भाकृअनुप
ICAR

भाकृअनुप-सीफेट
ICAR-CIPHET

2023

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
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1. NABL Accredited FTL laboratory
2. Millet Pre-processing Units
3. Vacuum Frying System
4. Insect Trap

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CONTENTS

भाकृअनुप
ICAR

भाकृअनुप–सीफेट
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प्रस्तावना

मेरे लिए सौभाग्य की बात है कि आपके समक्ष भा.कृ.अनु.प.–केंद्रीय कटाई–उपरान्त अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, लुधियाना की विभिन्न गतिविधियों, बाह्य कार्यक्रमों और महत्वपूर्ण उपलब्धियों की जानकारी वार्षिक रिपोर्ट 2023 के रूप में प्रस्तुत कर रहा हूँ। संस्थान विभिन्न प्रौद्योगिकियों को विकसित करके उद्यमिता के माध्यम से रोजगार पैदा कर, भोजन की क्षति की रोकथाम के लिए फसल कटाई के बाद इकाई संचालन के स्वचालन द्वारा बेहतर नियंत्रण, मूल्य संवर्धन, किसानों की आय में वृद्धि, उच्च दक्षता और कृषि और कृषि–उद्योगों के उप–उत्पादों का उपयोग करके मानवता के लिए अपनी सेवाएं प्रदान कर रहा है। इस रिपोर्ट में संस्थान की गतिविधियों के साथ साथ दो अखिल भारतीय समन्वित अनुसंधान परियोजनाओं (एआईसीआरपी) और एक कंसोर्टियम रिसर्च प्लेटफॉर्म (सीआरपी) का रिकॉर्ड भी शामिल है।

संस्थान की प्रमुख उपलब्धियां जैसे कि विभिन्न प्रौद्योगिकियाँ, अभियांत्रिकी समाधान, मशीनें/उपकरण/गैजेट्स, प्रक्रियाएँ/प्रोटोकॉल और डिजाइन किए गए नवीन खाद्य उत्पाद हैं, जिन्हें व्यापक प्रयोगों के बाद और वैज्ञानिक पद्धतियों का उपयोग करके विकसित किया गया है। हमारे द्वारा विकसित कुछ मशीनें हैं: बेहतर गुणवत्ता वाले पौष्टिक और नवीन स्नैक्स के उत्पादन के लिए टेबल–टॉप वैक्यूम फ्राइंग सिस्टम, खेत पर मक्का के भुट्टे को सूखाने की प्रणाली, मैकेनिकल और श्री अन्न प्रसंस्करण के लिए इन्फ्रारेड–आधारित पूर्व–प्रसंस्करण प्रणाली, आपूर्ति श्रृंखला में केले की पर्यावरणीय स्थितियों पर नजर रखने के लिए सेंसर–आधारित प्रणाली और दृश्यमान प्रकाश कीट ट्रैप। श्रीअन्न, दलहनी फसलें आधारित, प्रसंस्करण उप–उत्पादों इत्यादि से उच्च पोषण युक्त, सुविधाजनक और कार्यात्मक उत्पादों के लिए प्रक्रिया प्रौद्योगिकियों और प्रोटोकॉल को मानकीकृत किये गए हैं। पेड़ों पर सेब के स्थानीयकरण के लिए कृत्रिम बुद्धिमत्ता आधारित प्रोटोकॉल विकसित किए गए हैं, जिससे रोबोटिक सेब चुनने की मशीन का विकास किया जा सकता है।

विभिन्न हितधारकों का क्षमता निर्माण संस्थान की प्रमुख गतिविधियों में से एक है। इस वर्ष हमने कृषि और पशुधन उत्पादों की कटाई के बाद प्रबंधन के क्षेत्र में 2000 से अधिक प्रतिभागियों के लिए लगभग 80 प्रशिक्षण कार्यक्रम आयोजित किए हैं। वर्ष–2023 को अंतर्राष्ट्रीय श्रीअन्न वर्ष के रूप में मनाने के लिए संस्थान ने विभिन्न बाह्य गतिविधियों का आयोजन किया और एक व्यावसायिक पैमाने की श्रीअन्न प्रसंस्करण इकाई शुरू की। भाकृअनुप–सीफेट ने अपने 35वें स्थापना दिवस के उपलक्ष्य में कृषि प्रसंस्करण पर उद्योग इंटरफेस मेला और एक किसान मेले की मेजबानी करके एक महत्वपूर्ण मील का पत्थर भी चिह्नित किया। इन कार्यक्रमों के दौरान संस्थान ने अपनी अग्रणी प्रौद्योगिकियों को प्रदर्शित किया। इस अवसर पर कई उद्यमियों की भागीदारी देखी गई, जिसमें लगभग 80 स्टालों पर विभिन्न आईसीएआर संस्थानों और अन्य व्यावसायिक संस्थानों के प्रदर्शन शामिल थे। इस पहल का उद्देश्य कृषि प्रसंस्करण के क्षेत्र में हितधारकों के बीच सहयोग और ज्ञान के आदान–प्रदान को बढ़ावा देना है। इस अवसर पर खाद्य प्रसंस्करण, फाइबर प्रसंस्करण और व्यापार स्टार्टअप से संबंधित मुद्दों पर तीन उद्योग इंटरफेस बैठकें भी आयोजित की गईं।

वर्ष 2023 के दौरान विभिन्न अनुसंधान प्रयासों की दृश्यता बढ़ाने की दृढ़ प्रतिबद्धता को दर्शाते हुए संस्थान द्वारा 08 प्रौद्योगिकियों का 12 उद्यमियों को लाइसेंस दिया गया, 01 पेटेंट दायर किया गया और 02 पेटेंट प्राप्त हुए। साथ हीं राष्ट्रीय और अंतर्राष्ट्रीय समीक्षा पत्रिकाओं में प्रकाशित 57 शोध पत्र और वर्ष के दौरान प्राप्त विभिन्न प्रतिष्ठित पुरस्कार और सम्मान हमारे वैज्ञानिकों की शैक्षणिक उत्कृष्टता को दर्शाते हैं। यह वास्तव में गर्व की बात है कि हमारे संस्थान की खाद्य परीक्षण प्रयोगशाला ने एनएबीएल मान्यता प्राप्त की है, जो खाद्य परीक्षण में उच्च मानक सुनिश्चित करने की हमारी

प्रतिबद्धता को रेखांकित करती है। इसके अतिरिक्त, हमें भारत सरकार की वेबसाइटों (जीआईजीडब्ल्यू) के लिए दिशानिर्देशों के साथ 'मानकीकरण परीक्षण और गुणवत्ता प्रमाणन (एसटीक्यूसी)' भी प्राप्त हुआ है। यह मान्यता हमारी प्रयोगशाला और ऑनलाइन उपस्थिति, दोनों में उत्कृष्टता बनाए रखने और स्थापित गुणवत्ता मानकों के पालन के प्रति हमारे समर्पण को दर्शाती है। वर्ष के दौरान, संस्थान ने उपज की बिक्री, प्रशिक्षण शुल्क, खाद्य परीक्षण शुल्क और प्रौद्योगिकी लाइसेंसिंग के माध्यम से लगभग 75.00 लाख रुपये का राजस्व अर्जित किया है। इसी तरह, संस्थान के पोस्ट–हार्वेस्ट मशीनरी और उपकरण परीक्षण केंद्र ने देश के विभिन्न हिस्सों से 69 मशीनों का परीक्षण किया, जिससे लगभग 87.00 लाख रुपये का कुल राजस्व अर्जित हुआ।

मुझे यह बताते हुए खुशी हो रही है कि एआईसीआरपी–पीएचईटी योजना के तहत 2023 के दौरान लगभग 90 के उपकरण/प्रक्रिया प्रोटोकॉल और उत्पाद विकसित किए गए और इस योजना के तहत लगभग 50 प्रौद्योगिकियों को हितधारकों को हस्तांतरित किया गया। एआईसीआरपी–पीईएएसईएम के तहत, लगभग 20 प्रौद्योगिकियाँ विकसित की गईं जबकि 2 प्रौद्योगिकियाँ हितधारकों को हस्तांतरित की गईं।

राष्ट्रीय और अंतर्राष्ट्रीय स्तर पर संस्थान की दृश्यता बढ़ाने के लिए, नियमित कार्यालय कार्यों में हिंदी के उपयोग को बढ़ाने और स्वच्छ भारत मिशन, अनुसूचित–जाति उप–योजना, मेरा गांव मेरा गौरव और मेरी माटी मेरा देश जैसी महत्वपूर्ण योजनाओं को लागू करने के भी प्रयास किए गए। आईसीएआर–सीफेट तकनीकी नवाचारों और हस्तक्षेपों पर जोर देते हुए पोस्ट–हार्वेस्ट इंजीनियरिंग के क्षेत्र में अनुसंधान और विकास को आगे बढ़ाने के लिए समर्पित है। संस्थान अपनी प्रतिबद्धता में दृढ़ है, और मुझे विश्वास है कि हमारी टीम फसल–कटाई के बाद अनुसंधान और विकास में उत्कृष्टता प्रदर्शित करने के अपने अथक प्रयासों में लगी रहेगी।

(नचिकेत कोतवालीवाले)

निदेशक

PREFACE

It's my privilege to present before you Annual Report – 2023 of ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana that gives insights of our activities, outreach programmes and significant achievements made during the year 2023. Institute is providing its services to the mankind by developing post-harvest technologies, automation of post-harvest unit operations for better control, food loss and wastage prevention, value addition, generating employment though entrepreneurship, increasing farmers' income, higher efficiency and utilizing by-products of agriculture and agro-industries. This publication includes record of activities by the Institute along with two All India Coordinated Research Projects (AICRPs) and one Consortium Research Platform (CRP).

The major output of the institute are technologies, engineering solutions, machines/ tools/ gadgets, processes/ protocols, and designed innovative food products, developed after extensive experimentations and validated using scientific methodologies. The machines developed by us are: Table-top Vacuum Frying System for producing nutritious and innovative snacks with improved quality attributes, On-farm maize cob drying system (1 ton capacity) that utilizes forced natural air and solar energy to dry maize cobs, Mechanical and infrared-based pre-processing system for millet processing, Sensor-based system for tracking the environmental conditions of banana in supply chain and Visible light insect trap. The process technologies and protocols were standardized for high nutritional, convenient and functional products from millets, legumes, processing by-products, etc. Artificial intelligence based protocols have also been developed for localization of apples on trees, leading to development of robotic apple picking machine.

Capacity building of various stakeholders is one of the major activities of the institute. This year we have organized around 80 training programs for more than 2000 participants in the area of post-harvest management of agricultural and livestock produce. To commemorate the year-2023, as International Year of Millets, the institute organized various outreach activities and commissioned a commercial-scale millet processing unit. ICAR-CIPHET has also marked a significant milestone by hosting the Industry Interface Fair on Agro Processing - 2023 (CIPHET-IIFA 2023) and a Kisan Mela in celebration of its 35th Foundation Day. During these events, the institute showcased and demonstrated its cutting-edge technologies to a diverse range of stakeholders. The occasion saw the participation of numerous entrepreneurs, with around 80 stalls featuring exhibits from various ICAR Institutes and other business entities. This initiative aimed to foster collaboration and knowledge exchange among stakeholders in the field of agro processing. Three industry interface meetings were also held on this occasion addressing issues related to food and fibre processing and business startups.

The steadfast commitment to elevate the visibility of the Institute's research endeavours was addressed by licensing 08 technologies to 12 entrepreneurs whereas, 01 patent was filed and 02 were granted. The scholastic excellence of our scientists was shown in the form of 57 research papers published in national and international peer reviewed journals and through various prestigious awards and recognitions received during 2023. It is indeed a matter of pride that our institute has achieved NABL accreditation for its Food Testing Laboratory, underscoring our commitment to ensuring high standards in food testing. Additionally, we have also received

"Standardization Testing and Quality Certification (STQC)" for the ICAR-CIPHET website, aligning it with the guidelines for Indian Government Websites (GIGW). This recognition reflects our dedication to maintaining excellence and adherence to established quality benchmarks in both our laboratory practices and online presence. During this year, institute has generated net revenue of about Rs 75.00 lakh through the sale of produce, training fee, food testing fee and technology licensing. Likewise, institute's Post-Harvest Machinery and Equipment Testing Centre (PHMETC) tested 69 machines from different parts of the country, earning a total revenue of about Rs 87.00 Lakh.

I also feel pleasure to share that under AICRP on PHET scheme, about 90 post-harvest tools/equipment/process protocols and products were developed during 2023 and about 50 technologies were transferred to the stakeholders under this scheme. Under AICRP on PEASEM, about 20 technologies were developed whereas 2 technologies were transferred to the stakeholders.

Efforts were also made for increasing institute's visibility at both national and international level, to enhance the usage of Hindi in routine office work and to implement important schemes like *Swachh Bharat Mission, Schedule-Caste Sub-Plan, Mera Gaon Mera Gaurav* and *Meri Mati Mera Desh*. ICAR-CIPHET remains dedicated to advancing research and development in the realm of Post-Harvest Engineering, emphasizing technological innovations and interventions. The institute is resolute in its commitment, and I am confident that our team will persist in its untiring efforts to demonstrate excellence in Post-Harvest Research and Development.

(Nachiket Kotwaliwale)
Director

कार्यकारी सारांश

भा.कृ.अनु.प.–केंद्रीय कटाई–उपरान्त अभियांत्रिकी एवं प्रौद्योगिकी संस्थान (सीफेट), लुधियाना देश का एक प्रमुख संस्थान है जो फसल कटाई के बाद अभियांत्रिकी और प्रौद्योगिकी में अनुसंधान गतिविधियों में कार्यरत है। वर्ष 2023 के दौरान संस्थान ने फसल कटाई के बाद प्रसंस्करण और गुणवत्ता प्रबंधन से संबंधित नवीन प्रौद्योगिकियों, प्रक्रियाओं को विकसित करने और इन प्रौद्योगिकियों की लाइसेंसिंग, प्रशिक्षण, क्षमता निर्माण और विस्तार गतिविधियों द्वारा किसानों, उद्यमियों और उद्योगों जैसे संबंधित हितधारकों को स्थानांतरित करने में महत्वपूर्ण भूमिका निभाना जारी रखा। संस्थान ने अपनी विभिन्न बहु–विषयक आंतरिक और बाह्य रूप से वित्त पोषित अनुसंधान परियोजनाओं के माध्यम से योगदान दिया है एवं विभिन्न हितधारकों की विभिन्न समस्याओं के लिए नवीन समाधान विकसित किये हैं। वर्ष 2023 के दौरान भा.कृ.अनु.प.–सीफेट की मुख्य उपलब्धियाँ यहाँ संक्षेप में प्रस्तुत की गई हैं:

मशीनें / उपकरण विकसित

टेबल–टॉप वैक्यूम फ्राइंग सिस्टम

पारंपरिक डीप–फैट तलने के तरीकों से जुड़े प्रतिकूल प्रभावों को कम करने के लिए और बेहतर गुणवत्ता विशेषताओं के साथ पौष्टिक और नवीन स्नैक्स का उत्पादन करने के लिए छोटे रेस्तरां तथा फास्ट–फूड श्रृंखलाओं की जरूरतों को पूरा करने के लिए एक टेबल–टॉप वैक्यूम फ्राइंग सिस्टम विकसित किया गया है। इसमें फ्राइंग बर्तन, फ्राइंग बास्केट, कंट्रोल पैनल, वैक्यूम पंप, कंडेनसर, आउटलेट और प्रेशर गेज शामिल हैं। इसकी क्षमता 9–12 लीटर की है तथा यह न्यूनतम 100 ग्राम खाद्य पदार्थ को फ्राई कर सकता है।

खेत पर मक्का के भुट्टे सूखाने की प्रणाली

उच्च गुणवत्ता वाली सूखी मक्का प्राप्त करने के लिए, भा.कृ.अनु.प.–सीफेट ने भा.कृ.अनु.प.–आईआईएमआर लुधियाना के सहयोग से 1 टन क्षमता, की खेत पर मक्का सूखाने की प्रणाली विकसित की है। यह मक्के के भुट्टों को सूखाने के लिए फोर्स्ड प्राकृतिक वायु और सौर ऊर्जा का उपयोग करता है। इसे आसानी से फोल्ड किया जा सकता है, जिससे इसे संभालना आसान है और लागत भी कम है। खरीफ मक्के को सूखाने के लिए इसका मूल्यांकन किया गया जिसमे 36 प्रतिशत नमी की मात्रा ग्यारह दिनों में 17 प्रतिशत (भार के आधार पर) तक सूख गयी।

श्री अन्न प्रसंस्करण के लिए यांत्रिक और अवरक्त–आधारित पूर्व–प्रसंस्करण प्रणाली के प्रोटोटाइप का विकास

पारंपरिक तरीके से श्री अन्न की मिलिंग के दौरान, मिलिंग घाटे को दूर करने के लिए भा.कृ.अनु.प.–सीफेट, लुधियाना ने प्री–प्रोसेसिंग सिस्टम के दो प्रोटोटाइप विकसित किए हैं, एक यांत्रिक प्रकार का है और दूसरा अवरक्त प्रकाश का उपयोग करता है। यांत्रिक प्रणाली 5 किग्रा / घंटा की क्षमता वाली एक स्क्रू–पिच प्रकार की व्यवस्था है जबकि अवरक्त–आधारित पूर्व–प्रसंस्करण प्रणाली, 500 ग्राम क्षमता की एक बैच प्रकार की इकाई है।

