	15 Aug 2024	CIPHET Premises	30
3	Awareness program on use and manufacturing of fermented organic manure/ liquid manure	16 Aug 2024	Kathera	45
4	Awareness program on spray of potassium nitrate in guava	16 Aug 2024	Kathera	45
5	Awareness program on alternate drying/wetting in rice	16 Aug 2024	Kathera	45
6	Cotton awareness program	21 Aug 2024	Raipura	32
7	Awareness program on use and manufacturing of fermented organic manure/ liquid manure	07 Sep 2024	CIPHET Premises	30

8	Awareness program on alternate drying/wetting in rice	08 Sep 2024	Roohreya Wali	42
9	Awareness program for girls on anemia control	06 Sep 2024	Khuia sarwar and Abohar	40
10	Awareness program for girls on anemia control	24 Sep 2024	Khui Khera	20
11	Awareness program on milk adulteration	18 Sep 2024	Abohar	09

### OFT's

Sr. No	Title	Number
1.	Home Science	02
2.	Agri. Engineering	01

### Front Line Demonstrations

Sr. No	Title	Number
1.	Agronomy (Crop Sciences)	08
2.	Horticulture	02
3.	Home Science	03



## Progress under Crop Residue Management (CRM) Scheme

### Demonstrations of CRM

Two Village Khui Khera and Khippawali were selected under CRM project of KVK, ICAR-CIPHET, Abohar to benefit the farmers regarding practices of residue management of paddy crop through CRM machinery to improve the soil health and productivity of the area. The DBT will be based on IN Situ management done by the farmers.

**Khui Khera:** About 2500-acre area in this village having paddy crop and for management of paddy straw is about 65 percent by using CRM Machinery and baling, to secure the fertility of soil as well as environment. We have selected farmers under this project.

**Khippawali-** About 400-acre area in this village having paddy crop and for management of paddy straw is about 67 percent by using CRM Machinery and baling, to secure the fertility of soil as well as environment. We have selected farmers under this project who managed paddy straw by using In Situ techniques.

### Field Visits under CRM

Conducted more than 25 field visits under CRM in adopted villages for motivation to farmers regarding management of paddy straw via in situ management.

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**प्रकाश चंद गुर्जर, अरविंद कुमार अहलावत, अमित नाथ, हरेन्द्र सिंह धैया, रमेश चंद कांठवा, किशन कुमार पटेल** (2024) सरसों के उन्नत खेती।

**राजेश कुमार, विमल भोभरिआ, प्रकाश महला, पृथ्वीराज, अरविन्द कुमार अहलावत** (2024) ग्रीष्मकालीन सब्जियों की उत्पादन प्रौद्योगिकी।



### Participation in conference/symposia/workshops/meetings

Name of the official	Title of the programme	Organised by	Date
Surya Tushir, Senior Scientist	Oral presentation on Optimization of Laccase Enzyme Production in <i>Trametes versicolor</i> VSRK01 using One-Factor-at-a-Time approach during in National conference on “Microbial Bioprospecting: Exploration and Conservation organized by Govt. V.Y.T. PG Autonomous College, Durg (C.G.) in association with Microbiologist Society	Govt. V.Y.T. PG Autonomous College, Durg (C.G.)	05-06 Feb 2024
	National Seminar-cum-Exhibition on Makhana and Allied Aquatic Crops – 2024	ICAR-NRC for Makhana, Darbhanga, Bihar	17 Oct 2024
Manju Bala, Principal Scientist	Attended Annual Workshop of CRP on SA and presented research achievements of project entitled “Extraction of Bioactive Compounds and Value Addition to By-products of Farms and Agro-processing Industries	ICAR-CIPHET, Ludhiana	16 March 2024
	Attended and acted as chairperson in one of the technical sessions on "Waste Vaporization" during National Symposium on Food Processing 4.0: Innovation and Sustainability	PAU, Ludhiana	30 April 2024
	Attended Seminar on “Functional Ingredients in Indian Traditional / Indigenous Products- Safety, Benefits and Way Forward”	International Life Sciences Institute-India (ILSI-India), Office for South Asian Region, New Delhi 110024	30 Sep 2024
	Attended and acted as Co-chair in one of the technical sessions on “Mechanization and value addition of aquatic crops” during National Seminar-cum-Exhibition on makhana and allied aquatic crops (NRCM-NASMACH 2024)	ICAR-NRCM, Darbhanga	17 Oct 2024
	Attended Annual Workshop of CRP on SA and presented research achievements of project entitled “Extraction of Bioactive Compounds and Value Addition to By-products of Farms and Agro-processing Industries	ICAR-NRCM, Darbhanga	18 Oct 2024
Guru PN, Scientist	National Steering Committee (NSC) meeting of ICAR-DoCA Pulse Storage Project.	ICAR-IIPR Kanpur (UP)	06-07 May 2024
	National seminar cum exhibition on makhana and allied crops (NRCM-NASMACH 2024)	NRCM, Darbhanga	17 Oct 2024
	Indian ecological society international conference on ‘Transforming agrifood systems in the face of climate changes and energy transitions’	PAU, Ludhiana	12-15 Nov 2024

Name of the official	Title of the programme	Organised by	Date
Urhe Sumit Bhusaheb, Scientist	Training on Carbon Auditing of Agricultural and Allied Systems Activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
	National Symposia on Food Processing 4.0: Innovation and Sustainability	Department of Food Science & Technology, Punjab Agricultural University, Ludhiana	21-23 May 2024
	6 <sup>th</sup> International Nutri Cereal Convention INCC 6.0	ICAR-IIMR, Hyderabad.	17-19 Oct 2024
	40 <sup>th</sup> Annual Workshop of AICRP on PHET, ICAR-CIPHET	Dept. of Agricultural Engineering, Assam Agricultural University, Jorhat, Assam	20-22 Nov 2024
	58 <sup>th</sup> Annual Convention of ISAE on Engineering Innovations for next-gen digital agriculture and international symposium on agricultural engineering education for aspiring youth in transforming agriculture	VNMKV Parbhani and ISAE New Delhi	12-14 Nov 2024
Deepika Goswami, Senior Scientist	Attended the National Seminar-cum-Exhibition on makhana and allied aquatic crops (NRCM-NASMAC 2024)	ICAR-NRC for Makhana, Darbhanga	17 Oct 2024
	Acted as Rapporteur for Technical session on 'Functional and Nutraceutical Foods' in the 58th Annual Convention of ISAE on 'Engineering Innovations for Next-gen Digital Agriculture' and International Symposium on 'Agricultural Engineering Education for Aspiring Youth in Transforming Agriculture'.	VNMKV, Parbhani, Maharashtra	12-14 Nov 2024
Pankaj Kumar, Scientist	National Symposium on "Food Processing 4.0: Innovation and Sustainability,"	The Department of Food Science and Technology, Punjab Agricultural University, Ludhiana	30 April 2024
	58th Annual Convention of the Indian Society of Agricultural Engineers (ISAE)	Vasantryo Naik Marathwada Krishi Vidyapeeth (VNMKV), Parbhani,	12-14 Nov 2024
	XX Annual workshop of AICRP on PEASEM (Plastic Engineering on Agricultural Structure and Environment Management)	SKUAST-K, Srinagar.	14-16 Oct 2024
Soumya Mohapatra, Scientist	39th Annual Workshop of AICRP on PHET	ICAR-CIPHET, Ludhiana	13-15 March 2024
	Annual Workshop of CRP on SA	ICAR-CIPHET, Ludhiana	16 March 2024
	Current methodologies for water footprint estimation and techniques for water saving (online)	ICAR-IIWM, Bhubaneswar	18-20 March 2024



Name of the official	Title of the programme	Organised by	Date
	Carbon Auditing of Agricultural and Allied Systems Activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
	Multivariate Data Analysis Using R (online)	ICAR-NAARM, Hyderabad	22-26 July 2024
	32 <sup>nd</sup> International Conference of Agricultural Economists	IAAE/AERA India	02-07 Aug 2024
	Zonal Workshop of Farmers' FIRST Project	ATARI Zone-I, Ludhiana	13-14 Aug 2024
	ICAR-IFPRI Workplan Review Meeting 2025-2030	IFPRI South Asia, New Delhi	25 Sep 2024
Sandeep Mann, Principal Scientist	All India Coordinated Research Project on Plastic Engineering in Agriculture Structure and Environment Management (PEASEM)	MPUAT, Udaipur	22-23 Feb 2024
	All India Coordinated Research Project on Post-Harvest Engineering and Technology (PHET)	ICAR-CIPHET, Ludhiana	13-15 March 2024
	40th Annual Workshop on Post-Harvest Engineering and Technology, held at AAU, Jorhat	ICAR-AICRP on PHET	20-22 Nov 2024
	PESEAM workshop	Srinagar	13-16 Oct 2024
Poonam, Scientist	Role of PT and ILC in Quality Assurance and Maintaining Accreditation as per the ISO 17025:2017" organized by National Institute of Plant Health Management, Hyderabad	Online at ICAR-CIPHET, Ludhiana	10 Jan 2024
	Hands-on Training Program on "Genome Editing Technologies in Crops"	ICAR-Indian Institute of Rice research, Hyderabad	14-23 Oct 2024
	58th ISAE Annual Convention on Engineering Innovations for next gen Digital Agriculture & International Symposium on Agricultural Engineering education for aspiring youth in transforming agriculture" organized by Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani	Online at ICAR-CIPHET, Ludhiana	12-14 Nov 2024
Abhinav Dubey, Scientist	Training on Carbon Auditing of Agricultural and Allied Systems Activities	AICRP on PEASEM, ICAR-CIPHET, Ludhiana	21-23 May 2024
	National Symposia on Food Processing 4.0: Innovation and Sustainability	Department of Food Science & Technology, Punjab Agricultural University, Ludhiana	30 April 2024
	National Workshop on "Development of Building Materials Utilizing Agricultural Biomass	ICAR-NINFET, Kolkata	09 Dec 2024

Name of the official	Title of the programme	Organised by	Date
	National Workshop on "How to Write a Research Paper"	TEC, ICAR-IVRI, Pune	18 Oct 2024
	Day-long workshop on Development of National Agriculture Code (NAC)	BIS-National Institute of Training for Standardization (NITS)	24 Sep 2024.
	Attended Working Group on Post-Harvest Engineering and Technology for Horticulture"	Agricultural Engineering SMD	31 July 2024
Shrikrishna Nishani, Scientist	Annual Workshop on AICRP on PHET	AAU, Jorhat	20-22 Nov 2024
	8th Indian Grain Storage Working Group (IGSWG) Meeting,	Agricultural Engineering SMD	21 Aug 2024
	National Workshop on "How to Write a Research Paper"	TEC, ICAR-IVRI, Pune	18 Oct 2024
	Three days training programme on Post Harvest Management and Storage Techniques	NIPHM, Hyderabad	16-18 Dec 2024
	58th ISAE Annual Convention on Engineering Innovations for next gen Digital Agriculture & International Symposium on Agricultural Engineering education for aspiring youth in transforming agriculture" organized by Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani	Online at ICAR-CIPHET, Ludhiana	12-14 Nov 2024
Ravi Prakash, Scientist	Annual Workshop on AICRP on PHET	AAU, Jorhat	20-22 Nov 2024
	58th ISAE Annual Convention on Engineering Innovations for next gen Digital Agriculture & International Symposium on Agricultural Engineering education for aspiring youth in transforming agriculture" organized by Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani	Online at ICAR-CIPHET, Ludhiana	12-14 Nov 2024
Thingujam Bidyalakshmi, Scientist	National Steering Committee meeting under DoCA project	ICAR-IIPR Kanpur	06 May 2024
	1st Meeting of the Working Group on Post- Harvest Engineering and Technology for Horticulture; Horticulture 4.0: Automated Post-harvest Management	SMD (Agricultural Engineering)	31 July 2024
	"Multivariate data analysis using R software" through online mode	NAARM	22-26 July 2024
	Workshop for hands on training on instrumentation and AI during the visit of Dr. Dharmendra Saraswat, Purdue University and Dr. Santosh Kumar Pitla, University of Nebraska Lincoln meeting	ICAR-CIPHET, Ludhiana	15-16 April 2024
	National workshop on Development of Building Materials Utilizing Agricultural Biomass under CRP on NF held at NINFET Kolkata	through online	09 Dec 2024
	Indian Mobile Congress (IMC 24) for demonstration of NePPA project technology.	Bharat Mandapam, New Delhi	15-18 Oct 2024



Name of the official	Title of the programme	Organised by	Date
	DSIR-hawaijar project in the 2nd PRC (Project Review Committee) meeting on "Mechanized system for making hawaijar-a traditional fermented food of north-east India"	through online	16 Oct 2024
	58th ISAE Annual Convention on Engineering Innovations for next gen Digital Agriculture & International Symposium on Agricultural Engineering education for aspiring youth in transforming agriculture" organized by Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani	Online at ICAR-CIPHET, Ludhiana	12-14 Nov 2024
Chandan Solanki, Scientist	National Symposia on Food Processing 4.0: Innovation and Sustainability	Department of Food Science & Technology, Punjab Agricultural University, Ludhiana	30 April 2024
	58 <sup>th</sup> Annual Convention of ISAE on Engineering Innovations for next-gen digital agriculture and international symposium on agricultural engineering education for aspiring youth in transforming agriculture	VNMKV Parbhani and ISAE New Delhi	12-14 Nov 2024
Bembem K, Scientist	Conference on 'Enabling Sustainable Food Systems through Natural Farming (ESFS-NF)'	Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan (HP)	13-14 Sep 2024
Renu Balakrishnan, Scientist	39th Annual Workshop of AICRP on PHET	ICAR-CIPHET, Ludhiana	13-15 March 2024
Navnath Indore, Scientist	40 <sup>th</sup> Annual workshop of AICRP on PHET	ICAR CIPHET Ludhiana	20-22 Nov 2024
Swati Sethi, Senior Scientist	National Seminar-cum-Exhibition on makhana and allied aquatic crops (NRCM-NASMAC 2024)	ICAR-NRCM, Darbhanga	18 Oct 2024
	58th Annual Convention ISAE on Engineering Innovations for Next-gen Digital Agriculture and International symposium on Agricultural Engineering Education for Aspiring Youth in Transforming agriculture	VNMKV, Parbhani, Maharashtra	12-14 Nov 2024
Sandeep P Dawange, Scientist	3 <sup>rd</sup> International Conference on 'Climate Smart Nutri Sensitive Integrated Farming System for Gender equitable Sustainable Agriculture: Prospects and Challenges'	ICAR-CIWA, Bhubaneswar	6-8 Nov 2024

## PRIORITIZATION, MONITORING AND EVALUATION (PME) CELL

The Project Monitoring and Evaluation (PME) cell plays a crucial role in coordinating and overseeing research activities at the institute. It facilitates the Institute Research Council meetings, maintains project records, and collects progress reports from scientists. The PME cell acts as an intermediary between the council and researchers, ensuring smooth communication and efficient project management. Additionally, it handles parliament

questions and related matters concerning the institute's scientific endeavours. Furthermore, the cell utilizes the Project Information and Management System (PIMS) software to digitally manage research project information, including data on ongoing and completed projects. This centralized system enables unified priority setting, monitoring of externally funded and in-house projects, and efficient project management.

### Research Projects (2024)

Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
<b>In-house projects:</b>					
1.	Capacity building of agricultural extension professionals to promote agro processing	Dr. Renu Balakrishnan (PI)	01 July 2021	30 June 2024	01 July 2021 to 30 June 2024
		Dr. Khwairakpam Bembem (Co-PI)	01 July 2021	30 June 2024	
		Dr. Deep Narayan Yadav (Co-PI)	01 July 2021	28 April 2022	
		Dr. Vikas Kumar (Co-PI)	01 July 2021	30 June 2024	
2.	Techno-economic feasibility assessment and socio-economic impact analysis of selected post-harvest technologies	Dr. Renu Balakrishnan, Scientist (PI)	01 July 2021	Till Date	01 July 2021 to 30 June 2025
		Dr Sandeep Mann, Pr. Scientist (Co-PI)	01 July 2021	Till Date	
		Dr Reshma Gills, Scientist (Co-PI) - ICAR-CMFRI, Cochin	01 July 2021	Till Date	
		Ms. Soumya Mohapatra (Co-PI)	01 July 2024	Till Date	
3.	Development of mushroom mycelium based eco-friendly packaging materials utilizing crop residues	Dr. R.C. Kasana (PI)	01 July 2022	30 June 2024	01 July 2022 to 30 June 2024
		Dr. B.M. Ghodki (Co-PI)	01 July 2022	28 Aug 2023	
		Dr Anil Kumar (Co-PI), ICAR DMR Solan	01 July 2022	30 June 2024	
4.	Biospeckle laser technique for post-harvest quality and safety evaluation of Agricultural produce	Er. Shaghaf Kaukab (PI)	01 July 2021	Till date	01 July 2021 to 30 June 2025
		Dr. R. C. Kasana, (Co-PI)	01 July 2021	Till date	
		Dr. Khwairakpam Bembem (Co-PI)	01 July 2021	Till date	
5.	Development and optimization of 3D food Printing system for designer foods	Dr. Leena Kumari (PI)	01 July 2022	30 June 2024	01 July 2022 to 30 June 2024
		Dr. Deepika Goswami (Co-PI)	01 July 2022	30 June 2024	
		Er. Thongam Sunita Devi (Co-PI)	01 July 2022	30 June 2024	



Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period	
			From	To		
6.	Valorisation of by-products from peanut ( <i>Arachis hypogea</i> L.) milk processing	Dr. Khwairakpam Bembem (PI)	01 July 2022	30 June 2024	01 July 2022 to 30 June 2024	
		Dr. DN Yadav (Co-PI)	01 July 2022	28 April 2022		
7.	Real-time fruit quality monitoring using digital twins and machine learning during storage	Dr. Dhritiman Saha (PI).	01 Aug 2023	Till date	01 Aug 2023 to 31 July 2025	
		Er. Thongam Sunita Devi (Co-PI)	01 Aug 2023	Till date		
		Dr. Ranjeet Singh (Co-PI)	01 Aug 2023	Till date		
8.	Metabolite profiling and sprouting inhibition of Onions for prolonged storage	Mahesh Kumar Samota (PI)	01 Aug 2023	Till date	01 Aug 2023 to 31 July 2026	
		Dr. Poonam Choudhary (Co-PI)	01 Aug 2023	Till date		
		Dr Amit Nath (Co-PI)	01 Aug 2023	Till date		
9.	Development of functional coating for preservation of minimally processed fruits and vegetables	Dr. Ramesh Kumar (PI)	01 Aug 2023	Till date	01 Aug 2023 to 31 July 2026	
		Dr. Amit Nath (Co-PI)	01 Aug 2023	Till date		
		Dr. Sandeep Raheja, Plant Pathologist, PAU, Abohar campus (Co-PI)	01 Aug 2023	Till date		
10.	Development and Evaluation of a Waterless Live Fish Transportation System for Freshwater Fish	Dr. Armaan U. Muzaddadi (PI)	01 Aug 2023	11 Mar 2024	01 Aug 2023 to 31 July 2026	
		Dr. Vikas Kumar	(Co-PI)	01 Aug 2023		11 Mar 2024
			(PI)	12 Mar 2024		Till date
		Dr. Ranjeet Singh (Co-PI)	01 July 2024	Till date		
11.	Development of enzyme assisted technology for enhancing protein extraction from de-oiled rice bran	Dr. Surya (PI)	01 April 2023	31 Mar 2024	01 April 2023 to 31 Mar 2024	
12.	Newer methods for energy-efficient oil extraction and novel product development from mustard seed	Dr. S K Tyagi (PI)	01 Aug 2023	31 July 2024	01 Aug 2023 to 31 July 2024	
13.	Development of a PCM based energy-efficient vending cart for fruits and vegetables	Dr. Ravi Prakash (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2026	
		Dr. Sandeep Mann (Co-PI)	01 July 2024	Till date		
14.	Development of a Model Dairy Structure for Peri-Urban Areas	Dr. Ravi Prakash (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2025	

Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
15.	Development of self-cooling coating for sustainable environment control	Dr. Abhinav Dubey (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2026
		Dr. Shrikrishna Nishani (Co-PI)	01 July 2024	Till date	
		Dr. Sandeep Mann (Co-PI)	01 July 2024	Till date	
16.	Development of Visible Light Induced Composite (C-Dot/TiO <sub>2</sub> ) Photocatalytic Reactor for Ethylene Degradation	Dr. Shrikrishna Nishani (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2027
		Dr. Abhinav Dubey (Co-PI)	01 July 2024	Till date	
17.	Identification of Aril browning and Blackening (Black Heart Disease) in Pomegranate using X-ray imaging	Er. Ritu Bharat Kukde (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2026
		Er. Shaghaf Kaukab (Co-PI)	01 July 2024	Till date	
		Dr. Navnath Indore (Co-PI)	01 July 2024	Till date	
		Er. Thongam Sunita Devi (Co-PI)	01 July 2024	Till date	
18.	Development of a biosensor-based kit for quality detection of Aflatoxin B1 in maize	Er. Urhe Sumit Bhausahab (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2027
		Dr. Surya (Co-PI)	01 July 2024	Till date	
		Prof Sunil Bhand, BITS Pilani (Co-PI)	01 July 2024	Till date	
19.	Value chain management of tomato for minimization of post-production losses	Dr. Amit Nath (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2025
		Dr. Ramesh Kumar (Co-PI)	01 July 2024	Till date	
20.	Assessing the Impact of Farmer Producer Organizations (FPOs) on Agro-Processing in Trans-Gangetic Plains of India	Dr. Soumya Mohapatra (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2027
		Dr. Renu Balakrishnan (Co-PI)	01 July 2024	Till date	
		Dr. Rahul Kumar Anurag (Co-PI)	01 July 2024	Till date	
21.	Creation of online mass media based digital repository of selected CIPHET technologies and digital interface for stakeholders	Dr. Rahul Kumar Anurag (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2026
		Dr. Ranjeet Singh (Co-PI)	01 July 2024	Till date	
		Dr. Sandeep Dawange (Co-PI)	01 July 2024	Till date	
22.	Development of on-farm maize cob drying system for effective value chain	Dr. Pankaj Kumar (PI)	01 July 2024	Till date	01 July 2024 to 30 June 2025
		Er. Shaghaf Kaukab (Co-PI)	01 July 2024	Till date	
		Dr. Sumit Kumar Aggarwal, IIMR Ldh (Co-PI)	01 July 2024	Till date	



Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
<b>ICAR Funded Projects under National Agriculture Innovation Fund (NAIF): Component-I</b>					
23.	Agri Business Incubation and ITMU	Dr. Ranjeet Singh (PI)	06 Feb 2024	Till Date	06 Feb 2024 to 31 Mar 2026
		Dr. Renu Balakrishnan (Co-PI)	06 Feb 2024	Till Date	
		Dr Arvind Ahlawat (Co-PI)	06 Feb 2024	Till Date	
		Dr Soumya Mohapatra (Co-PI)	06 Feb 2024	Till Date	
<b>ICAR-Funded Project - Under Special Call for Project Proposals on Genome Editing-Mediated Avenues in Agriculture</b>					
24.	Genetic modification of yeast ( <i>Saccharomyces cerevisiae</i> ) for improving xylitol production from corn cob	Dr. R.C. Kasana (PI)	01 Nov 2023	Till date	01 Nov 2023 to 31 Oct 2026
		Dr. Poonam (Co-PI)	01 Nov 2023	Till date	
<b>ICAR Funded Project under CRP on Secondary Agriculture (SA)</b>					
25.	Reformation of Makhana processing and value-addition industry through mechanization and automation.	Dr. R.K. Vishwakarma (PI)	01 April 2021	Till date	01 April 2021 to 31 Mar 2026
		Dr. Mridula D. (Co-PI)	01 April 2021	11 Nov 2022	
		Dr. Ranjeet Singh (Co-PI)	01 April 2021	31 Mar 2024	
		Dr. Kh. Bembem (Co-PI)	01 April 2021	Till date	
		Dr. Guru P.N. (Co-PI) w.e.f.	01 Sep 2022	Till date	
		Dr. Swati Sethi. (Co-PI) w.e.f.	01 April 2024	Till date	
		Dr. Rahul Kumar Raut (Co-PI) (ICAR-NRC for Makhana, Darbhanga)	01 April 2024	Till date	
26.	Extraction of bioactive compounds and value addition of by-products of agri-produce	Dr. Manju Bala (Co-PI) & (PI)	01 Sep 2022 21 Dec 2022	20 Dec 2022 Till date	01 April 2021 to 31 Mar 2026
		Dr. Mridula D. (PI)	01 April 2021	11 Nov 2022	
		Dr. Deepika Goswami (Co-PI)	01 April 2021	Till date	
		Er. Akhoon Asrar Bashir (Co-PI)	01 April 2021	23 June 2022	
<b>ICAR-Funded Project - Under CRP on Natural Fiber (NF), ICAR-CIRCOT, Mumbai</b>					
27.	Development of building materials using natural fibers and other fibrous crops- Reinforcement of concrete bricks/blocks using fibre from crop residues under CRP on Natural Fiber (NF) CIRCOT, Mumbai	Dr. Sandeep Mann (CC-PI)	16 May 2024	Till date	16 May 2024 to 15 May 2027
		Dr. Thingujam Bidyalakshmi Devi (Co-CCPI)	16 May 2024	Till date	
		Dr. Abhinav Dubey (Co-CCPI)	16 May 2024	Till date	

Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
<b>ICAR Funded Projects under Farmer FIRST Programme (FFP)</b>					
28.	Farmers First Project entitled "Processing and Value Addition of Agricultural Produce for Enhancing Farmers income and Employment in Production Catchment with revised mandate to cover whole State of Punjab	Dr. Sandeep Mann (PI)	01 April 2020	Till date	01 April 2020 to 31 Mar 2025
		Dr. A.K. Dixit, Pr. Scientist, ICAR-NDRI, Karnal (Co-PI)	01 April 2020	31 Mar 2024	
		Dr. Rahul Kumar Anurag (Co-PI)	01 April 2020	31 Mar 2024	
		Dr. Renu Balakrishnan (Co-PI)	01 April 2020	Till date	
		Dr. Soumya Mohapatra (Co-PI)	01 April 2024	Till Date	
		Dr. Rajeev Sharma TO (Co-PI)	01 April 2024	Till Date	
		Er. Yogesh Kalnar (Co-PI)	01 April 2020	28 Oct 2022	
		Dr. B.V.C Mahajan (Co-PI) Director & Prof., (PHPTC)	01 April 2020	Retired on 31 Mar 2023 Till Date	
<b>Externally Funded Projects</b>					
29.	Non-chemical management of stored-grain moths using flexible light-trap	Dr. Guru P.N. (PI)	01 Oct 2020	31 Mar 2024	01 Oct 2020 to 31 Mar 2024
		Er. Yogesh Kalnar (Co-PI)	01 Oct 2020	28 Oct 2022	
		Dr. Dhritiman Saha (Co-PI)	13 Jan 2023	31 Mar 2024	
30.	Development of image (Visual and X-Ray) based mango sorting and grading system and sensor-based monitoring system with block chain technology for supply chain of banana <i>Co-operating Center under ICAR-Network Project on Precision Agriculture (NePPA)</i>	Dr. Nachiket Kotwaliwale, Director (Mentor)	08 Sep 2021	Till date	08 Sep 2021 to 07 Sep 2025
		Dr. K. Narsaiah, Pr. Scientist & Acting Head, AS&EC Division (PI)	08 Sep 2021	28 Oct 2022	
		Er. Yogesh B. Kalnar, Scientist, A&ST Division (Co-PI)	08 Sep 2021	28 Oct 2022	
		Dr. Bhupendra M. Ghodki, Scientist, AS&EC Division (Co-PI)	08 Sep 2021	28. Aug 2023	
		Dr. Leena Kumari, Scientist, A&ST Division (Co-PI) & PI	08 Sep 2021 14 Dec 2022	13 Dec 2022 Till date	
		Dr. Thingujam Bidyalakshmi Devi, Scientist, AS&EC Division (Co-PI)	08 Sep 2021	Till date	
		Er. Thongam Sunita Devi, Scientist, A&ST Division (Co-PI)	08 Sep 2021	Till date	
		Dr. P. Suresh Kumar, ICAR-NRC, Banana (CC-PI)	08 Sep 2021	Till date	
		Dr. Dhritiman Saha Scientist (Co-PI)	08 May 2023	Till date	



Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
31.	Mechanized system for making Hawaijar - a traditional fermented food of North-East India	Dr. Thingujam Bidyalakshmi Devi (PI)	01 April 2021	Till date	01 April 2021 to 31 Mar 2025
		Dr. Surya (Co-PI)	01 April 2021	Till date	
		Dr. Khwairakpam Bembem	01 April 2021	Till date	
		Dr. Ng. Joy Kumar (Co-PI from CoFT, CAU, Imphal)	01 April 2021	Till date	
32.	Vision guided AI-enabled Robotic Apple Harvester Under National Programme on Electronics and ICT Applications in Agriculture and Environment (Agriencs) funded by MeitY-GOI-C-DAC, Kolkata	Er. Yogesh B.Kalnar (PI)	17 Mar 2022	28 Oct 2022	17 Mar 2022 to 16 Dec 2024
		Dr. K. Narsaiah (Co-PI)	17 Mar 2022	28 Oct 2022	
		Dr. Bhupendra M Ghodki (Co-PI)	17 Mar 2022	28 Aug 2023	
		Er. Shaghaf Kaukab (Co-PI) and PI	17 Mar 2022 15 Nov 2022	14 Nov 2022 16 Dec 2024	
33.	Collaborative Contract research project entitled "Development of grain image processing software for rice and paddy"	Dr. Dhritiman Saha (PI)	09 June 2023	Till Date	09 June 2023 to 31 Mar 2025
		Dr. Ranjeet Singh (Co-PI)	09 June 2023	Till Date	
		Dr. Nachiket Kotwaliwale (Co-PI)	09 June 2023	Till Date	
34.	ICAR-DOCA Project entitled "Study on Determining Storage Losses of pulses stored in Warehouses and to Recommend Norms for Loss/Gain during Long term Storage."	Dr. Nachiket Kotwaliwale (Coordinator)	14 Sep 2023	Till Date	14 Sep 2023 to 13 Mar 2027
		Dr. R. K. Vishwakarma (PI)	14 Sep 2023	Till Date	
		Dr. Guru P. N. (Co-PI)	14 Sep 2023	Till Date	
		Dr. Thingujam Bidyalakshmi Devi (Co-PI)	14 Sep 2023	Till Date	
		Dr. Sandeep P. Dawange (Co-PI)	14 Sep 2023	Till Date	
		Er. Shaghaf Kaukab (Co-PI)	14 Sep 2023	Till Date	
		Dr. Navnath Indore Sakharam (Co-PI)	05 Aug 2024	Till Date	
35.	Development of rice bran protein-based Gummies and flavored powder premix	Dr. Surya(PI)	05 Aug 2023	04 Aug 2024	05 Aug 2023 to 04 Aug 2024
		Dr. DN Yadav (Co-PI)	05 Aug 2023	04 Aug 2024	

Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
36.	Collaborative project on “Research, Development & Capacity Building Activities on Processing & Value Addition of Forest Produce of Chhattisgarh State” between ICAR-CIPHET, Ludhiana as Nodal Agency and CGMFPFED	Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET (Mentor)	24 Aug 2023	Till Date	24 Aug 2023 to 23 Aug 2028
		Dr. R.K. Vishwakarma, Principal Scientist & PC PHET (Mentor)	24 Aug 2023	Till Date	
		Dr. Manju Bala (PI)	24 Aug 2023	Till Date	
		Dr. Sandeep Mann (Co-PI)	24 Aug 2023	Till Date	
		Ms. Surya (Co-PI)	24 Aug 2023	Till Date	
		Dr. Swati Sethi (Co-PI)	24 Aug 2023	Till Date	
		Dr. Chandan Solanki (Co-PI)	24 Aug 2023	Till Date	
		Dr. Pankaj Kumar (Co-PI)	24 Aug 2023	Till Date	
		Dr. Poonam (Co-PI)	24 Aug 2023	Till Date	
		Dr. T. Bidyalakshmi Devi (Co-PI)	24 Aug 2023	Till Date	
		Dr. Sandeep P. Dawange (Co-PI)	24 Aug 2023	Till Date	
		Dr. Guru P.N (Co-PI)	24 Aug 2023	Till Date	
37.	Establishment of millet processing facility and development of value-added products from millets.	Dr. Manju Bala (PI)	15 Mar 2024	Till Date	15 Mar 2024 to 14 Mar 2027
		Dr. Deepika Goswami (Co-PI)	15 Mar 2024	Till Date	
		Dr. Swati Sethi (Co-PI)	15 Mar 2024	Till Date	
		Dr. Chandan Solanki (Co-PI)	15 Mar 2024	Till Date	
		Dr. Pankaj Kumar - Co-PI	15 Mar 2024	Till Date	
		Dr. Guru P.N. (Co-PI)	15 Mar 2024	Till Date	
		Mrs. Surya (Co-PI)	15 Mar 2024	Till Date	
		Er. Urhe Sumit Bhausahab (Co-PI)	15 Mar 2024	Till Date	
38.	Collaborative research project entitled, “Development of Day-Night Solar Insect Trap”	Dr. Guru P.N. (PI)	22 Mar 2024	Till date	22 Mar 2024 to 21 Mar 2025
		Er. Urhe Sumit Bhausahab (Co-PI)	22 Mar 2024	Till date	
39.	Up-scaling of chitosan and thymol based smart nanoformulations to control fungal diseases and fall armyworm in maize crop	Dr. Poonam (PI)	26 April 2024	Till Date	26 Apr 2024 to 25 Apr 2027
		Dr. Sandeep Mann (Co-PI)	26 April 2024	Till Date	
		Dr. Shrikrishna Shrinivas Nishani (Co-PI)	26 April 2024	Till Date	



Sr. No.	Project Name	Project Leader & Associates	Period of Association		Project period
			From	To	
40.	Sensitizing stakeholders to minimize food loss and waste through awareness programmes. <i>[Funded by CSR, Vardhman textiles limited, Chandigarh Road, Ludhiana.]</i>	Dr Manju Bala (PI)	01 Oct 2024	Till date	01 Oct 2024 to 30 Sep 2025
		Dr Surya (Co-PI)	01 Oct 2024	Till date	
		Dr. Chandan Solanki (Co-PI)	01 Oct 2024	Till date	
		Sh. Lakhwinder Singh (Co-PI)	01 Oct 2024	Till date	
41.	Assessment of Oilseeds and Pulse Production and Processing Potential for Economic Prosperity and Sustainable Development: A study of Punjab”	Dr. Gurdeep Singh, Deputy Director (T), KVK, Bhatinda (PI)	10 Sep 2024	Till date	10 Sep 2024 to 09 Oct 2025
		Dr. Renu Balakrishnan (Co-PI)	10 Sep 2024	Till date	
		Prof. Amandeep Singh Brar (Co-PI)	10 Sep 2024	Till date	
		Prof. Bikramjit Singh (Co-PI)	10 Sep 2024	Till date	
		Associate Prof. Sanjeev Kumar Katria (Co-PI)	10 Sep 2024	Till date	
		Assistant Prof. Ramandeep Kaur (Co-PI)	10 Sep 2024	Till date	
		Sh. Harinder Singh, AB Engineer (Co-PI)	10 Sep 2024	Till date	