प्रक्रियाएं / प्रोटोकॉल / अध्ययन

आंवला के ओसमोटिक–निर्जलीकरण से सिरप अपशिष्ट का उपयोग करके सिरका के जैविक उत्पादन के लिए प्रक्रिया प्रोटोकॉल

फलों के ओसमोटिक निर्जलीकरण के दौरान बड़ी मात्रा में चीनी की सिरप अपशिष्ट के रूप में उत्पन्न होती है। इसका उपयोग कर सिरका उत्पादन के लिए एक उपयोगी उत्पाद प्रक्रिया प्रोटोकॉल मानकीकृत किया गया। यह पाया गया कि अनुकूलित प्रक्रिया स्थितियों के उपयोग से, एक लीटर सिरप से लगभग तीन लीटर सिरका (5.5 प्रतिशत एसिटिक एसिड) का उत्पादन किया जा सकता है।

आम के उप–उत्पादों से पीएचबी के उत्पादन को दर्शाने वाले बैक्टीरियल आइसोलेट का पृथक्करण और पहचान

आमों के प्रसंस्करण के उप–उत्पाद (छिलके और गुठली जिन्हें अपशिष्ट के रूप में फेंक दिया जाता है) का उपयोग पॉलीहाइड्रॉक्सीब्यूटाइरेट (पीएचबी) पैदा करने वाले

बैक्टीरिया को बढ़ाने के लिए किया गया। सात चयनित बैक्टीरियल आइसोलेट्स में से एक पीएचबी3, जिसने आम के उत्पादों पर पॉलीहाइड्रॉक्सीब्यूटाइरेट (पीएचबी) का अधिक उत्पादन दिखाया, को आणविक तकनीकों का उपयोग करके पहचाना गया। बैक्टीरियल आइसोलेट की पहचान *बैसिलस वेलेजेंसिस* स्ट्रेन पीएचबी3 के रूप में की गई और इसका उपयोग आम के उत्पादों से पीएचबी उत्पादन के लिए किया जा सकता है।

मशीन लर्निंग के माध्यम से *ट्रामेटेस वर्सिकलर* में उन्नत लैक्केज एंजाइम उत्पादन के लिए प्रक्रिया अनुकूलन

तेल–रहित चावल की भूसी (डीओआरबी, जो लिग्निन का एक समृद्ध स्रोत है) का उपयोग, ठोस अवस्था किण्वन द्वारा लैक्केज एंजाइम का उत्पादन करने के लिए एक सब्सट्रेट के रूप में किया गया। एक आनुवंशिक एल्गोरिदम (जीए) और कृत्रिम तंत्रिका नेटवर्क (एएनएन) आधारित अनुकूलन का उपयोग ठोस अवस्था किण्वन स्थितियों के तहत एक सब्सट्रेट के रूप में डीओआरबी का उपयोग करके *ट्रैमेट्स वर्सिकलर* में लैक्केज एंजाइम उत्पादन को बढ़ाने के लिए किया गया। सब्सट्रेट और नमी का 1:1.5 अनुपात और सब्सट्रेट (13.3 ग्राम) के साथ 10वें दिन लैक्केज एंजाइम उत्पादन (865.18 माईक्रोग्राम) में 5.19 गुना वृद्धि हुई।

कोदो के छिलका उतारने के लिए रबर रोल शेलर का उपयोग करने की प्रक्रिया का प्रोटोकॉल

रबर रोल शेलर का उपयोग करके कोदो का छिलका उतारने के लिए एक अध्ययन किया गया। अध्ययन में छिलका उतारने की दक्षता, अनाज की रिकवरी और टूटे हुए प्रतिशत के लिए प्रक्रिया को अनुकूलित किया। नमी (9 प्रतिशत), अंतर गति (1:1.35) और 0.75 मिमी की निकासी ने 53.60 प्रतिशत अनाज की रिकवरी एवं टूटे हुए कोदो में 8.05 प्रतिशत की कमी के साथ अधिकतम डीहलिंग दक्षता 76.68 प्रतिशत पाई गई।

कोदो के लिए इम्पेक्ट प्रकार के पॉलिशर की प्रक्रिया का अनुकूलन

कोदो पर बहुपरत भूसी होने की वजह से यह एक बहुत ही कठिनाई से छिलका उतरने वाली फसल है। वर्तमान में, कोदो की व्यावसायिक पॉलिशिंग चावल पॉलिश करने वाली मशीनों पर की जाती है, जिससे 30 प्रति ात तक टूटे हुए अनाज के साथ कम गुणवत्ता वाले पॉलिश अनाज मिलते हैं। वर्तमान अध्ययन में कोदो अनाज को पॉलिश करने लिए इम्पेक्ट–प्रकार के पॉलिशर का उपयोग किया गया। पॉलिशर ने 57.92 प्रतिशत की हेड रिकवरी दी जो व्यावसायिक रूप से उपयोग किए जाने वाले पॉलिशर (47 प्रतिशत) की तुलना में काफी अधिक है।

माइक्रोवेव का उपयोग करके कीट शोधन और कोदो की मिलिंग पर इसका प्रभाव

श्री अन्न में कोदो *(पास्पलम स्क्रोबिकुलटम)* लोकप्रिय प्रजातियों में से एक है। श्री अन्न को लोकप्रिय बनाने और इसके उत्पादन पर अधिक ध्यान देने के साथ–साथ भंडारण भी अत्यंत महत्वपूर्ण है। वर्तमान अध्ययन में सबसे आम भंडारण कीटों में से एक, *ट्राइबोलियम कैस्टेनियम* पर माइक्रोवेव एक्सपोजर के प्रभाव का आकलन किया गया। 50 और 60 सेकंड पर माइक्रोवेव एक्सपोजर ने *टी. कैस्टेनियम* वयस्कों की पूर्ण मृत्यु दर 100 प्रतिशत दिखाई। इसके अलावा, यह पाया गया कि माइक्रोवेव उपचार ने कोदो मिलिंग दक्षता को प्रभावित नहीं किया और इस प्रकार इसे गैर–रासायनिक–आधारित कीटाणुशोधन तकनीक के रूप में इस्तेमाल किया जा सकता है।

बैच प्रकार के माइक्रोवेव सिस्टम का उपयोग कर प्रमुख फलियों के कीटाणुशोधन के लिए प्रक्रिया का मानकीकरण

कीड़ों को मारने के लिए माइक्रोवेव का उपयोग, अनाज में मौजूद कीड़ों के डायइलेक्ट्रिक हीटिंग पर आधारित है, जो बिजली का अपेक्षाकृत खराब संवाहक है। बैच प्रकार के घरेलू माइक्रोवेव सिस्टम का उपयोग करके बंगाल चना, लाल चना, हरा चना और काले चने जैसी प्रमुख फलियों में ब्रुचिड्स के कीटाणुशोधन के लिए प्रक्रिया मापदंडों (सतह की नमी, कंडीशनिंग समय और एक्सपोजर समय) को अनुकूलित किया गया है।

सतत् प्रकार की माइक्रोवेव प्रणाली के उपयोग के साथ प्रमुख फलियों के कीटाणुशोधन के लिए प्रक्रिया का मानकीकरण

पीएयू, लुधियाना में उपलब्ध सतत् माइक्रोवेव–आधारित उपचार प्रणाली (जिसमें 2 मैग्नेट्रॉन और 120 से.मी. की

बेल्ट लंबाई शामिल है) का उपयोग 10 किलोग्राम/घंटा की क्षमता के साथ हरे चने को ब्रुचिड से कीटाणुरहित करने के लिए किया गया। ब्रुचिड्स की 100 प्रतिशत मृत्यु 50 आरपीएम की बेल्ट गति, 7.73 प्रतिशत की नमी और 1080W के शक्ति स्तर पर पायी गयी।

भंडारण में कीट प्रबंधन के लिए नवीन वनस्पति सूत्रीकरण गोलियाँ

इस अध्ययन में वानस्पतिक विकल्पों की प्रभावकारिता की जांच करके अनाज भंडारण में कीट प्रबंधन के लिए एक वैकल्पिक दृष्टिकोण की खोज की। सरसों आधारित रासायनिक फॉर्मूलेशन को वानस्पतिक गोलियों पर संचेचित कर खपरा भृंग, लाल भृंग, लघु धान्य वेधक, दाल भृंग और धान्य पट्ट भृंग के विरुद्ध प्रभाव का परीक्षण किया गया। इस प्रयोगशाला अध्ययन में 100 मिलीलीटर ग्लास का और 20 कीड़ों का उपयोग किया गया। इन गोलियों ने केवल 20 मिनट के बाद 100 प्रतिशत मृत्यु दर दर्ज करके त्वरित और पूर्ण प्रभावशीलता दिखायी।

लंबे दाने वाले धान से बेहतर लम्बे चावल के लिए प्रक्रिया मानकीकरण

मिल्ड चावल की गुणवत्ता से समझौता किए बिना उच्च हेड चावल की रिकवरी प्राप्त करने के लिए भिगोने, भाप देने और उबालने की प्रक्रिया को सूखाने के लिए प्रक्रिया मापदंडों को मानकीकृत किया गया। परिणामों से पता चला कि 4 घंटे के लिए 65 डिग्री सेल्सियस पर भिगोने, 5 मिनट के लिए 1.0 किग्रा/सेमी^{2} पर भाप देने के बाद 12 प्रतिशत नमी प्राप्त करने के लिए छाया में सूखाने से हेड चावल की रिकवरी 62 प्रतिशत हुई।

हाइड्रोकोलॉइड का उपयोग करके बाजरा–आधारित ग्लूटेन–मुक्त मफिन के विकास के लिए प्रक्रिया प्रोटोकॉल

गेहूं, राई और जौ जैसे कुछ अनाजों में मौजूद ग्लूटेन सीलिएक रोग से पीड़ित व्यक्तियों के लिए खतरा पैदा करता है। इन सीलिएक रोगियों के लिए खाद्य विकल्प सीमित हैं और ग्लूटेन–मुक्त खाद्य पदार्थों, विशेष रूप से बेकरी उत्पादों के विकल्पों की कमी के कारण उनके आहार में विविधता कम पाई जाती है। वर्तमान अध्ययन में ऑर्गेनोलेप्टिक स्वीकार्यता और अन्य गुणवत्ता विशेषताओं के आधार पर बार्नयार्ड मिलेट और फॉक्सटेल मिलेट से ग्लूटेन–मुक्त मफिन तैयार करने के लिए 0.4 ग्राम प्रति 100 ग्राम के स्तर पर जैंथन गम (एक हाइड्रोकोलॉइड) के उपयोग को अनुकूलित किया गया है।

भौतिक रासायनिक और एंटीऑक्सीडेंट क्षमता के लिए छद्म अनाज और श्री अन्न की विशेषता

इस अध्ययन में चयनित श्री अन्न जैसे कोदो, साँवा, कंगनी, छद्म अनाज जैसे कुट्टू और किनोवा के विभिन्न अंशों (साबुत अनाज–डब्लयू, छिलका–एच और छिलका मुक्त अनाज–के) की मूलभूत सरंचना, कुल फेनोलिक सामग्री (टीपीसी), कुल फ्लेवोनोइड सामग्री (टीएफसी), एंटीऑक्सीडेंट गतिविधि (डीपीपीएच और एफआरएपी) पर डीहलिंग के प्रभाव को देखा गया। विभिन्न श्री अन्न के अंशों (डब्ल्यू, एच, के) में अलग–अलग आहार फाइबर सामग्री देखी गई जो क्रमशः 3.53 प्रतिशत से 28.30 प्रतिशत, 10.09 प्रतिशत से 81.71 प्रतिशत और 2.70 प्रतिशत से 5.72 प्रतिशत थी और कार्बोहाइड्रेट सामग्री (डब्ल्यू, एच, के) क्रमशः 56.18 प्रतिशत से 75.70 प्रतिशत, 9.35 प्रतिशत से 72.72 प्रतिशत और 67.94 प्रतिशत से 81.27 प्रतिशत थी।

मूंगफली के मक्खन में मूंगफली ओकरा का उपयोग

मूंगफली ओकरा (मूंगफली प्रसंस्करण का एक उपोत्पाद) का उपयोग फाइबर और प्रोटीन से भरपूर होने के कारण स्वस्थ और पौष्टिक उत्पादों के विकास के लिए किया जा सकता है। फाइबर और प्रोटीन युक्त मक्खन विकसित करने के लिए 15 प्रतिशत ओकरा प्रतिस्थापन के साथ मूंगफली का मक्खन तैयार करने की प्रक्रिया को अनुकूलित किया गया। अनुकूलित मूंगफली के मक्खन में एसिड मान 2.82 और एल, ए, बी रंग मान 46, 14 और 40 पाया गया। विकसित उत्पाद में 0.17 की कम जल गतिविधि और विस्कोइलास्टिक प्रकृति पायी गयी।

कटाई उपरांत मशीनरी एवं प्रौद्योगिकियों के लिए डेटाबेस का विकास

भा.कृ.अनु.प.–सीफेट ने एनएआरईएस संस्थानों और निजी संगठनों द्वारा विकसित प्रसंस्करण मशीनों, प्रौद्योगिकियों, प्रक्रियाओं और उत्पादों के लिए एक डेटाबेस विकसित किया है। डेटाबेस को मुख्य रूप से कृषि उपज की विभिन्न श्रेणियों के लिए प्रसंस्करण मशीन प्रौद्योगिकियों और उत्पादों एवं प्रक्रिया प्रौद्योगिकियों में विभाजित किया गया

है। प्रमुख फसल श्रेणियां अनाज, दालें, तिलहन, बाजरा, मसाले, फल, सब्जियां, वाणिज्यिक फसलें, वृक्षारोपण फसलें, पशुधन उत्पाद, औषधीय और सुगंधित, कंद फसलें शामिल हैं।

प्रशिक्षण कार्यक्रम के माध्यम से कृषि–प्रसंस्करण में के.वी.के. विशेषज्ञों का सशक्तिकरण

भा.कृ.अनु.प.–सीफेट ने जमीनी स्तर पर फसल कटाई के बाद की प्रौद्योगिकियों के बारे में जागरूकता को बढाने के लिए अटारी क्षेत्र स्तर पर ओडीओपी दृष्टिकोण पर आधारित कार्यक्रम अटारी क्षेत्र III-IX (क्षेत्र VII को छोड़कर) के तहत आठ राज्यों के 58 के.वी.के. के 65 प्रतिभागियों को शामिल कर पांच प्रशिक्षण कार्यक्रम आयोजित किये, जिसमें क्षेत्रों की भौगोलिक, सामाजिक और आर्थिक जरूरतों के अनुरूप कृषि–प्रसंस्करण के विभिन्न मॉडलों पर जोर दिया गया। संगठित प्रशिक्षण कार्यक्रमों का मूल्यांकन करने के लिए किर्कपैट्रिक के चार–स्तरीय मॉडल ढांचे का उपयोग करके प्रतिभागियों से प्रतिक्रिया एकत्र की गयी।

चयनित प्रौद्योगिकियों के प्रभाव आकलन के लिए व्यापक रूपरेखा

व्यापक रूपरेखा विभिन्न हितधारकों पर विविध प्रौद्योगिकियों के प्रभाव का आकलन करने के लिए एक संरचित दृष्टिकोण प्रदान करने, निर्णय लेने और नीति निर्माण के लिए मूल्यवान अंतर्दृष्टि प्रदान करते हैं। एपीसी का प्रभाव प्रसंस्कृत वस्तु के आधार पर कृषि–जलवायु क्षेत्र–वार विश्लेषण के माध्यम से किया गया। गंगा पार कृषि–प्रसंस्करण केंद्रों के व्यवस्थित विश्लेषण से इस क्षेत्र में कृषि–प्रसंस्करण केंद्र स्थापित करने की औसत लागत लगभग रु. 20.91 लाख और औसतन, प्रत्येक कृषि–प्रसंस्करण केंद्र ने परिवार के कम से कम 5 सदस्यों को रोजगार दिया।

सहयोगात्मक/बाह्य वित्त पोषित परियोजनाएँ

आपूर्ति श्रृंखला में केले की पर्यावरणीय स्थितियों पर नजर रखने के लिए सेंसर–आधारित प्रणाली

केले की आपूर्ति श्रृंखला के परिवहन, भंडारण, पकने के चरणों के दौरान पर्यावरणीय स्थितियों की निगरानी के लिए सेंसर–आधारित प्रणाली विकसित की गयी। यह प्रणाली पकने वाले कक्षों और भंडारण क्षेत्रों में अत्यधिक पकने को प्रबंधित करने के लिए एथिलीन की निगरानी करने में सक्षम है। सिस्टम का परीक्षण तापमान, आरएच रिकॉर्डिंग और वाहनों के स्थान ट्रैकिंग के लिए किया जाता है।