## RESEARCH & ADMINISTRATIVE MEETINGS

### 26<sup>th</sup> Research Advisory Committee Meeting (RAC)

The SMD (Engg.), ICAR, KAB-II, Pusa, New Delhi vide File No. A.Engg.05/02/2024-(A.E) E-File No. 300590 dated 06.03.2024 constituted the Research Advisory Committee for ICAR- CIPHET, Ludhiana for a period of three years w.e.f. 20.02.2024 to 19.02.2027. The first meeting of the Research Advisory Committee (RAC) was held during April

10-11, 2024, at ICAR-CIPHET, Ludhiana. This meeting was conducted in a hybrid format, allowing for both online participation and physical presence of members. All Heads, Project Coordinators, and Scientists of the institute attended the meeting along with the Chairman and other RAC members.

### Research Advisory Committee

Dr. R.C. Maheshwari Former Vice-Chancellor, Sardarkrushinager Dantiwada Agricultural University (SDAU), District Banaskantha-385506 (Gujarat)	Chairman
Dr. Sirshendu De Professor, Chemical Engineering, IIT, Kharagpur	Member
Dr. R.K. Pal Former Director, ICAR-NRCP (Solapur)	Member
Dr. Kalpana Rayaguru Professor and Head Department of Agricultural Processing and Food Engineering CAET, OUAT, Bhubaneswar	Member
Dr. P.S. Rao Professor, Agricultural & Food Engineering Indian Institute of Technology(IIT), Kharagpur	Member
Dr. P.K. Nema Professor, Food Engineering NIFTEM, 97, Niftem Rd, Haryana 131028	Member
Dr. K. Narsaiah ADG(PE), Division of Agricultural Engineering, ICAR, KAB II, Pusa, New Delhi – 110 012	Member
Sh. Kuldip Singh Dhaliwal Flat No.1,Gurukul Campus,Bathinda Road, Kotakpura - 151 201 (Punjab)	Member
Dr. Jaipal Village-Assan Khurd, Post- Assan Kalan, Panipat	Member
Dr. Nachiket Kotwaliwale Director, ICAR-CIPHET, Ludhiana-141004	Member
Dr. Dhritiman Saha Sr. Scientist and OIC PME Cell, ICAR-CIPHET, Ludhiana	Member Secretary



### Quinquennial Review Team (QRT) Meeting

First Meeting of QRT held on February 27, 2023, at SMD (Engg.), ICAR, New Delhi and the last meeting was held during February 29<sup>th</sup> to March 01, 2024, at ICAR-CIPHET, Ludhiana. Final QRT Report

submitted to DG, ICAR and DDG (Engg.), ICAR, New Delhi by the Chairman QRT and MS-QRT on 26.03.2024.

Dr. N.C. Patel Former Vice Chancellor Anand Agricultural University, Anand, Gujarat	Chairman
Dr. Pitam Chandra Former Director ICAR-Central Institute of Agricultural Engineering (CIAE), Bhopal, Madhya Pradesh	Member
Dr. R.K. Jain Ex. Principal A.D. Patel Institute of Technology (ADIT), Anand, Gujarat	Member
Dr. Ashutosh Upadhyay Prof. Deptt. of Food Science & Technology National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundli, Sonipat, Haryana	Member
Sh. Uday Shankar Saha Ex. Chair (RBI)-IRMA & Former Chief General Manager National Bank for Agriculture and Rural Development (NABARD), Mumbai, Maharashtra	Member
Dr. Sandeep Mann Head, AS & EC Division ICAR-CIPHET, Ludhiana, Punjab	Member Secretary



### Institute Research Council (IRC) Meeting

The 35th Institute Research Council Meeting of the ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana, was convened on June 04-05, 2024, at the institute premises. Dr. Nachiket Kotwaliwale, Director of ICAR-CIPHET and Chairman of the Indian Research Council (IRC), presided over the meeting.

### Institute Management Committee Meeting

The 37th Institute Management Committee meeting of ICAR-CIPHET, Ludhiana, was held on March 21, 2024, through online mode under the chairmanship of Dr. Nachiket Kotwaliwale, Director of the institute. The meeting reviewed the action taken report of the previous committee meeting and expressed satisfaction with the institute's research achievements, infrastructure development, and financial progress. The committee thoroughly considered most of the proposed agenda items and made corresponding recommendations.

### IJSC Meeting

An Institute Joint Staff Council meeting was convened on September 11, 2024, at ICAR-CIPHET, Ludhiana. The primary objectives of the meeting were to review the Action Taken Report (ATR) of the preceding IJSC meeting and to address the new agenda items raised by the staff of the institute.

## PERSONALIA

### Appointment/ Recruitment/ New Joining

Name of the Official	Date of Joining	Designation
Ms. Anuradha	22 April 2024	Administrative Officer
Sh. Anupam Kumar Choudhary	03 May 2024	Technical Trainees
Sh. Gautam Kumar	06 May 2024	Technical Trainees
Dr. Kishan Kumar Patel	06 June 2024	SMS /T-6
Dr. Prakash Chand Gurjar	06 June 2024	SMS / T-6
Dr. Ramesh Chand Kantwa	10 June 2024	SMS / T-6
Dr. Harender Singh Dhaiya	18 June 2024	SMS / T-6
Sh. Rajesh Kumra	15 July 2024	Senior Administrative Officer
Sh. Pradeep Kulhari	22 Aug 2024	Assistant Finance & Account Officer
Sh. Mohit Sikka	22 Aug 2024	Assistant Finance & Account Officer
Sh. Lakshay	13 Sep 2024	Assistant
Sh. Rahul Kumar	09 Sep 2024	Assistant
Sh. Anuj Chhabra	04 Oct 2024	Assistant

### Superannuation

Name of the Official	Date of Retirement	Designation
Sh. Hardev Singh	31 Jan 2024	Technical Officer (Driver)
Sh. Ramesh Chand Meena	31 Oct 2024	Chief Administrative Officer

### Promotion

Name of the Official	Date of Promotion (CAS)	Designation
<b>Technical Staff</b>		
Sh. Gurdeep Singh	w.e.f. 01 Jan 2023	Senior Technical Officer
Sh. Sukhwinder Singh Sekhon	w.e.f. 24 Aug 2023	Senior Technical Assistant
Smt. Pragya Singh	w.e.f. 01 Oct 2023	Senior Technical Assistant
Sh. Jaswinder Singh	10 Mar 2024	Technical Officer
Sh. Rajinder Kumar Raheja	21 Mar 2024	Assistant
Sh. Ajay Kumar	21 Mar 2024	Upper Division Clerk
Sh. Jagtar Singh	23 Mar 2024	Technical Officer

### Transfer

Name of the Official	Date of Transfer	Place of Transfer
Dr. A U Muzaddadi	11 Mar 2024	ICAR-CIFRI, Barrackpore
Smt. Pragya Singh	14 Sep 2024	ICAR-NBSS&LUP, Bangalore