भा.कृ.अनु.प.–सीफेट दृश्यमान प्रकाश कीट ट्रैप

भा.कृ.अनु.प.–सीफेट ने यूवी आधारित ट्रैप की तुलना में कुशल आकर्षण क्षमता वाला एक दृश्यमान प्रकाश ट्रैप विकसित किया जो भंडारण किए गए किसी भी अनाज के लिए उपयोगी है। यह र*ाइजोपर्था डोमिनिका, लैसियोडर्मा सेरीकोर्न, कैड्रा कॉटेला, सिटोट्रोगा अनाजेला, ट्रिबोलियम कैस्टेनियम,* और *लेमोफ्लोयस* जैसी कीट प्रजातियों (कीड़ों के आधार पर 65–93 प्रतिशत की आकर्षण दक्षता के साथ जिसमें सिटोट्रोगा में उच्चतम आकर्षण (93 प्रतिशत दर्ज किया गया) को पकड़ सकता है। इसके अलावा, एलईडी आधारित ट्रैप (स्टेनलेस स्टील से बने) भी विकसित किए गये, जो कीड़ों की फोटो–रणनीति व्यवहार प्रतिक्रियाओं के उपयोग पर काम करते हैं।

बंगनापल्ली आम के गूदे और छिलके से बीटा कैरोटीन की मात्रा निर्धारित करने के लिए एचपीएलसी आधारित विधि का विकास

बीटा–कैरोटीन पिगमेंट का एक समूह है जो कई फलों और सब्जियों में नारंगी, पीले और लाल रंग के लिए जिम्मेदार होता है। आम के गूदे और छिलके में बीटा–कैरोटीन की मात्रा निर्धारित करने के लिए एचपीएलसी आधारित विधि विकसित की गयी है। बीटा कैरोटीन की मात्रा का निर्धारण एक क्वाटर्नेरी पंप के साथ एचपीएलसी एजिलेंट 1260 इन्फिनिटी प्रणाली का उपयोग करके किया गया। इसे मेथनॉल और मिथाइल–टर्ट–ब्यूटाइल ईथर सॉल्वैंट्स के एक लीनियर ग्रेडिएंट एल्युसन का उपयोग करके अलग किया गया।

प्राकृतिक रूप से पके आम के भौतिक–रासायनिक गुणों पर किस्म, कटाई का समय और भंडारण अवधि का प्रभाव

दशहरी और बंगनापल्ली की अच्छी गुणवत्ता विशेषताओं के साथ इष्टतम परिपक्वता के संदर्भ में सर्वोत्तम कटाई/परिपक्वता चरण और भंडारण अवधि निर्धारित करना इस अध्ययन का लक्ष्य था। फिजियोलोजिकल वेट लॉस (प्रतिशत), रंग मान, कुल घुलनशील ठोस पदार्थ और

छिलके की कठोरता को मापा गया। ये परिपक्वता संकेतक आम के लिए इष्टतम परिपक्वता चरण और भंडारण अवधि के बारे में विश्वसनीय और सूचित निर्णय लेने में उपयोगी हो सकते हैं।

सोयाबीन की दो किस्मों के भौतिक–रासायनिक गुणों पर किण्वन का प्रभाव

सोयाबीन की दो किस्में, छोटे बीज (स्थानीय किस्म–एलवी) और बड़े बीज (जेएस335) का उपयोग मणिपुर के पारंपरिक किण्वित उत्पाद हवाईजार की तैयारी के लिए किया गया। भौतिक–रासायनिक गुणों पर किण्वन के प्रभाव से फेनोलिक और फ्लेवोनोइड की मात्रा में वृद्धि देखी गई जबकि कठोरता और फाइटिक एसिड सामग्री में कमी पायी गयी। अध्ययन से पता चला कि सोयाबीन के पोषण संबंधी प्रोफाइल को बढ़ाने के लिए किण्वन एक प्रभावी तरीका है।

सेब के फलों का पता लगाने और स्थानीयकरण के लिए आरजीबी–डी मॉड्यूल का विकास

आरजीबी–डी मॉड्यूल को आरजीबी–डेप्थ इमेजिंग सेंसर से प्राप्त आरजीबी–डी फ्रेम की गहराई से जानकारी निकालने के लिए यूजर इंटरफेस के साथ विकसित किया गया। विकसित दृष्टि प्रणाली बाहरी बगीचे के वातावरण में अपनी सीमा के भीतर सेब की पहचान कर सकती है। गहन शिक्षण तकनीकों का लाभ उठाते हुए, सिस्टम न केवल पेड़ की शाखाओं से घिरे सेबों की पहचान करता है, बल्कि पत्तियों और शाखाओं सहित बाधाओं को पहचानने और वर्गीकृत करने में भी सक्षम है, जिससे यह सेब निकालने के लिए इष्टतम प्रक्षेप पथ की गणना करने में सक्षम होता है।

छवि कोष का निर्माण

कश्मीर में उच्च घनत्व वाले बगीचों के जटिल प्रकाश वातावरण में वस्तु का पता लगाने के लिए सेब के फलों की छवियों, वीडियो, टेक्स्ट फाइलों का एक डेटासेट विकसित किया गया है। इसमें सेब की दो किस्मों का डेटा है, जो कि रेड वेलॉक्स और रेड गाला क्रमशः 1.2 टीबी और 300 जीबी के डेटा सेट के साथ हैं। यह डेटासेट अधिक पिक्सेल जानकारी और उच्च इमेजिंग गुणवत्ता के साथ–साथ गहराई की जानकारी देता है।

पल्स बीटल के विरुद्ध परजीवियों की पहचान

पल्स बीटल कल्चर पर प्राकृतिक परजीवी संक्रमण देखा गया और उनकी पहचान के लिए प्रयास किए गए। आईसीएआर–एनबीएआईआर, बेंगलुरु के सहयोग से, पैरासिटोइड्स की पहचान *अनिसोप्टेरोमालस कैलेंड्रे* के रूप में की गई, जो टेरोमैलिडे परिवार से संबंधित एक छोटा ततैया है, और इसने पल्स बीटल के अंडे और लार्वा को परजीवी बनाने की उल्लेखनीय क्षमता दिखायी।

एआईसीआरपी–पीएचईटी द्वारा विकसित मशीनरी/प्रक्रियाएं/उत्पाद

एआईसीआरपी–पोस्ट–हार्वेस्ट इंजीनियरिंग एंड टेक्नोलॉजी (पीएचईटी) ने विभिन्न मशीनें, उत्पाद और प्रक्रिया प्रोटोकॉल विकसित किये। कुछ मशीनों में शामिल है–महुआ स्टेमेन रिमूवर, आधुनिक गुड़ संयंत्र, डीह्यूमिडिफिकेशन यूनिट और वायवीय एस्पिरेटर, वैक्यूम असिस्टेड ओमिक हीटिंग सिस्टम, नीम फ्रूट डिपल्पर, अनाज ऐमारैंथस के लिए थ्रेशर, प्याज खराब होने का पता लगाने वाला उपकरण आदि। पहाड़ी नींबू और सेब के रस मिश्रित पेय की तैयारी के लिए प्रक्रिया प्रोटोकॉल, कम्यूटेड पहाड़ी नींबू फलों का रस पेय, पहाड़ी नींबू के छिलके से पूरक कुकीज, कार्यात्मक प्रोबायोटिक पोर्क स्प्रेड, गुड़ आधारित कुल्फी विकसित की गई है। सूखे हल्दी प्रकंदों के भंडारण के लिए रेडियोफ्रिक्वेंसी (आरएफ) प्रणाली का उपयोग करके रासायनिक कीटाणुशोधन की एक विधि को अनुकूलित किया गया है।

एआईसीआरपी–पीईएएसएम द्वारा विकसित मशीनरी/प्रक्रियाएं/उत्पाद

एआईसीआरपी–कृषि संरचनाओं और पर्यावरण प्रबंधन में प्लास्टिक इंजीनियरिंग (पीईएएसईएम) द्वारा किए गए कुछ प्रमुख विकासों में पॉलीहाउस संरचना के तहत एक्वापोनिक्स प्रणाली, कृत्रिम प्रकाश का उपयोग कर संयंत्र कारखाना, वास्तविक समय सिंचाई शेड्यूलिंग के लिए एक स्वदेशी मिट्टी नमी सेंसर, वर्मी–कंपोस्टिंग इकाई, कृषि वोल्टाइक ग्रीनहाउस प्रणाली, और पहाड़ी और अर्ध–शुष्क क्षेत्रों में जल प्रबंधन के लिए प्लास्टिक चेक डैम, वगैरह शामिल है।

सीआरपी–एसए द्वारा पर विकसित मशीन/प्रक्रिया

सीआरपी–द्वितीयक कृषि (एसए) ने यांत्रिक मखाना बीज संग्रह प्रणाली का निर्माण, किन्नू की अपरिपक्व फलों के

पाउडर से हेस्परिडिन और पेक्टिन के निष्कर्षण के लिए प्रक्रिया मापदंडों का अनुकूलन किया।

अन्य उपलब्धियाँ

हमारे वैज्ञानिकों को कटाई–उपरांत के बाद के क्षेत्र में अनुसंधान और विकास में उनके योगदान के लिए कई पुरस्कार और सम्मान (मौखिक/पोस्टर प्रस्तुति पुरस्कार सहित) से सम्मानित किया गया है। हमारे वैज्ञानिक विभिन्न समितियों और वैज्ञानिक पैनलों के सदस्य भी हैं। 2023 के दौरान आठ (08) प्रौद्योगिकियों को लाइसेंस दिया गया जिसमें वसा रहित स्वादयुक्त मखाना तैयार करने की प्रक्रिया, चावल की भूसी प्रोटीन तैयार करने की प्रक्रिया प्रौद्योगिकी, कच्चे मखाना के बीजों को प्राथमिक रूप से भूनने और उसकी प्रक्रिया के लिए मशीनीकृत प्रणाली, मखाने की पॉपिंग और डिकॉर्टिकेशन के लिए मशीनीकृत प्रणाली शामिल है। बीज, मूंगफली आधारित स्वादयुक्त पेय, दही और पनीर, कुट्टू के छिलके निकालने वाली मशीन, बाजरा आधारित मिश्रित एक्सट्रूडेट, मक्का आधारित ग्लूटेन मुक्त मफिन तैयार करने की प्रक्रिया भी शामिल है। वर्ष के दौरान प्रौद्योगिकी लाइसेंसिंग से 5.21 लाख रुपये का राजस्व प्राप्त हुआ। रिपोर्ट की गई अवधि के दौरान संस्थान को दो (02) पेटेंट भी प्राप्त हुए।

संस्थान के पोस्ट–हार्वेस्ट मशीनरी और उपकरण परीक्षण केंद्र ने देश के विभिन्न हिस्सों से 69 मशीनों का परीक्षण किया, जिससे कुल 87 लाख रुपये का राजस्व अर्जित हुआ। रिपोर्ट की गई अवधि के दौरान, विभिन्न योजनाओं के तहत विभिन्न उद्यमिता विकास कार्यक्रम, मानव संसाधन विकास कार्यक्रम, किसान प्रशिक्षण, छात्र प्रशिक्षण आदि आयोजित किए गए। विभिन्न स्थानों से 750 से अधिक छात्रों और 2000 नवोदित उद्यमियों को उद्यमिता विकास कार्यक्रमों (ईडीपी), किसानों के प्रशिक्षण और संवेदीकरण कार्यक्रमों के माध्यम से कृषि और पशुधन उपज के कटाई के बाद के प्रबंधन के लिए प्रशिक्षित किया गया। आजादी का अमृत महोत्सव के अंतर्गत, भाकृअनुप–सीफेट ने विभिन्न कार्यक्रम आयोजित किए हैं–जैसे खाद्य में 3डी प्रिंटिंग पर ऑनलाइन वेबिनार, स्कूली छात्रों के लिए ओरिएंटेशन प्रोग्राम एवं एक्सपोजर विजिट, और बाजरा प्रसंस्करण और मूल्य संवर्धन पर ऑनलाइन वेबिनार का आयोजन किया गया। भाकृअनुप–सीफेट, लुधियाना ने तीन दिवसीय कृषि प्रसंस्करण पर उद्योग इंटरफेस मेला–2023 का अपने स्थापना दिवस के उपलक्ष्य में आयोजन किया। वर्ष के दौरान राष्ट्रीय और अंतर्राष्ट्रीय जरनल में 57 से अधिक शोध पत्र प्रकाशित हुए।

संस्थान के अन्य प्रमुख प्रकाशनों में प्याज के भंडारण जीवन को बढ़ाने के लिए भाकृअनुप द्वारा विकसित तकनीक, प्रसंस्करण प्रगति–अर्धवार्षिक राजभाषा पत्रिका (जनवरी से जून, 2023), वर्ष 7 अंक 1, प्रसंस्करण प्रगति–अर्धवार्षिक राजभाषा पत्रिका (जुलाई–दिसंबर, 2023) वर्ष 7 अंक 2 पर पत्रिकाएं शामिल हैं। कृषि–प्रसंस्करण को बढ़ावा देने के लिए फसल कटाई के बाद की प्रौद्योगिकियों पर आधारित पुस्तिका तथा एससीएसपी योजना के तहत 'पोषण सुरक्षा के लिए अनाज और बाजरा का मूल्य संवर्धन', 'कृषि उपज का कटाई उपरांत प्रबंधन', 'कृषि और पशुधन उपज का खाद्य प्रसंस्करण, पैकेजिंग और मूल्य संवर्धन', 'श्री अन्न के प्राथमिक प्रसंस्करण' और मूल्य संवर्धन पर कौशल विकास' इत्यादि प्रशिक्षण पुस्तिकाएं प्रकाशित की गई।

Executive Summary

ICAR-CIPHET is a premier institute in the country with a mandate to undertake research activities in post-harvest engineering and technology. During 2023, the institute continued to play a significant role in developing innovative technologies, methodologies related to post-harvest processing and quality management and further transferring these technologies to respective stakeholders such as farmers, entrepreneurs and industries through technology licensing, trainings, capacity building and extension activities. Institute has contributed through its various multidisciplinary in-house and externally funded research projects; the institute has developed innovative solutions for the problems posed by various stakeholders. The salient achievements of ICAR-CIPHET during the year 2023 are summarized here:

Machines/Equipment Developed

Table-Top Vacuum Frying System

In order to mitigate the adverse effects associated with traditional deep-fat frying methods, and for producing nutritious and innovative snacks with improved quality characteristics, a table-top vacuum frying system has been developed to cater the needs of small restaurants and fast-food chains. It consists of frying vessel, frying basket, control panel, vacuum pump, condenser, outlet, and pressure gauge. The capacity of vacuum fryer is 9-12 litre and can fry minimum of 100 grams of food material.

On-Farm Maize Cob Drying System

To get high-quality dried maize, ICAR-CIPHET in collaboration with ICAR-IIMR, Ludhiana, has developed on-farm maize cob drying system of 1 ton capacity. It utilizes forced natural air and solar energy to dry maize cobs. The developed system can be folded and thus, is easy to handle, and cost-effective. The system has been evaluated for drying kharif harvested maize, which at 36 % moisture content was dried up to 17 % (w.b.) in eleven days.

Development and Evaluation of Prototypes of Mechanical and Infrared-Based Pre-Processing System for Millet Processing

To overcome the less milling yield during traditional millet milling, ICAR-CIPHET, Ludhiana has developed two prototypes of pre-processing systems. One is of mechanical type and other uses the infrared light. The mechanical system is a screw pitch type arrangement with capacity of 5 kg/h while the infrared light type pre-processing system is a batch type unit of 500 g capacity.

Processes/Protocols/Studies

Process Protocol for Biological Production of Vinegar Using Syrup Waste from Osmotic-Dehydration of Aonla

During osmotic dehydration of fruits, large amount of sugar syrup is produced as a waste. To utilize it, and to convert it in some useful by product, a process protocol for vinegar production has been standardized. It is found that with use of optimized process conditions, from one litre of spent syrup about three litres of vinegar (5.5% acetic acid), could be produced.

Isolation and Identification of Bacterial Isolate Showing Production of PHB from Mango-By Products

Mango processing by-products namely, mango peels and kernels, discarded as a waste, were used for growing PolyHydroxyButyrate (PHB) producing bacteria. Among the seven selected bacterial isolates, PHB3, which showed more production of PolyHydroxyButyrate (PHB) on mango by products, was further identified using molecular techniques. The bacterial isolate, was identified as *Bacillus velezensis* strain PHB3, and it could be utilized for PHB production from mango by products.

Process Optimization for Enhanced Laccase Enzyme Production in *Trametes Versicolor* Through Machine Learning Approach

De-oiled rice bran (DORB), a rich source of lignin content, was used as a substrate to produce Laccase enzyme using solid state fermentation. A genetic algorithm (GA) and connected neural network (CNN) based optimization approach was used for enhanced laccase enzyme production in

Trametes versicolor, using DORB as a substrate under solid state fermentation conditions. This approach led to 5.19-fold increase in laccase enzyme production (865.18 U gds^{-1}) on 10^{th} day with substrate to moisture ratio 1:1.5, and substrate amount 13.3 g.

Process Protocol Using Rubber Roll Sheller for Dehulling of Kodo Millet

A study has been conducted for kodo millet dehulling using rubber roll sheller. The study optimized the process variables for dehulling efficiency, grain recovery, and broken percentage. It has been observed that moisture content of 9 %, differential speed of 1:1.35 and clearance space of 0.75 mm gave the maximum dehulling efficiency of 76.68 %, with grain recovery of 53.60 %, with reduced broken of 8.05 % for Kodo millets.

Process Optimization of Impact Type Polisher for Kodo Millet

Kodo is a difficult to dehull millet and having multilayer husk on it. Currently, the commercial polishing of Kodo millet is done on rice polishing machines which yields low-quality polished grains with broken grains up to 30 %. The present study used impact-type polisher for polishing Kodo grain. The polisher gave head rice recovery of 57.92 % which is quiet high as compared to commercially used polishers (47%).

Insect Disinfestation using Microwaves and its Effect on Milling in Kodo Millet

Among the minor millets, Kodo millet (*Paspalum scrobiculatum*) is one of the popular species. With popularization of millets and more attention towards their production, storage is also of paramount importance. Present study assessed the effect of microwave exposure on one of the commonest storage insects, *Tribolium castaneum*. Microwave exposure at 50 and 60s showed the complete mortality (100%) of *T. castaneum* adults. Further, it was found that microwave treatment did not affect the millet milling efficiency and thus is could be used as non-chemical-based insect disinfestation technique.

Process Standardization for Disinfestation of Major Legumes with Use of Batch Type Microwave System

The use of microwaves for killing insects is based on the dielectric heating of insects present in grain, which is a relatively poor conductor of electricity. Process parameters (surface moisture addition and conditioning time and exposure time) have been optimized for the disinfestation of major legumes like Bengal gram, Red gram, Green gram and Black gram against bruchids, using batch type domestic microwave system.

Process Standardization for Disinfestation of Major Legumes with Use of Continuous Type Microwave System

Continuous microwave-based treating system (consisting of 2 magnetrons and a belt length of 120 cm) available at PAU, Ludhiana, having capacity of 10 kg/h was used for disinfestation of green gram against bruchids. It was found that 100% mortality of bruchids could be achieved at a belt speed of 50, moisture of 7.73% and a power level of 1080W.

Novel Botanical Formulation Tablets for Insect Management in Storage

This study explored an alternative approach to insect management in grain storage by investigating the efficacy of botanical options. The herbal tablets impregnated with mustard based chemical formulations were tested against Khapra beetle, Rust red grain beetle, Lesser Grain Borer, Pulse Beetle and Flat Grain Beetle, in a lab study using a 100 ml glass and 20 insects were released. These tablets showed quick and complete effectiveness by recording 100% mortality after 20 minutes, only.

Process Standardization for Improved Head Rice Recovery from Long Grain Paddy

Process parameters for soaking, steaming and drying of parboiling process have been standardized to achieve higher head rice recovery without compromising the quality of milled rice. The results revealed that soaking at 65 °C for 4h, steaming at 1.0 kg/cm^2 for 5 minutes followed by shade drying to achieve 12 % moisture resulted in the head rice recovery of 62 %.

Process Protocol for Development of Millet-Based Gluten Free Muffins Using Hydrocolloid

Gluten, present in certain cereals namely, wheat,

rye and barley, poses risk to persons suffering from celiac disease. These celiac patients suffer with food restrictions and reduced diversification of their diet by lack of choices of gluten free foods, especially bakery products. The present study optimized the use of xanthan gum, a hydrocolloid, at a level of 0.4g per 100g for preparing gluten free muffins from barnyard millet and foxtail millet, on the basis of organoleptic acceptability and other quality attributes.

Characterization of Selected Pseudo Cereals and Millets for Physicochemical and Antioxidant Potential

The present study assessed the effect of dehulling on proximate composition, total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity (measured by DPPH and FRAP) of different fractions (whole grains, kernels, and hull) in selected millets i.e. kodo millet (KM), barnyard millet (B), and foxtail millet (F) and pseudo cereals buckwheat (BW) and quinoa (Q). Different millets fractions (W, H & K) showed variable dietary fibre content ranging from 3.53% to 28.30%, 10.09% to 81.71%, and 2.70% to 5.72%, respectively and the carbohydrate content W, H, and K varied from 56.18% to 75.70%, 9.35% to 72.72%, and 67.94% to 81.27%, respectively.

Utilization of Peanut Okara in Peanut Butter

Peanut okara, a byproduct of peanut processing industry, being rich in fibre and protein could be utilized for development of healthy and nutritious products. In order to develop fibre and protein rich butter, process for preparation of peanut butter with 15 percent okara substitution has been optimized. The optimized peanut butter showed an acid value of 2.82 and L, a, b colour value of 46, 14 and 40. The developed product had low water activity of 0.17 and showed viscoelastic nature.

Development of Database for Post-Harvest Machineries & Technologies

ICAR-CIPHET has developed a database for processing machines, technologies, processes and products developed by NARES institutions and private organizations. The database is primarily divided into Processing machine technologies and products/process technologies for different categories of agricultural produce. The major crop categories are cereals, pulses, oil seeds, millets, spices, fruits, vegetables, commercial crops, plantation crops, livestock produce, medicinal & aromatic, tuber crops.

Empowering KVK Specialists in Agro-Processing through Training Program

Empowering KVK Specialists, five training programmes were organized covering 65 participants from 58 KVKs from eight states under ATARI Zone III – IX (except Zone VII), emphasizing different models of agro-processing suiting geographical, social, and economic needs of other regions. The feedback from the participants was collected using Kirkpatrick's four-level model framework to evaluate the organized training programs.

Comprehensive Frameworks for Impact Assessment of Selected Technologies

Comprehensive frameworks provide a structured approach to assess the impact of diverse technologies on different stakeholders, offering valuable insights for decision-making and policy formulation. A systematic analysis of Agro-Processing Centers of trans-Gangetic plains revealed that an APC can be established at an average cost of Rs. 20.91 lakh with generation of employment for atleast 5 persons.

Collaborative/Externally Funded Projects

Sensor-Based System for Tracking the Environmental Conditions of Banana in Supply Chain

Sensor-based system is developed for monitoring the environmental conditions during transportation, storage, ripening stages of supply chain of Banana. This system is also capable of monitoring the ethylene to manage excessive ripening in ripening chambers and storage areas. The system is tested for temperature, RH recording and location tracking of vehicles.

ICAR-CIPHET Visible Light Insect Trap

ICAR-CIPHET has developed a visible light trap with efficient attraction capacity in comparison to UV based traps and has no exposure hazards regardless of the type of grain stored. It can capture insect species like *Rhyzopertha dominica*,

Lasioderma serricorne, *Cadra cautella*, *Sitotroga cerealella*, *Tribolium castaneum*, and *Laemophloeus* spp. with the attraction efficiency from 65-93%, depending upon the insects, wherein highest attraction (93%) has been reported in *Sitotroga cerealella*. Further, LED based traps (made up of stainless steel) have also been developed, which uses photo tactic behavioural responses of insects.

Development of HPLC Based Method for Quantification of Beta Carotene from Banganapalli Mango Pulp and Peel

Beta-carotene is a group of pigments that are responsible for the orange, yellow, and red colours in many fruits and vegetables. For quantification of beta-carotene in the mango pulp and peel, HPLC based method has been developed. The quantification of beta carotene was carried out using HPLC Agilent 1260 Infinity system with a quaternary pump. It was separated using a linear gradient elution of methanol and methyl-tert-butyl ether solvents.

Influence of Cultivar, Harvesting Time and Storage Duration on the Physio-Chemical Properties of Naturally Ripened Mangoes

This study aimed to determine the best harvesting/maturity stage and storage duration in terms of optimal ripeness with good quality characteristics of two important mango cultivars *i.e.*, Dashehri and Banganapalli. The physiological weight loss (%), colour values, total soluble solids and peel hardness were measured. These maturity indicators could be useful in making reliable and informed decision about optimal maturity stage and storage period for the mangoes.

Effect of Fermentation on the Physicochemical Attributes of Two Soybean Varieties

Two varieties of soybean *viz.* small seeds (Local variety; LV) and big seeds (JS335) were used for the preparation of *hawaijar,* a traditional fermented product from Manipur. Effect of fermentation on physicochemical attributes revealed increase in phenolic and flavonoid content while decrease in hardness and phytic acid content was observed. The study showed fermentation is an effective method for enhancing the nutritional profile of soybeans.

Development of RGB-D Module for Detection and Localization of Apple Fruits

RGB-D module has been developed with user interface to extract depth information of RGB-D frames acquired from RGB-depth imaging sensor. The developed vision system can identify apples within its range in an outdoor orchard environment. Leveraging deep learning techniques, the system not only identifies apples occluded by the branches of a tree, but also is capable to recognize and categorize obstacles, including leaves and branches, enabling it to calculate the optimal trajectory for extracting the apples.

Creation of Image Corpus

A dataset of apple fruits images, videos, text files has been developed for object detection in the complex lighting environment of high-density orchards in Kashmir. It has data of two apple varieties *viz.* Red Velox and Red Gala with their data set of 1.2 TB and 300Gb, respectively. This dataset offers more pixel information and higher imaging quality, as well as with depth information.

Identification of Parasitoids Against Pulse Beetle

The natural parasitoid infestation on pulse beetle culture was observed and the efforts were made for their identification. With the support of ICAR-NBAIR, Bengaluru, the parasitoids identified as *Anisopteromalus calandrae*, which is a tiny wasp belonging to the Pteromalidae family, and it has shown a remarkable ability to parasitize eggs and larvae of pulse beetles.

Machineries/Processes/Products Developed by AICRP-PHET

The AICRP on Post-Harvest Engineering and Technology (PHET) has developed various machines, products and process protocols. A few of machines include Mahua stamen remover, dehumidification unit and pneumatic aspirator for modern jaggery plant, vacuum assisted ohmic heating system, neem fruit depulper, thresher for grain amaranthus, onion spoilage detection device etc. Process protocols for the preparation of hill lemon and apple juice blended *RTS* beverage, *comminuted hill lemon fruit juice RTS beverage , hill*

lemon peel supplemented cookies, functional probiotic pork spread, jaggery based kulfi have been developed. A method for non-chemical disinfestation using Radio Frequency system for storing dried turmeric rhizomes has also been optimized.

Machineries/Processes/Products Developed by AICRP-PEASEM

Some of the major developments made by AICRP on Plastic Engineering in Agriculture Structures & Environment Management (PEASEM) includes aquaponics system under a polyhouse structure, plant factory using artificial light, an indigenous soil moisture sensor for real-time irrigation scheduling, vermi-composting unit, agri voltaic greenhouse system, and plastic check dam for water management in hilly and semi-arid regions, etc.

Machinery/Process Developed by CRP on SA

The CRP on secondary agriculture (SA) has undertaken fabrication of mechanical makhana seed collection system, optimization of process parameters for extraction of hesperidin and pectin from immature droppings of Kinnow fruits.

Other Professional Achievements

Our scientists are conferred with many awards and honours (including oral/poster presentation award) in recognition of their contributions in research and development in post-harvest sector. Our scientists are also members of various committees and scientific panels. Eight (08) technologies were licensed during 2023 which include process for preparation of fat free flavoured makhana, process technology for preparation of rice bran protein, mechanized system for primary roasting of raw makhana seeds and process thereof, mechanized system for popping and decortications of makhana seeds, groundnut based flavoured beverage, curd and paneer, buckwheat dehuller, pearl millet based composite extrudates, process for preparation of maize based gluten free muffins. Sale of produce, training fee, food testing fee and technology licensing etc. led to generation of net revenue of 75 lakh during the year. Two (02) patents were granted and one (01) patent was filed during the reported period.

The Post-Harvest Machinery and Equipment Testing Centre (PHMETC) tested 69 machines from different parts of the country, earning a total revenue of Rs. 87 lakh. During the reported period, various entrepreneurship development programmes, human resource development programmes, farmer's training, student's trainings etc. were organized under different schemes. More than 2000 stakeholders from different places were trained for post-harvest management of agricultural and livestock produce through entrepreneurship development programs (EDP), farmers' trainings, and sensitization programmes. Under 'Azadi Ka Amrit Mahotsav', ICAR-CIPHET has organised various programmes; e.g. 'Online Webinar on 3D Printing in Food', 'Orientation Program cum Exposure Visit for School Students', and 'Online Webinar on Millet Processing and Value Addition'. ICAR-CIPHET, Ludhiana has also organized industry Interface Fair on Agro processing and Kisan Mela – 2023 to commemorate its foundation day. 57 research papers were published in high quality national and international peer reviewed journals.

Other major publications of the institute include magazines on 'Technologies developed by ICAR to extend storage life of onions' प्रसंस्करण प्रगति, अर्धवार्षिक राजभाषा पत्रिका, वर्ष 7 अंक 1, प्रसंस्करण प्रगति, अर्धवार्षिक राजभाषा पत्रिका, वर्ष 7 अंक 2, training manuals on 'Post-harvest technologies for promoting agro-processing (For KVK's in ATARI Zone – III-VI)', 'Value Addition of Cereals and Millets for Nutritional Security', 'Post-Harvest Management of Agricultural Produce', 'Food Processing, Packaging and Value Addition of Agricultural and Livestock Produce', 'Skill Development Training on Primary Processing and Value Addition of Millets under SCSP scheme (GoI)'.


ICAR CIPHET
Estd 1989

VISION

- Achieving near zero post-harvest losses and high level of processing of agricultural commodities through excellence in research

MISSION

- Evolving efficient post-harvest engineering and technological interventions to enhance farmers income by transforming farmers and rural youth into entrepreneurs, providing products with quality and safety assurance to consumers, addressing environmental protection issues as well as acting as referral point for policy inputs, defining standards and networking with sister organizations to harness synergies for solving problems in post-harvest sector

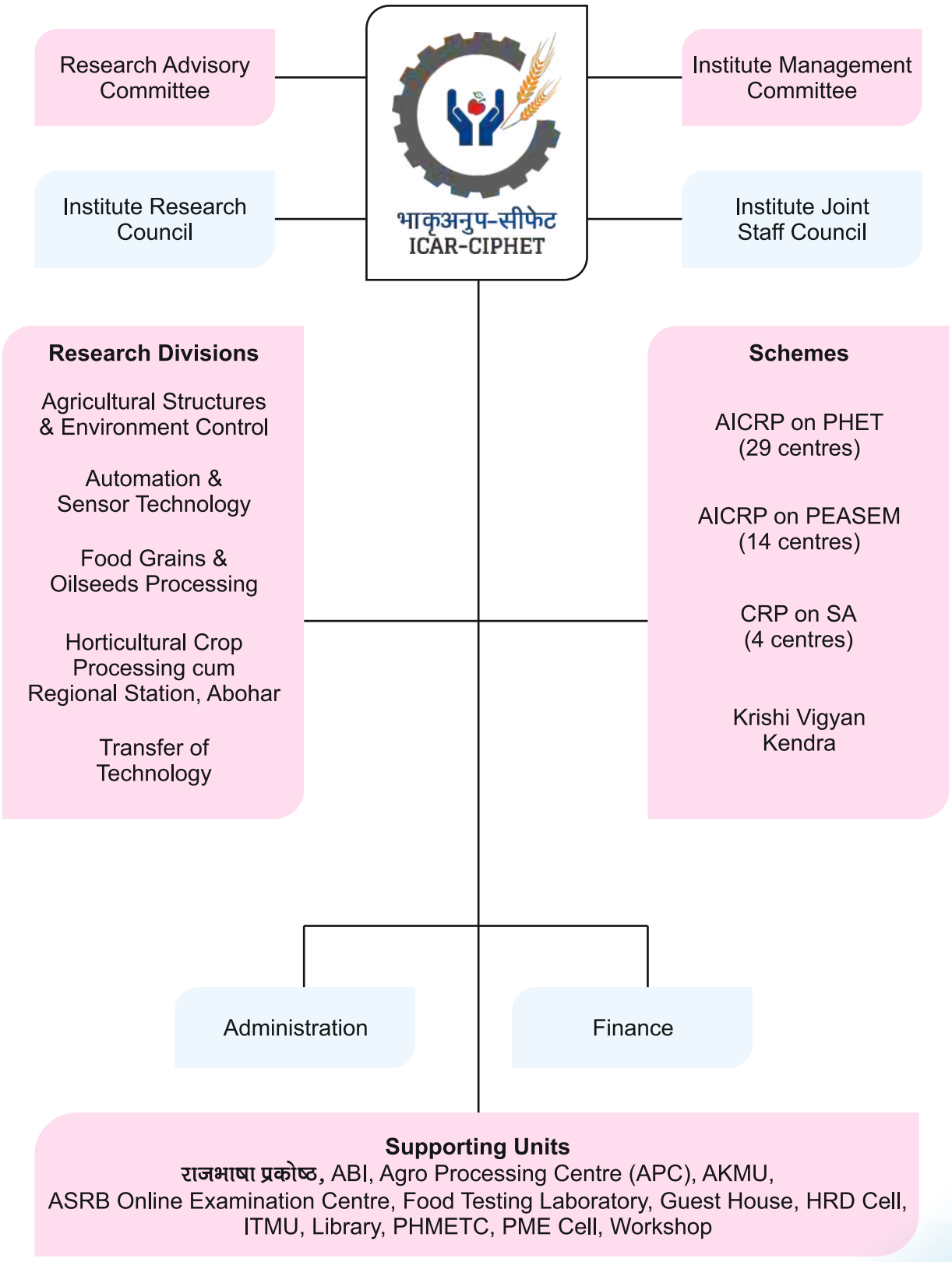
- Higher profitability of agricultural production systems ensuring better income to farmers and increased employment opportunities in rural sector through efficient post-harvest engineering and technological interventions for loss reduction and value addition to agricultural produce and by-products resulting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