## Institutional Staff – Ludhiana Campus

### Scientific Staff

Name of the Official	Designation	Discipline
Dr. Nachiket Kotwaliwale	Director	Agricultural Structures & Process Engineering
Dr. Rajesh Kumar Vishwakarma	PC (PHET)	Agricultural Structures & Process Engineering
Dr. Rakesh Sharda	PC, PEASEM (Deputation)	Soil & Water Engineering
Dr. Sandeep Mann	Head, AS&EC Division	Agricultural Structures & Process Engineering
Dr. Ranjeet Singh	Head, TOT Division & Head (Act.) AST Division	Agricultural Structures & Process Engineering
Dr. Manju Bala	Head (Act.) FG&OP	Plant Biochemistry
Dr. Sanjeev Kumar Tyagi	Principal Scientist	Chemical Engineering
Dr. Ramesh Chand Kasana	Principal Scientist	Agricultural Microbiology
Dr. Rahul Kumar Anurag	Senior Scientist	Food & Science Technology
Dr. Deepika Goswami	Senior Scientist	Food & Science Technology
Dr. Swati Sethi	Senior Scientist	Food Technology
Dr. Dhritiman Saha	Senior Scientist	Agricultural Process Engineering
Dr. Surya	Senior Scientist	Agricultural Microbiology
Dr. Chandan Solanki	Senior Scientist	Agricultural Process Engineering
Dr. Leena Kumari	Senior Scientist	Electronics & Instrumentation
Er. Akhoon Asrar Bashir	Scientist	Agricultural Structures & Environment Engineering
Dr. Indore Navnath Sakharam	Scientist	Agricultural Structures & Environment Engineering
Er. Kalnar Yogesh	Scientist	Agricultural Process Engineering
Dr. Khwairakpam Bembem	Scientist	Home Science
Dr. Renu Balakrishnan	Scientist	Agricultural Extension
Dr. Vikas Kumar	Scientist	Fish Process Technology
Dr. Pankaj Kumar	Scientist	Agricultural Process Engineering
Dr. Poonam	Scientist	Plant Biochemistry
Dr. Guru P.N.	Scientist	Agricultural Entomology
Dr. Dawange Sandeep Popatrao	Scientist	Agricultural Process Engineering
Dr. Thingujam Bidyalakshmi	Scientist	Agricultural Process Engineering
Er. Thongam Sunita Devi	Scientist	Agricultural Structures & Process Engineering
Er. Shaghaf Kaukab	Scientist	Agricultural Structures & Process Engineering
Dr. Ravi Prakash	Scientist	Agricultural Structures & Process Engineering
Mrs. Soumya Shubhashree Mohapatra	Scientist	Agricultural Economics
Er. Urhe Sumit Bhausahib	Scientist	Agricultural Structures & Process Engineering
Dr. Shrikrishna Shrinivas Nishani	Scientist	Agricultural Structures & Process Engineering
Dr. Abhinav Dubey	Scientist	Agricultural Structures & Process Engineering
Er. Ritu Bharat Kukde	Scientist	Agricultural Structures & Process Engineering

### Administrative Staff

Name	Designation
Sh. R.C. Meena	Chief Administrative Officer
Sh. Rajesh Kumra	Senior Administrative Officer
Sh. Parmod Sharma	Finance & Account Officer
Sh. Ram Chand	Principal Private Secretary
Ms. Anuradha	Administrative Officer
Sh. Sughar Singh Verma	Personal Secretary
Sh. Kunwar Singh	Assistant Administrative Officer
Sh. Avtar Singh	Assistant Administrative Officer
Smt. Jasvir Kaur	Assistant
Sh. Gurdial Singh	Assistant
Sh. Ashwani Kumar	Assistant
Sh. Iqbal Singh	Assistant
Sh. Rajinder Kumar Raheja	Assistant
Smt. Sunita Rana	Upper Division Clerk
Sh. Ram Khelawan Yadav	Upper Division Clerk
Sh. Sanjay Kumar Gaur	Upper Division Clerk
Sh. Ajay Kumar	Upper Division Clerk
Sh. Mohit Sikka	Assistant Finance & Account Officer
Sh. Pradeep Kulhari	Assistant Finance & Account Officer
Sh. Lakshay	Assistant
Sh. Anuj Chhabra	Assistant

### Technical Staff

Name	Designation
Sh. Beant Singh	Technical Officer (Driver)
Sh. Vishal Kumar	Technical Officer (DEO)
Sh. Rajiv Sharma	Technical Officer(Lab. Technician)
Sh. Lakhwinder Singh	Technical Officer (Fitter)
Sh. Jaswant Singh	Technical Officer (Welder)
Sh. Hardeep Singh	Technical Officer (Turner)
Smt. Sonia Rani	Technical Officer (DEO)
Sh. Jaswinder Singh	Technical Officer (Machinist)
Sh. Jagtar Singh	Technical Officer (Electrician)
Sh. Pradip Kumar	Sr. Technical Assistant (Field Assistant)
Sh. Yashpal Singh	Sr. Technical Assistant (Field Assistant)
Sh. Sukhwinder Singh Sekhon	Sr. Technical Assistant (Workshop)
Sh. Sarup Singh	Sr. Technician (Lab. Technician)
Sh. Satwinder Singh	Sr. Technician (Lab. Technician)
Sh. Manoj Kumar	Technician (Lab. Technician)
Sh. Anupam Kumar Choudhary	Technician (T-1)
Sh. Gautam Kumar	Technician (T-1)

### Supporting Staff

Name	Designation
Sh. Sukhbir	Skilled Support Staff

### Institutional Staff – Abohar Campus

#### Scientific Staff

Name of the Official	Designation	Discipline
Dr. Amit Nath	Head	Food Science and Technology
Dr. Ramesh Kumar	Pr. Scientist	Horticulture
Dr. Mahesh Kumar Samota	Scientist	Plant Biochemistry
Dr. Shilpa S Selvan	Scientist	Agricultural Structures & Process Engineering

#### Administrative Staff

Name	Designation
Sh. Tarsem Singh Purba	Assistant Administrative Officer
Sh. Mohan Lal	Assistant
Sh. Rahul Kumar	Assistant

#### Technical Staff

Name	Designation
Sh. Rajesh Kumar	Assistant Chief Technical Officer (Field Farm.)
Sh. Prithvi Raj	Assistant Chief Technical Officer (Field Farm.)
Sh. Ganpat Ram	Technical Officer (Driver)
Sh. Devinder Kumar	Technical Officer (Fitter)
Sh. Dalu Ram	Technical Officer (Fitter)
Sh. Pawan Kumar	Technical Officer (Electrician)

### Supporting Staff

Name	Designation
Sh. Surinder Kumar	Skilled Support Staff

### Institutional Staff – KVK Fazilka

#### Scientific Staff

Name of the Official	Designation	Discipline
Dr. Arvind Kumar Ahlawat	Senior Scientist-cum-Head	Agricultural Botany
Dr. Rupender Kaur	SMS (ACTO)	Home Science
Dr. Ramesh Chand Kantwa	SMS/T-6	Fruit Science
Dr. Prakash Chand Gurjar	SMS/T-6	Soil Science
Dr. Kishan Kumar Patel	SMS/T-6	Farm Machinery and Power
Dr. Harender Singh Dahiya	SMS/T-6	Agronomy





### मक्का उत्पादन तकनीकों पर प्रशिक्षण कार्यक्रम का आयोजन



किसानों को प्रदर्शनी के लिए आदान वितरण करते सीफेट अधिकारी।

**सवेरा न्यूज/कथूरिया अंबोहर :** कृषि विज्ञान केंद्र सीफेट अंबोहर और से भारत सरकार एवं मक्का अनुसंधान संस्थान लुधियाना द्वारा की वैकल्पिक खेती में मक्का उत्पादन को बढ़ावा देने के लिए कार्यक्रम आयोजन किया गया। कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। जिसमें विभिन्न गांव में लगाई जाने वाली विभिन्न प्रदर्शनी के लिए चर्चानित किसानों को मक्का उत्पादन में आने वाली विभिन्न कृषि तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी। कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। जिसमें विभिन्न गांव में लगाई जाने वाली विभिन्न प्रदर्शनी के लिए चर्चानित किसानों को मक्का उत्पादन में आने वाली विभिन्न कृषि तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### खालसा कालेज में कृषि विज्ञान केंद्र का 5 दिवसीय प्रशिक्षण कार्यक्रम शुरू



**सवेरा न्यूज/कथूरिया अंबोहर, 10 सितंबर :** कृषि विज्ञान केंद्र सीफेट अंबोहर ने खालसा कालेज में 5 दिवसीय प्रशिक्षण कार्यक्रम शुरू किया। कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। इस कार्यक्रम में किसानों को मक्का उत्पादन के लिए आवश्यक तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### फसल अवशेष प्रबंधन पर स्कूल स्तर पर जागरूकता कार्यक्रम



**सवेरा न्यूज/कथूरिया अंबोहर :** कृषि विज्ञान केंद्र द्वारा सीनियर सेकेंडरी स्मार्ट स्कूल अंबोहर में फसल अवशेष प्रबंधन पर एक दिवसीय जागरूकता कार्यक्रम कराया गया। इस कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। इस कार्यक्रम में किसानों को फसल अवशेष प्रबंधन के लिए आवश्यक तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### किविच जैविक तरल कार्बनिक खाद बनाने की विधियों पर प्रशिक्षण कार्यक्रम

**सवेरा न्यूज/कथूरिया अंबोहर, 16 अगस्त :** कृषि विज्ञान केंद्र जिला फाजिल्का द्वारा गांव कटेहरा में किविच जैविक कार्बनिक खाद एवं किविच जैविक तरल कार्बनिक खाद बनाने की विधियों पर प्रशिक्षण कार्यक्रम का आयोजन डॉ अरविंद कुमार अहलावत प्रभारी, कृषि विज्ञान केंद्र फाजिल्का के निदेशन में किया गया। इस कार्यक्रम के संचालन डॉ प्रकाश चंद गुजर विषय विशेषज्ञ मृदा विज्ञान द्वारा किविच जैविक कार्बनिक खाद बनाने की विधियों पर प्रशिक्षण कार्यक्रम का आयोजन डॉ अरविंद कुमार अहलावत प्रभारी, कृषि विज्ञान केंद्र फाजिल्का के निदेशन में किया गया।