MANDATE

- Research for solving problems and identifying technologies related to post-harvest loss assessment and prevention, processing, value addition and storage of agricultural, horticultural, livestock and aquaculture produce targeted to achieve food safety and quality assurance

- Human resource and entrepreneurship development in post-harvest engineering and technology

ORGANOGRAM


Research Advisory Committee
Institute Research Council
भाकृअनुप-सीफेट
ICAR-CIPHET
Institute Management Committee
Institute Joint Staff Council
Research Divisions
Agricultural Structures & Environment Control
Automation & Sensor Technology
Food Grains & Oilseeds Processing
Horticultural Crop Processing cum Regional Station, Abohar
Transfer of Technology
Schemes
AICRP on PHET (29 centres)
AICRP on PEASEM (14 centres)
CRP on SA (4 centres)
Krishi Vigyan Kendra
Administration
Finance
Supporting Units
राजभाषा प्रकोष्ठ, ABI, Agro Processing Centre (APC), AKMU, ASRB Online Examination Centre, Food Testing Laboratory, Guest House, HRD Cell, ITMU, Library, PHMETC, PME Cell, Workshop

Overview

ICAR-Central Institute of Post-Harvest Engineering and Technology (ICAR-CIPHET) was established on 03 October 1989, Ludhiana, Punjab. It is a nodal institute that undertakes lead research in the post-harvest engineering and value addition technologies appropriate to agricultural production catchments and agroprocessing industries. Another campus of the Institute was established on 19 March 1993 at Abohar, Punjab, to primarily undertake research and development activities for processing and value addition of fruits, vegetables, and horticultural crops. ICAR-CIPHET is also headquarter of two All India Coordinated Research Projects (AICRPs) *viz*. AICRP on Post-Harvest Engineering and Technology (PHET) with 29 Centres and AICRP on Plastic Engineering in Agriculture Structures & Environment Management (PEASEM) with 14 Centres across the country. ICAR-CIPHET is the only institute in India which works entirely for applied post-harvest technology and value addition of all commodities for farmers, orchardists, rural youth, and entrepreneurs directly as well as generates basic knowledge by taking various basic and strategic research projects in the 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 cum Regional Station, Abohar
5. Transfer of Technology

The institute has developed more than 100 technologies including several equipment for food processing, structures for safe handling and shelf-life enhancement of farm produce, process protocols for value added products, novel products and technologies for farmers and processors. Out of theses developed technologies, 87 technologies have been licensed/ commercialized to about 167 entrepreneurs/end users.

The technologies developed by ICAR-CIPHET helped the farming community in reducing post-harvest losses, value addition to the farm produce, development of functional foods and food safety through interventions in the arena of protected cultivation, threshing, milling, processing, improved storage, preservation, non-destructive quality evaluation, enhancement of shelf life for crops and livestock produce and by-product utilization. These technologies have helped the relevant stakeholders in augmenting the income and generating employment in rural areas. ICAR-CIPHET has so far filed 65 patents out of which 28 have been granted. The institute also has, Agri-Business Incubation Centre, and Post- Harvest Machinery and Equipment Testing Centre.

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

The All India Coordinated Research Project on Post-Harvest Engineering and Technology was launched by the Indian Council of Agricultural Research in September 1972. The Project is currently operating at 29 centres covering almost all the states and agro-climatic zones of the country. The aim is to develop location and crop specific post-harvest technologies and equipment to minimize quantitative and qualitative post-harvest losses and to produce value added products from agricultural crops including livestock and their by-products. The major activities are:

(i) Adoption / development of equipment / technologies for reduction in post-harvest losses during critical post-harvest stages / operations

(ii) Development of need based agro processing centres (APCs) in different production catchments for income augmentation and employment generation

(iii) Value added products from agricultural crops/commodities

(iv) Prototype development and process refinement with a view to develop complete packages for post-harvest utilization of crops/commodities and their by-products

(v) 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)

AICRP on Plastic Engineering in Agriculture Structures & Environment Management (PEASEM) became operational in the year 1988 by the name of AICRP on Application of Plastics in Agriculture (APA). The project is operative at 14 centers including six ICAR Institutes, seven State Agricultural Universities (SAUs) and one Central Agricultural University (CAU). The project has contributed in the development and modification of plasticulture technology in the area of water harvesting and management, surface cover cultivation, irrigation systems, plastic mulching, animal shelters, aquaculture technology and use of plastics in farm tools, machinery, post-harvest handling and packaging processes. The project has very good impact on farmers field particularly due to enhanced income per unit area of land and substantial saving of inputs like water, fertilizer and manpower.

Consortia Research Platform on Secondary Agriculture (CRP on SA)

The Consortia Research Platform Project on Secondary Agriculture started in a project mode in 2015 with limited budget released in October 2015. The project is currently operating with its 4 centres in other states. The project aimed to utilize the whole biomass generated from agricultural production for processing and value addition with objectives of maximizing the income generation and minimizing wastage for achieving better quality of life and cleaner environment. The scheme has developed and established pilot plants for Makhana, developed and licensed numerous value-added products and also established APC units.

INFRASTRUCTURE

Workshop

Both ICAR-CIPHET, Ludhiana and Abohar campus have separate workshop facilities which are used to manage fabrication and modification of post-harvest machineries, designed, and developed under different research projects. The workshops also extend service support to repair and maintenance of institute facilities/ work etc. from time to time.

Workshops have machines/ equipment such as lathe machines, drilling machines, gas welding sets, arc welding sets, sheet bending machines etc. to deliver their services. Besides this, various measuring instruments are also available in the workshops, which are useful in day-to-day research work.

Library

ICAR- CIPHET library plays an important role and act 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. ICAR-CIPHET has enrolled itself for Institutional Membership (IM-35) with the Indian Society of Agricultural Engineering. The number of books purchased from Jan-Dec 2023 is 85. Hence, during the reported year, the total number of books and standards in the library are 5401. The library as a member of consortium for e-Resources in Agriculture (CeRA) is getting access to online full text journals and e-books. In addition of these, several national and international serial, publications, annual reports, newsletters and research bulletins have been received on gratis and are available to the readers.

Agricultural Knowledge Management Unit (AKMU)

AKMU of the institute helps in providing a necessary assistance in electronic communications and IT related management & software (data analysis) solutions. The AKMU owns a number of analysis and design software such as Corel Draw Graphic Suite Software, Adobe Photoshop CS6 Software, Adobe Premier Pro Software (Creative Cloud Full Suite), MATLAB Software, MS-OFFICE Software, Design Expert Software, Google Hindi Input tools etc. and Upgrade Nebero Internet Management Solution software and Escan Total Security Suite for Business Anti-Virus (*via* Server/Network). The unit provides assistance to scientists and staff in data analysis, internet connectivity, online meeting arrangements, aadhar based biometric attendance system and electronic/ telecommunication. AKMU is also providing support to administration for the integration of service books of employees within ICAR's eHRMS software. AKMU also provides and maintains the facility of Wi-Fi in the institute as well as in the residential colonies. ICAR-CIPHET's Bilingual English & Hindi (Dynamic) Website (https://ciphet.icar.gov.in) is live and fully operational at ICAR-Data Center. The website has integrated SBI payment options to making easy and convenient transactions by the users. This year our Institute has received award "Standardization Testing and Quality Certification (STQC)" for the ICAR-CIPHET website as per Guidelines for Indian Government Websites (GIGW). AKMU has successfully renewed the Secure Sockets Layer (SSL) certificate for the domain "icar.gov.in." This SSL certificate renewal ensures the continued security and encryption of data transmitted *via* the website, guaranteeing the privacy and integrity of online interactions with ICAR's web resources.

itQcr

Empanelled Testing Laboratory
by Standardization Testing and Quality Certification (STQC)
Ministry of Electronics and Information Technology
Government of India

Ref No: ITQCR/GIGW/2023/03/WT/482/WQC Date: September 29, 2023

Website Quality and Accessibility Compliance Statement

It is hereby declared that the website of "ICAR-Central Institute of Post-Harvest Engineering and Technology, Ministry of Agriculture and Farmers Welfare, Government of India", Office address: Back Side of Radha Soami Satsang Ghar, Opposite Pratap Singh Wala, Humbran Road, Ludhiana, Punjab, India – 141008 live at URL: https://ciphet.icar.gov.in has been tested, audited and evaluated based on GIGW 2.0.

It is stated that the website conforms and complies** with all 68 quality requirements# of "Guidelines for Indian Government Websites 2.0 (GIGW 2018) as on date September 29, 2023."

Recommendation: It is recommended to conduct proactive assessment periodically, and ensure any new changes introduced on the application should undergo a GIGW assessment.

ITQCR

(Dr. Ashutosh)
Head-ITQCR

**GIGW 2.0 Compliance is subject to a valid security certificate.
04 requirements are found "Not Applicable" as per Annexure-A.
√ This compliance status can also verified at www.itqcr.com

C-202, Infotech Park, Tower no-8, CBD Belapur, Navi Mumbai-400614 (Maharashtra) INDIA
Email: info@itqcr.com; website: www.itqcr.com ; Phone: +91-22-46077354; 2756-6409; 2756-6410.

Guest House

Both Ludhiana and Abohar campus have Guest house facilities for providing the accommodation to ICAR/SAUs/Government employees and farmers. One International Training Centre with 08 AC-rooms and dininghall with kitchen is also available at Ludhiana campus.

Agro Processing Centre (APC)

Agro-processing centre is generally used to process the agricultural produce in production catchment with a view to enhance employment and income opportunities in rural areas. At ICAR-CIPHET, modest agro-processing centre has been established for processing of black gram, green gram, black pepper, turmeric, coriander etc. The processed products are being regularly sold to customers in and around ICAR-CIPHET. Besides, the APC facilities are also used to impart training to potential small rural entrepreneurs.

Institute Technology Management Unit (ITMU)

The Institute Technology Management Unit is responsible for Intellectual Property (IP) Protection, Management and Transfer/Commercialization of technologies developed by the Institute. ITMU plays a crucial role in the management of technologies. The role of ITMU is to encourage and accelerate the efforts towards development of technologies in the field of post-harvest management and to facilitate the transformation of ideas, inventions and technologies developed by the Institute into commercial ventures to serve the society. ITMU since its inception has been involved in protection, management and commercialization of Intellectual property generated by the institute. A total of 65 patent applications have been filed through ITMU so far, out of which 28 patents have been granted. Regular and sturdy efforts of ITMU lead to commercialization of 87 technologies developed by ICAR-CIPHET.

Agri-Business Incubation (ABI)

The Agri-Business Incubation Centers of ICAR support farmers, entrepreneurs, and young unemployed individuals by generating new technologies and machinery. They pave the way for accessing the latest agricultural technologies and offer tailored, need-based services. The ABI Center extends its services to farmers, entrepreneurs, unemployed youth, and women entrepreneurs, as well as small and medium-scale industries. This facilitates the utilization of ICAR-CIPHET developed agro-based technologies for income generation and employment opportunities.

Post-Harvest Machinery & Equipment Testing Centre (PHMETC)

The Post-Harvest Machinery and Equipment Testing Centre (PHMETC), ICAR-CIPHET, Ludhiana holds approval from Mechanization and Technology Division, Department of Agriculture & Cooperation, Ministry of Agriculture and Farmers' Welfare, Govt. of India, New Delhi. It is authorized to conduct tests on various post-harvest equipment and machinery, ensuring the supply of high-quality post-harvest equipment and machinery from manufacturers to end-users. The establishment of PHMETC at ICAR-CIPHET, Ludhiana, Punjab, serves the purpose of providing a platform and instilling confidence in manufacturers, buyers, and entrepreneurs engaged in post-harvest technology related machinery and equipment. PHMETC at ICAR-CIPHET conducts testing on all machines associated with the processing of agricultural and allied products.

Staff Position (as on 31 Dec 2023)

ICAR-CIPHET, Ludhiana

Category	Sanctioned Strength	Filled	Vacant
Director (RMP Post)	1	1	--
Scientific	65	34	31
Administrative	37	15	22
Technical	31	17	14
Supporting	2	1	1
Total	**136**	**67**	**69**

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	--
Total	**25**	**13**	**12**

KVK, Fazilka, Abohar

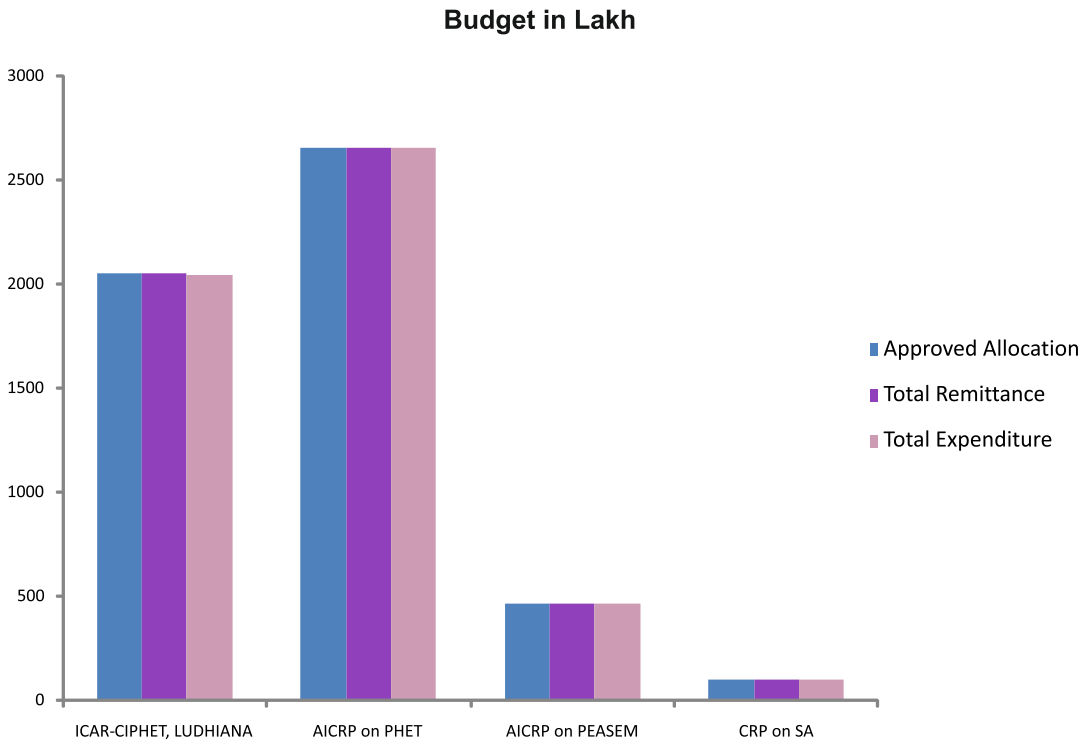
Category	Sanctioned Strength	Filled	Vacant
Programme Coordinator /Senior Scientist & Head	1	1	--
Subject Matter Specialist/T-6	6	1	5
Farm Manager/T-4	1	--	1
Program Assistant (Computer)/ T-4	1	--	1
Program Assistant (Lab. Tech.)/ T -4	1	--	1
Assistant	1	--	1
Stenographer Grade-III	1	--	1
Driver	2	--	2
Skilled Support Staff	2	--	2
Total	**16**	**2**	**14**

Budget (Rs. in lakh)

Plan BE/RE (2023-24)

(as on December 31, 2023)

Scheme	Approved Allocation	Total Remittance	Total Expenditure	% Utilization with respect to remittance
ICAR-CIPHET	2051.74	2051.74	2051.36	99.98
AICRP on PHET	2657.24	2657.24	2657.22	100.00
AICRP on PEASEM	466.45	466.45	466.00	99.90
CRP on SA	106.55	106.55	106.48	99.94



Revenue Generation

Scheme	Financial Year	Revenue Generated
ICAR-CIPHET	**2023-24**	74.77

Note: The Financial Year is from April to March (2023-2024)

RESEARCH HIGHLIGHTS

1.1 Machines/Equipment Developed

1.1.1 Table-top Vacuum Frying System

The escalating demand for fried foods due to the rise of fast-food establishments and online food deliveries along with consumer demand for healthy food has underscored the necessity for efficient, small-scale and a viable alternative to conventional deep frying. The vacuum frying process has gained significant attention as a means to mitigate the adverse effects associated with traditional deep-fat frying methods. This technology has been identified, particularly for producing nutritious and innovative snacks with improved quality attributes. Notable benefits include reduced oil absorption, lower acrylamide content (a carcinogenic compound), and preservation of typical fried food texture. Consequently, a table-top vacuum fryer has been developed. The table-top vacuum frying system has been designed (Fig. 1) to fulfil the criteria of compactness and minimal frying medium usage, aligning with the needs of small restaurants and fast-food chains. The system comprises the key components *viz.* frying vessel, frying basket, control panel, vacuum pump, condenser, outlet, and pressure gauge**.** It is equipped with electric immersion heating coil for oil heating. The capacity of the vacuum fryer is 9-12 litres. However, minimum of 100 grams of food material can be fried. The control panel enables precise temperature and vacuum level control during frying. A vacuum pump generates and maintains the desired vacuum levels for frying. Water-recirculating condenser, efficiently separates condensates from the frying chamber, preventing their entry into the vacuum pump. A gauge has been used to monitor the vacuum levels throughout the frying operation. The vacuum frying system is made up of SS 304 material with dimensions of 915×483×1143 mm. The developed system was evaluated for its performance by frying potato fries, using the system at 7.99 KPa absolute pressure and 115°C temperature at 7.5 minutes. Vacuum fried potato fries exhibited reduced fat absorption (20%), improved color (L; 54.85, a; -1.81, and b; 30.95) and texture (Hardness; 175.38, Chewiness; 132.06 and Gumminess; 1427.43) in comparison to conventionally fried potato fries.

Fig. 1. Table-top Vacuum Frying System

1.1.2 On-Farm Maize Cob Drying System

Maize is an important crop for millions of people worldwide, serving as a staple food. However, farmers often struggle to dry their maize crops effectively and efficiently, particularly in the Kharif harvesting season with high humidity or wet weather conditions, which increases the risk of mould growth, specifically *Aspergillus flavus* which produces aflatoxins. To address this issue and to get high-quality dried maize, ICAR-CIPHET in collaboration with ICAR-IIMR, Ludhiana, has developed on-farm maize cob drying system of 1 tonne capacity (Fig. 2) that utilizes forced natural air and solar energy to dry maize cobs (Fig. 3). The on-farm maize cob drying system has been designed and developed in such a way to make it foldable, easy to handle, and cost-effective. The system consists of a frame made of mild steel and fibre-reinforced plastic (FRP) with a flexible UV-stabilized transparent plastic sheet as a tapered roof and a UV-stabilized black-silver sheets as side walls. It is supported with pipes and fittings to accommodate the cobs. The drying platform is made of a customized thick (thickness: 5 mm) FRP sheet with perforations arranged in a circular hole (diameter: 25 mm) pattern to support the maize cobs. A centrifugal fan is installed for uniform drying of the maize cobs. The overall dimensions (L × W × H) of the developed system are 2.44 × 1.22 × 0.81 m. The ground clearance in the system is 15 cm. After folding, the dimensions are 1.22 × 1.22 × 0.20 m and weight of the system is around 80 kg. The developed system has been evaluated with kharif harvested maize and during experiment period,

environmental temperature and relative humidity, were in the range of 17.9°C to 30.8°C and 48% to 89%, respectively. A batch of 1 ton of maize cob at 36 % moisture content has been dried upto 17 % (w.b.) in eleven days consuming 0.183 kWh energy. The developed system can be operated by solar energy. Laboratory studies revealed that no mould growth was observed on the grain samples.

Fig. 2. On-farm Maize Cob Drying System

Fig. 3. Drying of Maize Cobs

1.1.3 Development and Evaluation of Mechanical and Infrared-based Pre-processing System for Millet Processing

The existing pre-treatment for millet milling is parboiling which yields less recovery i.e., 47%, leading to post-harvest losses and is also not widely adopted. To overcome this problem, ICAR-CIPHET, Ludhiana has developed two prototypes of pre-processing systems, i.e., one is of mechanical type and other with the use of infrared light. The mechanical system is a screw pitch type arrangement (capacity: 5 kg/h) for developing scratches on millet hulls by passing millets through the clearance. A 1 hp DC electric motor drives the system with varying speed for processing all millets (Fig. 4). The millet grains to be pre-processed are fed from a hopper. In this pre-processing step, Kodo millet were passed before dehulling using varying shaft speeds (250, 350, 450 rpm) and moisture content (6 - 12 %, w.b.) and the effects of these pre-treatments on the dehulling process were evaluated in terms of dehulling efficiency, grain recovery, and broken percentage under the optimized conditions of rubber roll sheller for millet dehulling (9 % moisture content, 1:1.35 differential speed and 0.75 mm clearance space for Kodo millet processing). With and without this pre-treatment, the dehulling efficiency, recovery, and broken were 92.75 %, 62.23 %, and 3.92% and 76.68 %, 52.57 %, and 8.05%, respectively. The use of this system led to an improved recovery of kodo millet grains (10%) with use of shaft speed of 250 rpm and moisture content of 9% (w.b.).This system facilitated the weakening of the husk-to-grain bond by scratching effect and enhanced its separation from the grain thus improving the dehulling efficiency of Kodo millet.

The infrared light based pre-processing system is a batch type unit of capacity 500g that comprises a chamber, infrared radiation source having wattage (250 W), grain holding plate and stirring blade and voltage variac (Fig. 5). In this system, Kodo millet were pre-treated at variable voltages (200, 220, and 240 V) for different time intervals (3 - 7 min). IR pre-treatment at 240V and 7min showed dehulling efficiency, recovery, and broken of 84.76 %, 58.77 %, and 5.79 %, respectively.

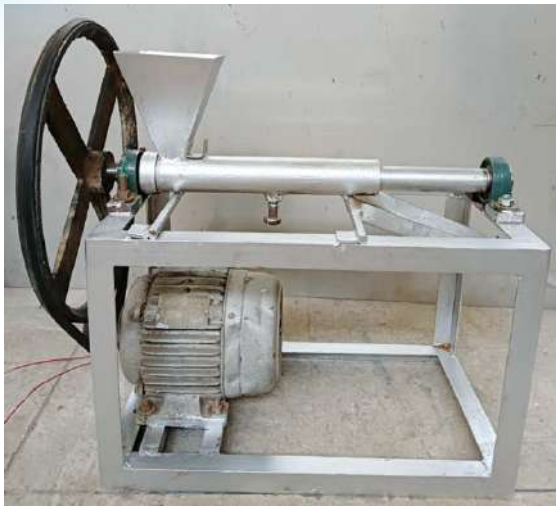


Fig. 4. Mechanical Pre-Processing System

Fig. 5. Infrared-based Pre-Processing System

1.2 Processes/Protocols/Studies

1.2.1 Process Protocol for Biological Production of Vinegar using Syrup Waste from Osmotic-dehydration of Aonla

To increase the shelf life of fruits many methods/combination of methods are used. Among various methods osmotic dehydration is suitable method to increase the shelf life of fruits. However, during osmotic dehydration of fruits, large amount of sugar syrup is produced, which presently go waste in the absence of suitable commercial usage of sugar syrup generated from candy and preserve preparation of Aonla. Keeping this in mind, an attempt was made to produce vinegar by converting the syrup waste from osmotic-dehydration of aonla. It was carried out in two steps. First step involved the production of alcohol from syrup waste using yeast and the second step involved the production of acetic acid by acetic acid bacterium. The syrup waste from osmotic-dehydration of aonla was diluted with water to bring down the TSS to 18-19 °Brix. Fermentation of pasteurized spent syrup from osmotic-dehydration of Aonla by yeast at temperature of 30 °C resulted in 10 % alcohol after 6-7 days. In the second step acetic acid fermentation was carried out using locally isolated acetic acid bacterium form rotten kinnow fruit at 10% inoculum which resulted in production of vinegar with 8.1% acetic acid after 22 days of incubation. The vinegar produced from syrup waste from osmotic-dehydration of aonla showed good antimicrobial activity against *Staphylococcus aureus* and *E. coli.* It is hereby reported that from one litre of spent syrup about three litres of vinegar (5.5% acetic acid) could be produced using optimized process conditions. The vinegar thus obtained has shelf life of six months at room temperature.

1.2.2 Isolation and Identification of Bacterial Isolate Showing Production of PHB from Mango-by Products

In India, biodegradable plastic films are mainly prepared from the starch, which are chiefly obtained from the edible portion of different crops such as corn, potato, tapioca and sugarcane. Due to ever increasing global population and diminishing land, it would not be more rational to utilize edible portions of crop for non-food purposes. On the contrary, mango processing by-products namely, mango peels and kernels are not utilized for any industrial purpose, and it is discarded as a waste causing environmental pollution. In the present study, among the seven selected bacterial isolates, PHB3, which showed more production of Poly Hydroxy Butyrate (PHB) on mango by products, was identified using molecular techniques. The genomic DNA was isolated and PCR amplification of the 16S rRNA gene using universal primers 16F27 [5'-CCA GAG TTT GAT CMT GGC TCA G-3'] and 16R1492 [5'-TAC GGY TAC CTT GTT ACG ACT T-3'] carried out. The amplified 16S rRNA gene PCR product was purified and sequenced by automated DNA sequencer. Identification was done using the EzBioCloud database and phylogenetic analysis performed with the program MEGA 11 and phylogenetic tree constructed method. The isolate

was identified as *Bacillus velezensis* strain PHB3 based on 16 S rRNA gene sequencing. The sequence has been submitted to NCBI and provided accession number OP935658. In evolutionary analysis it was most closely related to type strain *Bacillus velezensis* CR-502(T) having accession number AY603658 (Fig. 6). The identified bacterial isolate, *Bacillus velezensis* strain PHB3, could be further utilized for PHB production from mango by products.

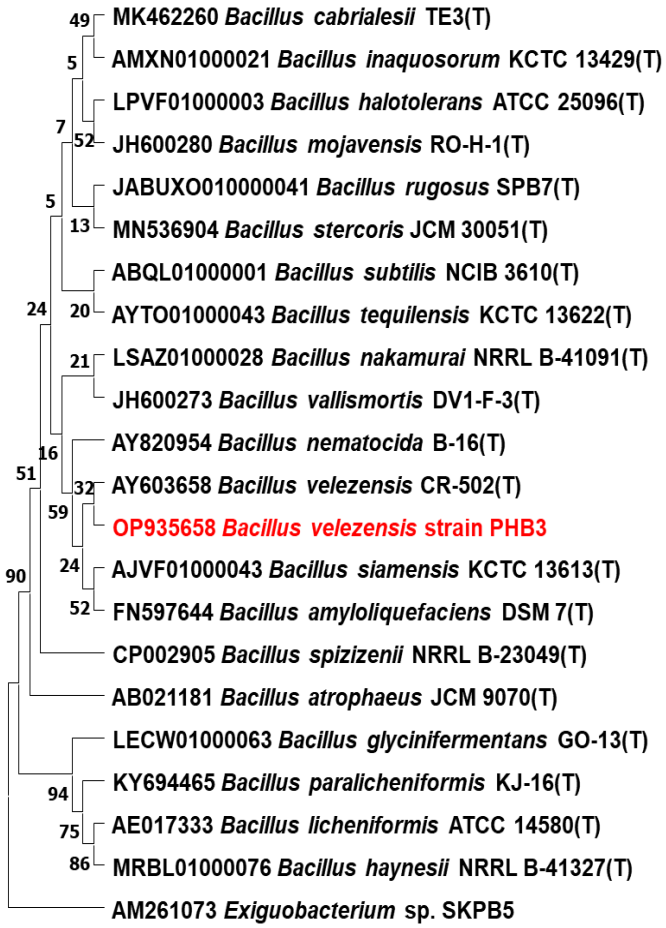


Fig. 6. Evolutionary Analysis by Maximum Likelihood Method and Tamura-Nei Model

1.2.3 Process Optimization for Enhanced Laccase Enzyme production in *Trametes Versicolor* through Machine Learning Approach

DORB (de-oiled rice bran) produced in large amounts by rice bran oil industries and is presently underutilized. The compositional analysis of DORB revealed cellulose (18.45%), hemicellulose (17.94%) and lignin (15.84%) and it has been found to be beneficial for growth of *Trametes sps*. This fungus naturally produces extracellular Laccase enzyme which is responsible for lignin degradation. In this study in DORB, characterized by its high lignin content, was used as a substrate in solid state fermentation to produce Laccase enzyme. This will serve both purposes of crude enzyme production and simultaneous biomass degradation. A genetic algorithm (GA) and connected neural network (CNN) based optimization approach was used for enhanced laccase enzyme production in *Trametes versicolor* DORB as substrate under solid state fermentation conditions. Initially, the effect of physiological parameters was checked by one factor at one time experiment. The experimental design involved the application of Face-Centered Central Composite Design (FCCCD), employing substrate-to-moisture ratio, incubation time, and substrate amount as variables. This design matrix was then used to generate experimental datasets with 20 runs for training the CNN-GA model. The model was trained, tested, and validated using the Levenberg-Marquardt (LM) algorithm in combination with the feed-forward backpropagation (FFBP) network. In 20 experimental sets, 14 were utilized for model training, 3 were used to test the model's performance, and 3 for testing model's validation. The regression plot derived from the CNN-GA model shows an excellent fit (Fig. 7). The overall R-value attained from modelling was 0.98, indicating a high level of model accuracy (98%). The R-values for training, testing, and validation sets were also close to 1, indicating that the model is reliable and can accurately predict laccase production based on the input parameters. The best validation performance of 15996.93 was achieved at epoch 2. The graph illustrates that the minimum mean square error was reached after 5 epochs, at which point the iterations were stopped. This indicates that the model has converged, and further training would not significantly improve prediction accuracy. This approach led to a remarkable 5.19-fold increase in laccase enzyme production (865.18 U gds^{-1}) on 10^{th} d with substrate to moisture ratio 1:1.5, substrate amount 13.3 g. Machine learning methodology demonstrated its efficacy as a valuable resource in optimizing complex processes, particularly in setups where conventional optimization methods encounter challenges arising from extensive search spaces and intricate optimal solutions.

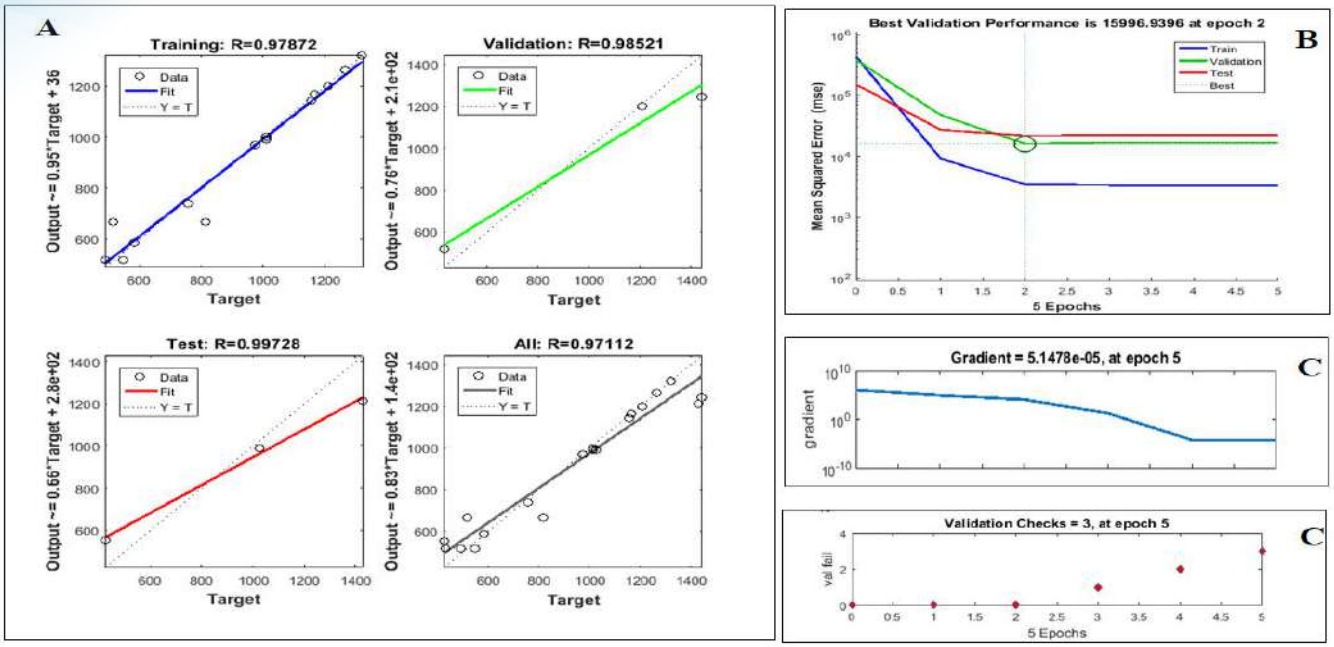


Fig. 7. CNN Regression Plots (a) Regression Plots for the Training, Validation and Test Model with R Value of 0.97612, 0.98695 and 0.97271 respectively (b) The Validation Performance Plots - Mean Square Error Vs Epoch (c) The Validation of CNN Model through Gradient and Validation Checks Plot.

1.2.4 Process Protocol using Rubber Roll Sheller for Dehulling of Kodo Millet

In India, millets are dehulled using abrasive or centrifugal type dehuller. For this purpose, ICAR-CIAE, Bhopal model, TNAU, Coimbatore model, and Dhan Foundation models (single and double stage) all generally used. A study was conducted to compare these two principles with rubber roll sheller machine, which works on compression and shear principle. In this study, the process variables have been optimized for dehulling efficiency, grain recovery, and broken percentage. The process variables were moisture content (7-12%), Differential Speed (1:1.2-1:1.5) managed by gear arrangement, and Clearance space (0.50-1.00 mm). Results indicated that at 9% moisture content, differential speed 1:1.35 and clearance space 0.75 mm was statistically best fit for the maximum dehulling efficiency of 76.68%, maximum grain recovery of 53.60%, with reduced broken of 8.05% for Kodo millets. The study found that the rubber roll sheller gave the highest recovery of 7% as compared to commercial existing recovery i.e., 47%.