किसानों को जानकारी देते अधिकारी।

सुधार के लिए पोटेथियम नाइट्रेट का इस्तेमाल के बारे में विस्तार पूर्वक जानकारी दी। हरेंद्र सिंह विषय विशेषज्ञ सत्य विज्ञान द्वारा धान की फसल में पानी की बचत के बारे में तकनीकी जानकारी दी। इस कार्यक्रम में सम्पूर्ण एग्री लेंचर की तरफ से उपस्थित राजू नारायण तरल किविच जैविक कार्बनिक खाद के बारे में जानकारी दी। इस कार्यक्रम का संचालन पृथ्वीरा (एसटीओ) द्वारा किया गया।

### दैनिक सवेरा फसल अवशेष प्रबंधन पर जागरूकता कार्यक्रम, पराली न जलाने की अपील



किसान व सीफेट अधिकारी।

**सवेरा न्यूज/कथूरिया अंबोहर, 21 अक्टूबर :** कृषि विज्ञान केंद्र सीफेट अंबोहर द्वारा पराली न जलाने की अपील की। इस कार्यक्रम में किसानों को फसल अवशेष प्रबंधन के लिए आवश्यक तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### क पौधा मां के नाम : केवीके-सीफेट ने पौधारोपण अभियान चलाया



**सवेरा न्यूज/कथूरिया अंबोहर :** पंचावरण स्थिरता और संरक्षण को बढ़ावा देने के लिए कृषि विज्ञान केंद्र फाजिल्का और क्षेत्रीय स्टेजन्स सीफेट अंबोहर ने संयुक्त रूप से परिसर में वृक्षारोपण अभियान का आयोजन किया। इस कार्यक्रम का उद्घाटन डॉ अमित नाथ प्रमुख, क्षेत्रीय केंद्र सीफेट अंबोहर और डॉ अरविंद अहलावत प्रमुख, केवीके फाजिल्का ने सभी स्टाफ सदस्यों की उपस्थिति में किया। टीम ने कई पौधे लगाए, जिससे एक हरित भविष्य की शुरुआत हुई। स्टाफ ने पौधों को देखभाल और पोषण के लिए शपथ ली जिससे उनकी बुढ़ि और सेहत सुनिश्चित हो। डॉ नाथ ने पंचावरण संरक्षण में सामूहिक प्रयासों की आवश्यकता पर जोर दिया।

### दूध और दूध उत्पादों के मूल्य संवर्धन पर प्रशिक्षण कार्यक्रम



**सवेरा न्यूज/कथूरिया अंबोहर :** कृषि विज्ञान केंद्र फाजिल्का ने गांव धरगवाला में दूध और दूध उत्पादों के मूल्य संवर्धन पर ऑफ कैम्पस प्रशिक्षण कार्यक्रम आयोजित किया। कार्यक्रम का संचालन डा. रूपेंद्र कौर द्वारा किया गया। कार्यक्रम दौरान प्रतिभागियों को दूध और दूध उत्पादों के मूल्य संवर्धन के महत्व और लाभों के बारे में सिखाया गया। केवीके विशेषज्ञों ने दूध में मिलावट और उपभोक्ता पर इसके दुष्परभावों के बारे में जोर दिया। पोषण सुरक्षा के लिए मिठे पानी का उपयोग करके पनीर और पेय बनाने के बारे में व्यावहारिक ज्ञान दिया गया। इस कार्यक्रम के दौरान विशेषज्ञ डॉ किशन ने कृषि विज्ञान केंद्र की गतिविधियों के बारे में बताया एवं डॉ रमेश चौधरी ने जैविक दूध उत्पादन और दूध उत्पादों के बारे में जानकारी दी गई।

### पराली प्रबंधन पर प्रशिक्षण कार्यक्रम का समापन



**सवेरा न्यूज/कथूरिया अंबोहर, 7 सितंबर :** कृषि विज्ञान केंद्र सीफेट अंबोहर द्वारा पराली प्रबंधन पर प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। इस कार्यक्रम में किसानों को फसल अवशेष प्रबंधन के लिए आवश्यक तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### पराली प्रबंधन पर जागरूकता कार्यक्रम करवाया

**सवेरा न्यूज/कथूरिया अंबोहर :** कृषि विज्ञान केंद्र सीफेट अंबोहर द्वारा फसल अवशेष प्रबंधन परियोजना के तहत गांव नरूपुर (अरनीवाला) में ग्रामीण स्तर पर जागरूकता कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन डॉ अरविंद कुमार अहलावत हैड कृषि विज्ञान केंद्र के निदेशन में डा. रूपेंद्र कौर द्वारा किया गया। कार्यक्रम में रूपेंद्र कौर द्वारा धान की पराली खेत में मिल्क और दूध तकनीकी पर चर्चा करते हुए कृषि विज्ञान केंद्र फाजिल्का द्वारा पराली प्रबंधन के लिए की गई विभिन्न गतिविधियों के बारे में विस्तृत जानकारी दी। डॉ किशन पटेल द्वारा पराली प्रबंधन में उपयोगी मशीनों व उसके उपयोग के बारे में जानकारी दी। टीएनसीएनजीओ के चमनप्रीत सिंह ने प्रबंधन के अंतर्गत अधिक से अधिक सहयोग देने के लिए प्रेरित किया। कुल 52 किसानों ने भाग लेकर कार्यक्रम को सफल बनाया।

### अनुसूचित जाति की महिलाओं को समृद्ध बन के लिए 5 दिवसीय प्रशिक्षण कार्यक्रम सुरू

**सवेरा न्यूज/कथूरिया अंबोहर, 10 सितंबर :** कृषि विज्ञान केंद्र सीफेट अंबोहर ने अनुसूचित जाति की महिलाओं को समृद्ध बन के लिए 5 दिवसीय प्रशिक्षण कार्यक्रम शुरू किया। कार्यक्रम का संचालन कृषि विज्ञान केंद्र के राजेश द्वारा किया गया। इस कार्यक्रम में महिलाओं को मक्का उत्पादन के लिए आवश्यक तकनीकों का प्रस्ताव दिया और उन्हें जानकारी दी।

### मुख्य कृषि अधिकारी ने किया कृषि विज्ञान केंद्र का दौरा

**सवेरा न्यूज/कथूरिया अंबोहर :** मुख्य कृषि अधिकारी डा. संदीप रिणव द्वारा कृषि विज्ञान केंद्र का दौरा किया गया। इस अवसर पर उनके द्वारा कृषि विज्ञान केंद्र के हैड डा. अरविंद कुमार अहलावत व अन्य स्टाफ के साथ चर्चा की गई। विभिन्न कार्यक्रमों के प्रति चर्चा की गई तथा दोनों विभागों के कार्यक्रमों में उचित समन्वय बनाने हेतु प्रतिबद्धता व्यक्त की गई जिससे क्षेत्र में किसान भलाई का सच्चा लक्ष्य प्राप्त किया जा सके। डा. संदीप रिणव





मधुमक्खी पालन पर व्यावसायिक प्रशिक्षण का सम...

सवेरा न्यूज/धर्मवीर अहोहर, 24 फरवरी : कृषि ज्ञान केंद्र सीफेट अहोहर द्वारा मधुमक्खी पालन पर तीन दिवसीय व्यावसायिक प्रशिक्षण का आयोजन... 22 फरवरी को किया गया। इस कार्यक्रम का संचालन पृथ्वीराज शर्मा मुख्य तकनीकी अधिकारी किया गया। इस कार्यक्रम के तहत क्षेत्रीय केंद्र सीफेट अहोहर के डॉ. अमित नाथ, कृषि विज्ञान...