1.2.5 Process Optimization of Impact Type Polisher for Kodo Millet

Kodo is a difficult to dehull millet and having multilayer husk on it. Currently, the commercial polishing of kodo millet is done on rice polishing machines which yields low-quality polished grains with broken grains upto 30%. For this purpose, we have evaluated an impact-type polisher to analyse the milling recovery and grain quality. In this study, machine variables were feed rate (1 – 3 kg/min), polishing time (1 – 2 min.), and speed of the rotor shaft (300 – 500 rpm).The results indicated that at a feed rate of 2 kg/min, a polishing time of 1.5 min, and a speed of the rotor shaft of 400 rpm of the machine resulted the best head rice recovery of 57.92%, broken grains of 4.36% with removal efficiency of 93%. The study found that the impact-type polisher is capable of polishing Kodo millet as compared to commercially used polishers to get the maximum head recovery of 57.92%.

1.2.6 Insect Disinfestation using Microwaves and its Effect on Milling in Kodo Millet

Among the minor millets, Kodo millet (*Paspalum scrobiculatum*) is one of the popular species. Along with the production, there is a need for processing and scientific storage of these grains at various levels, from farmers to bulk storage facilities. Like other grains, millet infestation is also a challenge. Since there are no standardized management protocols specifically for the storage of minor

millets, researchers have begun exploring available methodologies. In this line, a study has been conducted to assess the effect of microwave exposure on one of the commonest storage insects, *Tribolium castaneum*. A batch-type microwave system operating at 900 W and 2450 MHz with high power (P-HI - 100%) was used as radiation source. The insects within the grain mass thickness of 10 mm, were exposed for different durations i.e., 40, 50, and 60 s, under two conditions (a) with addition of 0.5% surface moisture and (b) without moisture. The results showed that complete mortality (100%) of *T. castaneum* adults was achieved at 50 and 60 s. The addition of surface moisture increased the mortality, reached 100% at 40 s of exposure (Fig. 8). The microwave exposure showed no significant difference in dehulling efficiency ($P<0.05$) using rubber roll sheller. However, the percentage of broken grains was reduced ($P<0.05$) when surface moisture was added and exposed under microwaves for 40, 50, and 60 s. Thus, microwave treatment can be considered as a pre-step prior to milling, which serves the purpose of non-chemical-based insect disinfestation, and does not alter the milling process.

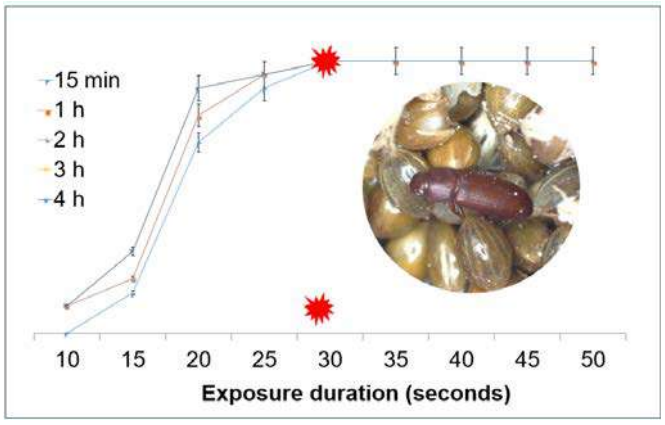
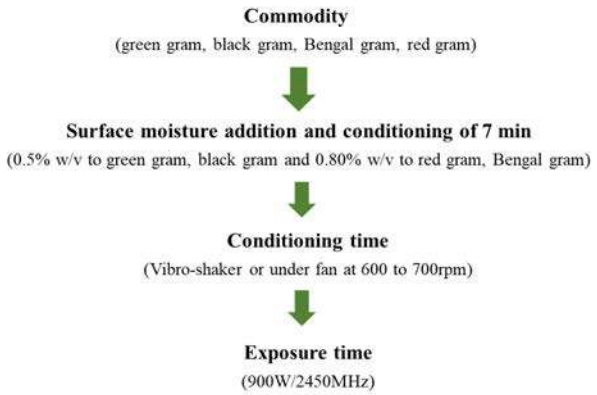


Fig. 8. Response of *Tribolium Castaneum* (Flour Beetle) to Microwave Exposure

1.2.7 Process Standardization for Disinfestation of Major Legumes with use of Batch Type Microwave System

Microwaves are electromagnetic waves lie between radio frequencies and infrared radiation. From the broad range of microwave frequencies available, a few are designated for industrial, scientific, and medical applications (ISM). For all practical purposes, industrial applications are carried out at 915 MHz in the USA, 896 MHz in the UK, and 2450 MHz worldwide. The use of microwaves for killing insects is based on the dielectric heating of insects present in grain, which is a relatively poor conductor of electricity. Domestic microwave oven (IFB 30SC®) with rotating table having 30 litre capacity and MW Power output – 900W (consumption microwave – 1400W, operation frequency – 2450 MHz), against bruchid, *Callosobruchus maculatus*. Major legumes like Bengal gram, Red gram, Green gram and Black gram were disinfested using microwaves. The generalised parameters optimised for the treatment of major legumes for their disinfestation against bruchids are shown in the Fig. 9.



Insect	Commodity	Grain layer (mm)	Exposure time
C. maculatus	Green gram	10	35
C. maculatus	Black gram	10	35
C. maculatus	Red gram	15	40
C. maculatus	Bengal gram	15	40

Fig. 9. Process flow chart for microwave disinfestation of major legumes

1.2.8 Process Standardization for Disinfestation of Major Legumes with use of Continuous Type Microwave System

A continuous microwave-based treating system available at PAU, Ludhiana was used for this study. The system has a capacity of 10 kg/h consisting of 2 magnetrons and a belt length of 120 cm. The total power of this system is 1800 Watt (900 + 900). The conveyor belt speed can be controlled in such a way that the sample gets exposure to radiations for 15-120 seconds (Fig. 10). In this system there was no control for the grain layer and based on the seed type approximately 12 to 15 mm of grain layer is generally formed. This was used to optimize the parameters for disinfestation of major legumes. A RSM design with three factors (belt speed, power level and moisture) was taken and evaluated using the green gram seeds. It was found that 100% mortality could be achieved at a belt speed of 50, moisture of 7.73% and a power level of 1080W

whereas the exposure also showed positive higher in the combinations of belt speed 69.64 rpm, moisture of 8.46% and power level of 1100.96W. Overall, it was found that the system can effectively disinfest the legumes infested with bruchids.

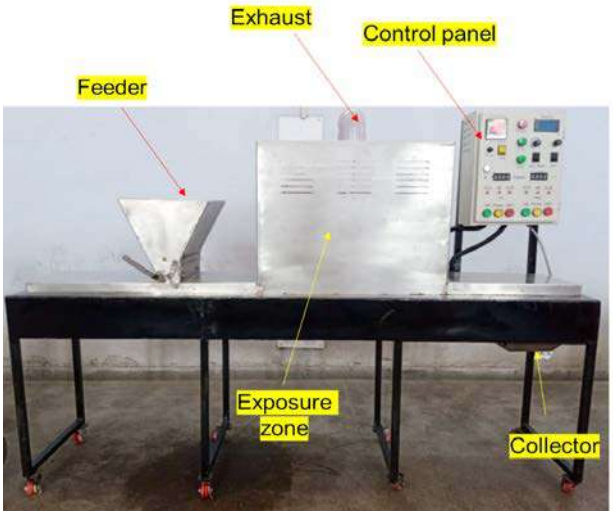


Fig. 10. Continuous Microwave Treating System at PAU, Ludhiana

1.2.9 Novel Botanical Formulation Tablets for Insect Management in Storage

Insect infestation poses a significant threat to grain storage, leading to substantial economic losses and compromising food security. Conventional insect management strategies often involve the use of synthetic pesticides, raising concerns about environmental impact, human health, and the development of pesticide-resistant insect populations. This study explores an alternative approach to insect management in grain storage by investigating the efficacy of botanical options. The herbal tablets impregnated with mustard based chemical formulations were tested against Khapra beetle, Rust red grain beetle, Lesser Grain Borer, Pulse Beetle and Flat Grain Beetle, in a lab study using a 100ml glass and 20 insects were released (Fig. 11). The fumigant bioassay protocol was followed, and observations were recorded at 2, 4, and 6h intervals after exposure. These tablets showed quick and complete effectiveness by recording 100% mortality after 20 minutes, only.

Fig. 11. Mustard based Substrate for Tablet, Formulated Tablets and the Mortality of Exposed Insects

1.2.10 Process Standardization for Improved Head Rice Recovery from Long Grain Paddy

Basmati and long grain rice varieties are more prone to breakage due to their longer length as compared to other rice varieties. In order to minimize the breakage of rice during milling, the paddy is subjected to a process known as parboiling (soaking, steaming, and drying) before milling. Different parboiling methods have been used by rice millers as per their use. However, based on the scientific observations, methods need to be standardized for the same. Various steps (soaking, steaming and drying) of parboiling process have been standardized to achieve higher head rice recovery without compromising the quality of milled rice. The standardized conditions are soaking at 65 °C for 4h, steaming at 1.0 kg/cm^2 for 5 minutes followed by shade drying to achieve 12% moisture. The head rice recovery has been obtained 62% under standardized conditions. There was a significant increase in equilibrium moisture content upon soaking in the case of parboiled rice, however, pasting viscosities and relative crystallinity showed a decline in the case of parboiled rice in comparison to raw rice. The equilibrium moisture content varied from 44.16% in native sample to 109.86% in parboiled rice. Starch crystallinity of raw rice reduced from 33.87% to 12.64% after steaming.

1.2.11 Process Protocol for Development of Millet-based Gluten Free Muffins using Hydrocolloid

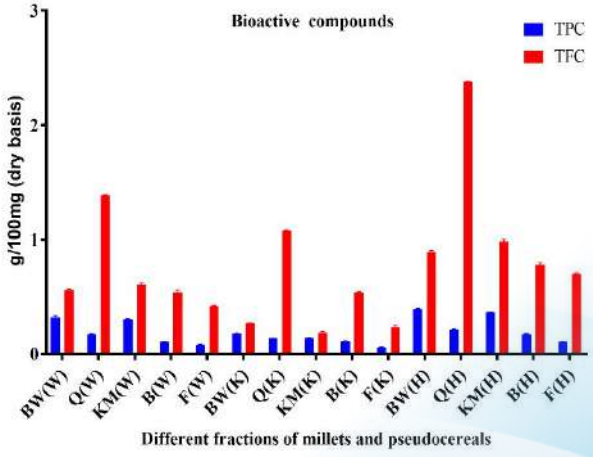
Gluten present in certain cereals namely, wheat, rye and barley, is essential for the desired quality of bakery products. However, persons suffering from celiac disease, the prolamins from gluten exerts toxic effect and damage the villi of the intestine leading to poor digestion and poor absorption of nutrients in the gastrointestinal tract. These celiac patients suffer with food restrictions and reduced diversification of their diet by lack of choices of gluten free foods, especially bakery products. Millets are nutritionally superior to the main cereal crops-wheat and rice owing to their comparatively higher protein, mineral, vitamins and fibre contents. Development of bakery products, formulated without gluten, although is essential for a celiac patient, but at the same time it is quite challenging too. Hence, in the present study gluten free muffins were prepared using barnyard millet and foxtail millet with the addition of xanthan gum, a hydrocolloid to the level of 0-0.5% (flour wt. basis).

The muffin samples were evaluated for height, crust colour, hardness and sensory acceptability (Fig. 12). Based on organoleptic acceptability and other quality attributes, the concluded level of xanthan gum in muffin formulations was 0.4g per 100g. Addition of xanthan gum even at 0.3% level significantly ($p \leq 0.05$) decreased the hardness of both millet based muffins. The sensory acceptability of muffin samples was determined using 9 point Hedonic scale, ranging from 1 (dislike extremely) to 9 (like extremely). The sensory panel comprised of 20 semi-trained persons. The quality of muffin samples, packed in LDPE pouches, was found acceptable in the ambient conditions (32±3ºC) up to 7 days.It can be concluded that addition of xanthan gum improved the quality traits of barnyard millet and foxtail millet based muffins.

Fig. 12. Barnyard Millet Muffins

1.2.12 Characterization of Selected Pseudo Cereals and Millets for Physicochemical and Antioxidant Potential

Millet grains are gaining recognition as promising future crops due to their nutritional content, which rivals that of major cereals. They offer essential proteins, fatty acids, minerals, vitamins, dietary fiber, and polyphenols. Additionally, pseudocereals like quinoa and buckwheat have attracted significant attention recently, due to their exceptional nutritional profiles. These pseudocereals are rich in high-quality protein, fiber, and minerals, and they also possess bioactive compounds with health-promoting effects. The increasing interest in millets and pseudocereals is driven by their abundance in various compounds known for their positive impact on human health. The present study assessed the effect of dehulling on proximate composition, total phenolic content (TPC), total flavonoid content (TFC), and antioxidant activity (measured by DPPH and FRAP) of different fractions (whole grains, kernels, and hull) in selected millets kodo millet (KM), barnyard millet (B), and foxtail millet (F) and pseudo cereals buckwheat (BW) and quinoa (Q). The dehulling of all samples was performed to separate the kernel and hull fractions their studied fractions were categorized as whole grains (W), kernels (K), and hull (H). The proximate content of millets and pseudocereals showed significant differences *w.r.t.* fractionation. The fat content of W, H and K ranged from 3.67% to 4.89%, 1.02% to 3.65%, and 2.99% to 7.08% respectively and found to be higher in foxtail millet than kodo millet and barnyard, while lowest in kodo millet in all fractions. The protein content of W, H, and K ranged from 8.9% to 17.33%, 2.45% to 10.2%, and 10.28% to 19.32% respectively, showing higher content in foxtail millet, and lowest in kodo millet. The ash content of W, H, and K varied from 2.30% to 5.30%, 2.37% to 8.99%, and 1.27% to 3.78%, respectively, with higher content observed in hull fractions while kernels had lower ash content among all samples. The total dietary fiber W, H, and K ranged from 3.53% to 28.30%, 10.09% to 81.71%, and 2.70% to 5.72%, respectively with higher fiber in kodo millet comparable to buckwheat, while the lowest observed in quinoa. Conversely, the carbohydrate content W, H, and K varied from 56.18% to 75.70%, 9.35% to 72.72%, and 67.94% to 81.27%, respectively across all fractions, with quinoa exhibiting the highest values, while the hull of kodo millet showed the lowest content. The findings indicated that kernel fractions had elevated levels of fat, protein, and carbohydrates, whereas ash and dietary fiber contents were more pronounced in hull fractions compared to other fractions. Depending on the fractions, the bioactive composition varied among different samples obtained (Fig.13). The results revealed that all these parameters were higher in hull fractions in comparison to whole grains, while lowest in kernels.



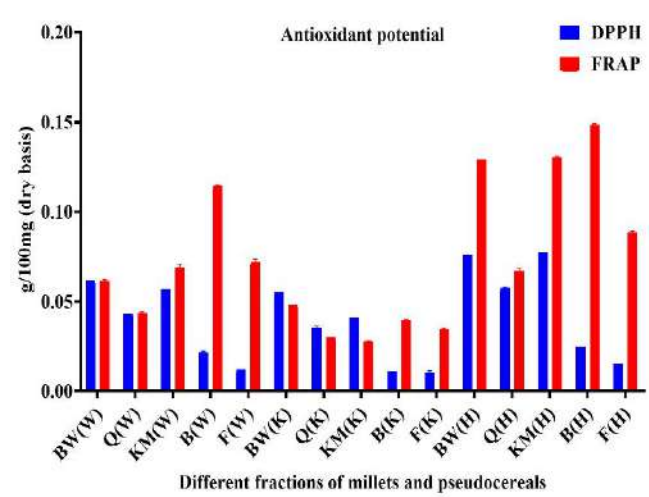


Fig. 13. a) Bioactive Compounds (TPC and TFC), b) Antioxidant Potential (DPPH and FRAP) of Millets and Pseudocereals under Different Fractions i.e., Whole (W), Hull (H), and Kernel (K). BW; Buckwheat, Q; Quinoa, KM; Kodo millet, B; Barnyard, and F; Foxtail.

1.2.13 Utilization of Peanut Okara in Peanut Butter

Peanut okara is an underutilized by-product obtained in the process of making peanut milk or tofu. It is the insoluble solid residue obtained after the filtration of milk from the slurry. The by-product is nutritious and finds applications in food, feed and as organic fertilizer. Due to its high protein and fiber, okara is an excellent raw material for development of healthy and nutritious products. There is an increasing demand for food with health benefits. With the aim of developing healthy alternative for peanut butter utilizing peanut okara, peanut butter with 15% okara substitution was optimized maintaining the FSSAI specifications for peanut butter (Fig. 14). To utilize the okara in peanut butter formulations, the wet okara was dehydrated at 60°C, ground and dry roasted till colour turns light brown. Dehydrated okara was substituted for peanuts at 5, 10, 15 & 20% . Roasted okara flour was incorporated in the stage 2 grinding of peanut butter with the blending of other ingredients like salt, sugar, stabilizers. The optimized peanut butter had a moisture, protein, fat, mineral and fibre content of 0.92, 25.02, 45.22, 2.86 and 3.37% respectively. The optimized peanut butter had an acid value of 2.82 and L, a, b colour value of 46, 14 and 40. Textural quality of peanut butter as measured by the amount of force (g) required to penetrate peanut butter as indicators for firmness and work of shear to reflect spreadability value were 245.95 g and 154.23g.sec. The developed product had low water activity of 0.17 and showed viscoelastic nature.