दैनिक सवेरा

नींबूवर्गीय फलों के बागों के विकार प्रबंधन पर प्रशिक्षण का



सीफेट अधिकारी व किसान।

सवेरा न्यूज/धर्मवीर, अहोहर : कृषि विज्ञान केंद्र फाजिल्का ( क्षेत्रीय केंद्र सी अहोहर ) द्वारा नींबू वर्गीय फलों के बागों में फलों के गिरने एवं विकार प्रबंधन पर प्रशिक्षण कार्यक्रम का आयोजन दिनांक 20 मार्च को किया गया। इस कार्य का संचालन डॉक्टर अरविंद कुमार हेड कृषि विज्ञान केंद्र के निदेशन में राधे कुमार द्वारा किया गया। इस कार्यक्रम के अंतर्गत राजेश कुमार द्वारा नींबू वर्गी फलों में विकार के विभिन्न कारण एवं प्रबंधन पर विस्तारपूर्वक चर्चा की गई। विमल कुमार द्वारा नींबू वर्गीय फलों के गिरने के कारण एवं रोकथाम के उपाय के बारे में विस्तारपूर्वक बताया गया। इसके साथ-साथ नींबू वर्गी के फलों के उत्पादन में आने वाली विभिन्न समस्याओं पर भी खुली चर्चा की गई। इस प्रशिक्षण कार्यक्रम के हेड डॉक्टर अरविंद कुमार, गृह विज्ञान विशेषज्ञ पृथ्वीराज, डॉ. महेश कुमार समता उपस्थित रहे।

खीष्पावाली में कृषि जागरूकता कार्यक्रम करपा



किसानों को जानकारी देते सीफेट कर्मचारी।

सवेरा न्यूज/कथूरिया, अहोहर : कृषि विज्ञान केंद्र सीफेट अहोहर द्वारा अल्पेक्ष प्रबंधन परियोजना के तहत गांव खीष्पावाली में ग्रामीण स्तर का जागरूकता कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन डॉ. अरविंद अहलावत हेड कृषि विज्ञान केंद्र के निदेशन में डॉक्टर रूपेंद्र कौर द्वारा किया गया। कार्यक्रम में रूपेंद्र कौर द्वारा धान की पराली खेत में मिलाने के तरीकों पर चर्चा करते हुए कृषि विज्ञान केंद्र फाजिल्का द्वारा पराली प्रतिक्रिया के विभिन्न गतिविधियों के बारे में बताया। पृथ्वीराज ने पराली से मुक्त स्वास्थ्य एवं मित्र क्रीट प्रबंधन में उपयोगी मशीनों व उसके रख-रखाव पर जानकारी दी। टीएनसीएनजीओ के चमनप्रत सिंह ने पराली के नुकसान से अधिक सहयोग देने के लिए प्रेरित किया तथा अपने अनुभवों के बारे में बताया। डॉक्टर अरविंद कुमार द्वारा पराली से निपटारे के लिए प्रेरित किया तथा अपने अनुभवों के बारे में बताया। डॉक्टर अरविंद कुमार द्वारा पराली से निपटारे के लिए प्रेरित किया तथा अपने अनुभवों के बारे में बताया।

महिलाओं ने सीखे अचार बनाने के तरीके



महिलाओं को जानकारी देते सीफेट अधिकारी।

सवेरा न्यूज/कथूरिया अहोहर : कृषि विज्ञान केंद्र सीफेट अचार बनाने की विधियों पर प्रशिक्षण कार्यक्रम का आयोजन में किया गया। इस कार्यक्रम का संचालन डा. रूपेंद्र कौर गृह द्वारा किया गया जिसमें डा. कौर द्वारा विभिन्न तरह के अचार के तैयारी के तरीके जैसे आम का अचार, नींबू का अचार आदि बनाए जाने की जानकारी दी गई तथा अचार को लंबे समय तक संरक्षित रखने के लिए विभिन्न सुझाव दिए गए। पृथ्वीराज द्वारा ग्रामीण महिलाओं को अचार बनाने के लघु प्रशिक्षण प्राप्त करने के लिए प्रेरित किया गया। यह कार्यक्रम स्वयं सहायता समूहों के सदस्यों को लाभ पहुंचाने के लिए आयोजित किया गया।

किसानों को बताएं विकसित किस्मों के गुण

सवेरा न्यूज/कथूरिया अहोहर, 11 अगस्त। कृषि विज्ञान केंद्र सीफेट अहोहर द्वारा भारतीय कृषि अनुसंधान परिषद द्वारा माननीय प्रधानमंत्री द्वारा विकसित 109 जैव संवर्धन एवं जलवायु अनुकूल किस्में जारी करने के सम्बन्ध में कार्यक्रम का आयोजन किया गया। इस कार्यक्रम के अंतर्गत विकसित नई किस्म के बारे में विस्तृत जानकारी दी गई तथा लाइव टेलीकास्ट कार्यक्रम भी दिखाया गया। इस कार्यक्रम के मौके पर कृषि विज्ञान केंद्र के डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया। डॉ. प्रकाश कुमार : स्वास्थ्य एवं उन्नत किस्मों से अधिक आर्थिक लाभ के लिए विकसित किस्मों के बारे में जानकारी दी गई। डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया। डॉ. प्रकाश कुमार : स्वास्थ्य एवं उन्नत किस्मों से अधिक आर्थिक लाभ के लिए विकसित किस्मों के बारे में जानकारी दी गई। डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया।

अनुसूचित जाति की महिलाओं को समृद्ध लिए 6 दिवसीय प्रशिक्षण कार्यक्रम का आयोजन



बैठक में जानकारी देते हुए अधिकारी।

सवेरा न्यूज/कथूरिया (अहोहर) : कृषि विज्ञान केंद्र (फाजिल्का, क्षेत्रीय केंद्र सीफेट अहोहर) द्वारा अनुसूचित जाति महिलाओं के लिए एससीएसजी योजना के तहत फल सब्जी प्रसंस्करण मूल्य संवर्धन पर 6 दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन डॉ. नचिकेत कोतवाली वाले, निदेशक कृषि विज्ञान केंद्र हेड डॉ. अमित नाथ हेड क्षेत्रीय केंद्र सीफेट अहोहर के तत्व कार्यक्रम के सह संयोजक डॉ. महेश कुमार अहलावत द्वारा किया गया। डॉ. अमित नाथ हेड क्षेत्रीय केंद्र सीफेट अहोहर के तत्व कार्यक्रम के सह संयोजक डॉ. महेश कुमार अहलावत द्वारा किया गया। डॉ. अमित नाथ हेड क्षेत्रीय केंद्र सीफेट अहोहर के तत्व कार्यक्रम के सह संयोजक डॉ. महेश कुमार अहलावत द्वारा किया गया। डॉ. अमित नाथ हेड क्षेत्रीय केंद्र सीफेट अहोहर के तत्व कार्यक्रम के सह संयोजक डॉ. महेश कुमार अहलावत द्वारा किया गया।

श्री अन्न का प्राथमिक प्रसंस्करण व मूल्यवर्धन विषय पर कार्यशाला आयोजित



अधिकारी किसानों को जानकारी देते हुए।

सवेरा न्यूज/धर्मवीर अहोहर, 19 अप्रैल : कृषि विज्ञान केंद्र-सीफेट द्वारा ग्रामीण स्तर पर किसानों के उत्पादन तकनीकी पर एक दिवसीय प्रशिक्षण कार्यक्रम का आयोजन दिनांक 19 अप्रैल 2024 को कृषि विज्ञान केंद्र पर करवाया गया। इस कार्यक्रम का संचालन राजेश कुमार सहायक मुख्य तकनीकी अधिकारी द्वारा किया गया। इस कार्यक्रम हेड कृषि विज्ञान केंद्र के दिशा निदेशन में किया गया। डॉक्टर अरविंद कुमार हेड कृषि विज्ञान केंद्र के दिशा निदेशन में किया गया। डॉक्टर अरविंद कुमार हेड कृषि विज्ञान केंद्र के दिशा निदेशन में किया गया। डॉक्टर अरविंद कुमार हेड कृषि विज्ञान केंद्र के दिशा निदेशन में किया गया।



किसानों को जानकारी देते हुए सीफेट के अधिकारी।

मृदा व पोषक तत्व प्रबंधन पर हुआ प्रशिक्षण



कार्यक्रम में हिस्सा लेते सीफेट अधिकारी व किसान।

सवेरा न्यूज/धर्मवीर, अहोहर : कृषि विज्ञान केंद्र सीफेट अहोहर द्वारा मृदा व पोषक तत्व प्रबंधन पर 11 मई को एक दिवसीय किसान प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन डा. रमेश कुमार द्वारा किया गया। इस कार्यक्रम में डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया। डॉ. प्रकाश कुमार : स्वास्थ्य एवं उन्नत किस्मों से अधिक आर्थिक लाभ के लिए विकसित किस्मों के बारे में जानकारी दी गई। डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया।

श्री अन्न का प्राथमिक प्रसंस्करण व मूल्यवर्धन विषय पर कार्यशाला आयोजित



कार्यक्रम में हिस्सा लेते सीफेट अधिकारी व किसान।

श्री अन्न का प्राथमिक प्रसंस्करण व मूल्यवर्धन विषय पर कार्यशाला आयोजित। इस कार्यक्रम का संचालन डॉ. अरविंद कुमार अहोहर द्वारा किया गया। इस कार्यक्रम में डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया। डॉ. प्रकाश कुमार : स्वास्थ्य एवं उन्नत किस्मों से अधिक आर्थिक लाभ के लिए विकसित किस्मों के बारे में जानकारी दी गई। डॉ. अरविंद कुमार अहोहर किसानों को नई विकसित किस्मों के अधिक लाभ लेने के लिए प्रेरित किया गया।

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