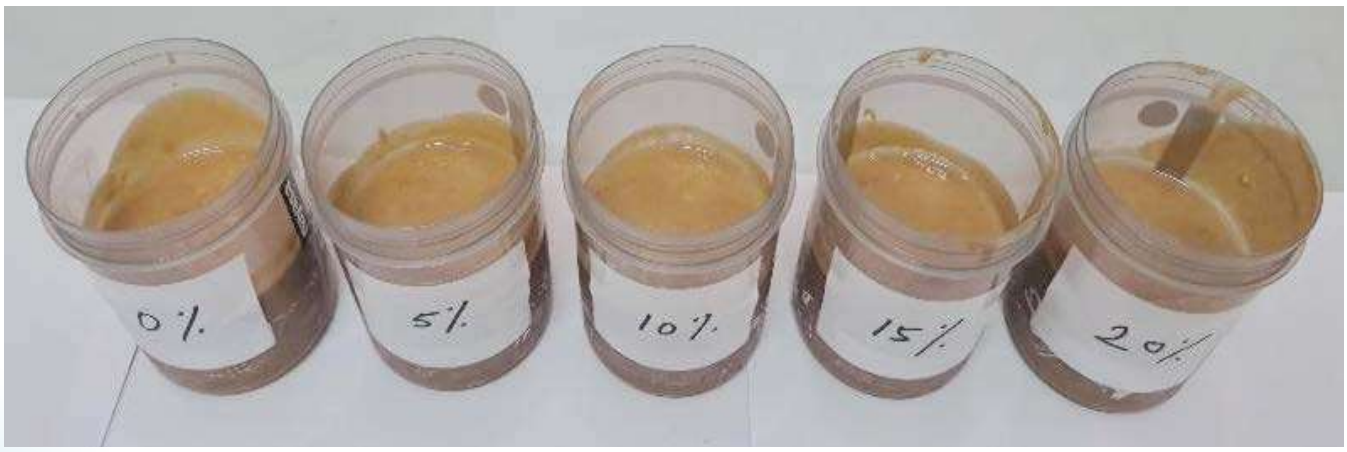


Fig. 14. Okara Substituted Peanut Butter

1.2.14 Development of Database for Post-Harvest Machineries & Technologies

The comprehensive database for processing machines, technologies, processes and products developed by NARES institutions and private organizations has been developed at ICAR-CIPHET. The database is primarily divided into Processing machine technologies and products / process technologies for different categories of agricultural produce (Fig.15). Databases showcases the machines as per the 12 broad categories of crops that are further divided into more than 80 specific crops. The major crop categories are Cereals, Pulses, Oil seeds, Millets, Spices, Fruits, Vegetables, Commercial Crops, Plantation crops, Livestock Produce, Medicinal, Aromatic and Tuber crops. The database has different features like advance search/filter options to identify technologies based on state, unit operations, and price, etc. A report can also be generated by selecting appropriate machine to facilitate establishment of processing unit. The information regarding newly developed processing technologies can be added by authorized personals using login credentials. The space for advertisement is provided for additional revenue generation from the developed database. Continuous updation of the database is ensured by the project team, and status of same is given on webpage as 'Last updated on'. The following is the link to access the database :

https://ciphet.icar.gov.in/research/database-mobile-apps/

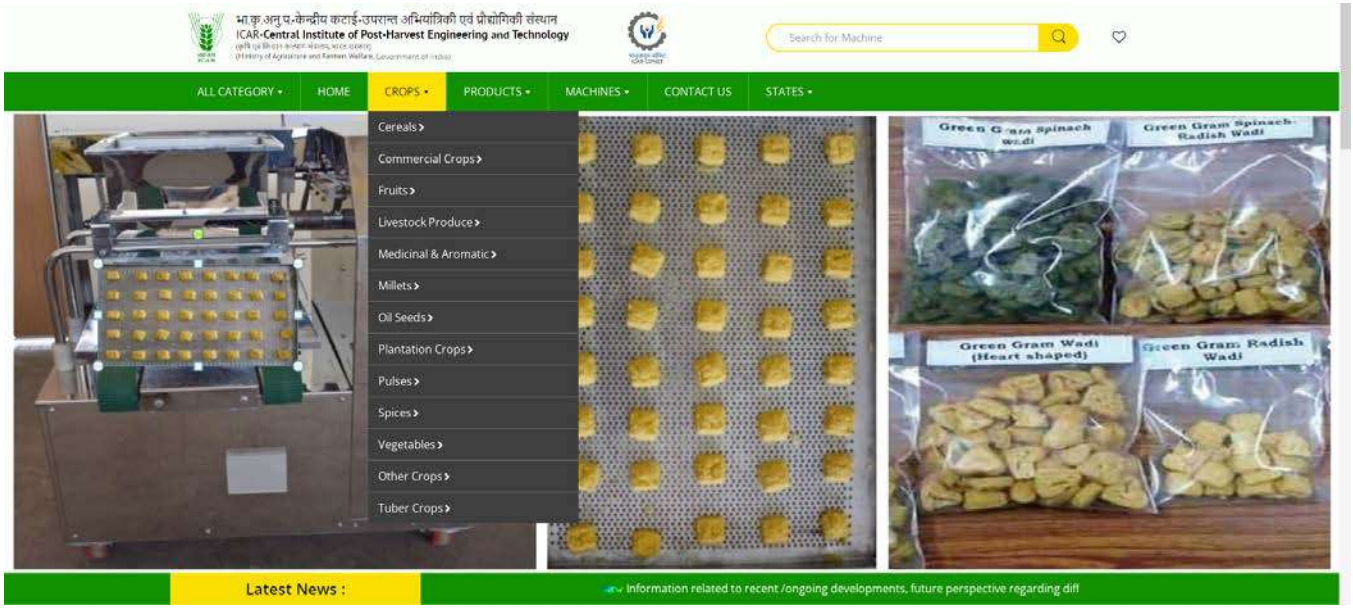


Fig. 15. Database showing Wadi Making Machine & Packaged Wadi

1.2.15 Empowering KVK Specialists in Agro-Processing through Training Program

ICAR-CIPHET's study uncovered a lack of awareness regarding post-harvest technologies at the grassroots level. To address this issue, the institute has initiated an awareness program focusing on post-harvest processing, value addition, and loss reduction, for Scientists/Subject Matter Specialists in KVKs, associated with the Farmer Producer Organizations (FPOs) formed by NCDC and Farmer FIRST Programme based on the ODOP approach at the ATARI Zone level. Five training programmes were organized covering 65 participants from 58 KVKs from eight states under ATARI Zone III – IX (except Zone VII), emphasizing different models of agro-processing suiting geographical, social, and economic needs of other regions. The feedback from the participants was collected using Kirkpatrick's four-level model framework to evaluate the organized training programs. 98% of participants recommended for extension of the training period from 3 days to 5- 7 days and the inclusion of a visit to industry/ successful entrepreneurs. The suggestions of the participants were incorporated into the training organized from ATARI Zone VIII. After completion of

the training around 20% of SMS contacted back for information, particularly for DPR preparation and information related to machinery. After the completion of training from ICAR-CIPHET, SMS from KVK, Moga organized an exposure visit of 20 farmers to the institute for guidance related to post-harvest technologies.

1.2.16 Comprehensive Frameworks for Impact Assessment of Selected Technologies

To assess the impact of technologies developed by ICAR-CIPHET and its schemes, namely AICRP on PHET and AICRP on PEASEM, ten (10) technologies were chosen based on their commercialization success and their reach at the grassroots level. Customized indicators were developed to assess the impact of the selected technologies across various dimensions, including Techno-economic feasibility, Social benefits, Sustainability-Livelihood assets, Consumer acceptability & other benefits, Environmental impact, and Overall impact. Based on this, structured impact assessment frameworks have been developed for plastic-lined ponds, fertigation with plastic mulch, value-added products, post-harvest machinery, and agro-processing centers. These frameworks provide a structured approach to assess the impact of diverse technologies on different stakeholders, offering valuable insights for decision-making and policy formulation.

The impact of APC was done through agro-climatic zone-wise analysis based on commodity processed. A systematic analysis of Agro-Processing Centers of trans-Gangetic plains revealed that the average cost for establishing an APC in this region is approximately Rs. 20.91 lakh. Fixed costs accounted for a significant portion, with machinery expenses comprising around 45.7% of the total fixed cost. Variable costs in APCs were influenced by labour and electricity expenses. The average Net Returns from APCs amounted to Rs. 5.47 lakh, with a BC Ratio of 1.26. The payback period for the investment was 2.43 years, and the Break-Even Point was 70.85%. On average, each APC employed 5 persons.

1.3. Collaborative/ Externally Funded Projects

1.3.1 Sensor-based System for Tracking the Environmental Conditions of Banana in Supply Chain

Sensor-based system is developed for monitoring the environmental conditions during various stages (transportation, storage, ripening) of supply chain of Banana (Fig. 16). It enables the monitoring of environmental parameters like temperature and RH, which helps in efficient management of cold chain and prevents quality degradation with timely intervention. Sensor based system also enables the ethylene monitoring to manage excessive ripening in ripening chambers and storage areas. Initial trials conducted with sensor based system for temperature, RH recording and location tracking of vehicles (Fig. 17 and 18). Maximum temperature was recorded 20.3°C and Maximum RH was recorded 68.3% during transit.

Fig. 16. Sensor Based System

Fig. 17. Location Tracked (blue line) using Sensor Based System

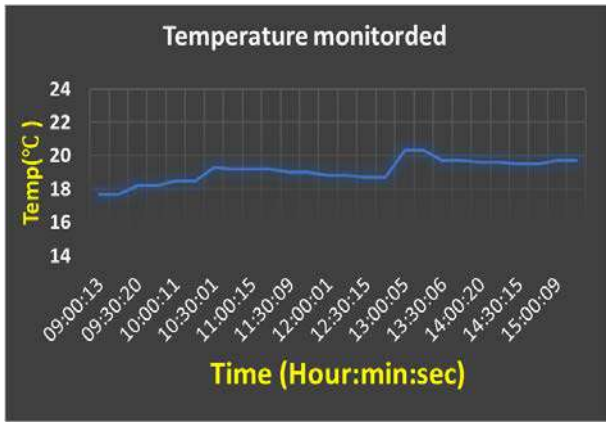


Fig. 18. Temperature Measured using Sensor Based System

1.3.2 ICAR-CIPHET Visible Light Insect Trap

Grain storage systems play a crucial role in a country's economy as they serve as vital buffers for ensuring food supply to the population. During storage, various biotic and abiotic factors affect the quality of the grains. Among the biotic factors, insects cause major damage, which causes nearly 1/3rd of the storage losses. The practice of managing insect pests during storage plays a pivotal role in reducing these losses. There are several management strategies in practice; however, the non-chemical ones are preferred. It is always necessary for early monitoring of the insect population through mechanical devices like traps. Various traps are available for this purpose, like a probe, pitfall, and light traps (primarily based on UV lights). ICAR-CIPHET has developed a visible light trap with efficient attraction capacity in comparison to UV based traps and has no exposure hazards regardless of the type of grain stored. It overcomes various limitations and drawbacks associated with existing light traps (Fig. 19). It can efficiently capture insect species like *Rhyzopertha dominica*, *Lasioderma serricorne*, *Cadra cautella*, *Sitotroga cerealella*, *Tribolium castaneum*, and *Laemophloeus* spp. The attraction efficiency ranges from 65-93%, depending upon the insects, wherein highest attraction (93%) has been reported in *Sitotroga cerealella*.

Fig. 19. ICAR-CIPHET Visible Light Insect Trap

Light trapping of insects is one of the most common and feasible mechanical method of pest control. However, in storage, the applications of light trap are having limitations, major one is non-availability of electrical supply. The advancements in LED and uninterrupted power technologies have led the researchers to develop various light traps applicable for grain storage environments. Based on the photo tactic behavioural responses, a metallic trap has been fabricated using with

Fig. 20. Metallic Insect Trap

stainless steel (SS-304) considering its durability (Fig. 20). The trap dimensions are 500 x 250 mm (LxW). The length of the plate for PCB/LED is 300 mm which also holds three baffles/flaps in the front. There is insect collection chamber of 200 mm length. The upper and bottom radius/arc of funnel in collection chamber is 110 mm and 20 mm. Average circular distance and angle between each baffle is 90 cm and 45°. Based on the previous Light trapping of insects is one of the most common and feasible mechanical method of pest control. However, in storage, the applications of light trap are having limitations, major one is non-availability of electrical supply. The advancements in LED and uninterrupted power technologies have led the researchers to develop various light traps applicable for grain storage environments. Based on the photo tactic behavioural responses, a metallic trap has been fabricated using with stainless steel (SS-304) considering its durability (Fig. 20). The trap dimensions are 500 x 250 mm (LxW). The length of the plate for PCB/LED is 300 mm which also holds three baffles/flaps in the front. There is insect collection chamber of 200 mm length. The upper and bottom radius/arc of funnel in collection chamber is 110 mm and 20 mm. Average circular distance and angle between each baffle is 90 cm and 45°. Based on the previous

results of attractions like, almond moth (450±10 nm), Paddy moths (480±10 nm) and Rice moths (570±10 nm), the trap is equipped separately with the LED strip lights.

1.3.3 Development of HPLC based Method for Quantification of Beta Carotene from Banganapalli Mango Pulp and Peel

Beta-carotene is a group of pigments that are responsible for the orange, yellow, and red colours in many fruits and vegetables. Most of the beta-carotene is concentrated in the mango pulp, but a small amount is also present in the peel. The mango peels are considered as bio-waste of mango processing industry. However, research on the screening of natural antioxidants from low-cost and leftover sources from agricultural industries has advanced tremendously in recent years due to rising interest in replacing synthetic antioxidants with natural ones. Therefore, a laboratory experiment has been conducted to find the effect of extraction solvent (methanol, ethanol, ethyl acetate, hexane, acetone), extraction temperature (40°C, 50°C, and 60°C), and solid-solvent ratio (1:10, 1:15, 1:20, and 1:30 (g/ml)) on the yield of beta carotene from mango pulp and peel from Banganapalli mango cultivar (Fig. 21). The quantification of beta carotene was carried out by HPLC Agilent 1260 Infinity (CA, USA) with a quaternary pump (1260 Quat Pump VL), auto sampler (1260 ALS) and Diode-array Detector (1260 DAD VL) at 450 nm. On a Thermo-Scientific Acclaim C-30 column (4.6x250 mm with 5 µm packing) equipped with guard column, beta carotene was separated using a linear gradient elution of methanol (mobile phase A) and methyl-tert-butyl ether (mobile phase B) following the gradient of 75:25 for first 7 minutes to 65:35 minutes for next 8 minutes, then 25:75 for next 35 minutes followed by 85:15 for next 20 minutes with flow rate starting at 1 ml/minute for first 7 minutes followed by 0.8 ml/minute for remaining 63 minutes at the column temperature of 29℃. The maximum beta carotene content from mango peel was obtained with ethanol using 1:20 g/ml solid to liquid ratio at 50°C extraction temperature, whereas in case of mango peel the maximum beta carotene yield was obtained with methanol solvent using 1:15 g/ml solid to liquid ratio at 40°C extraction temperature.

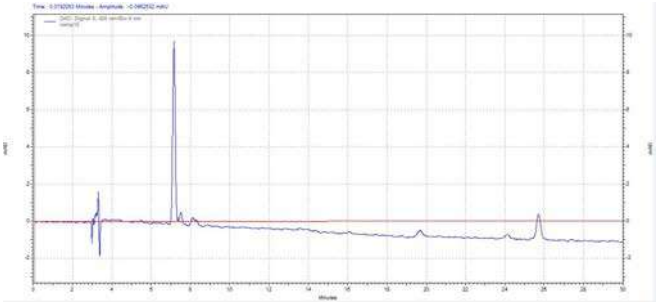
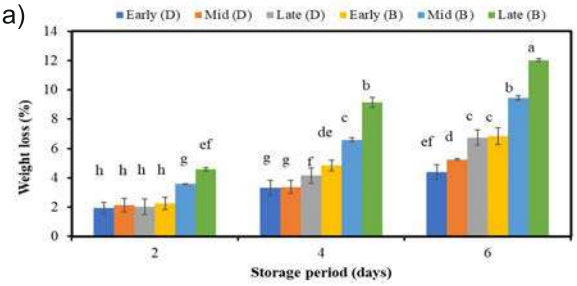


Fig. 21. HPLC Chromatogram

1.3.4 Influence of Cultivar, Harvesting Time and Storage Duration on the Physio-chemical Properties of Naturally Ripened Mangoes

Harvesting mangoes at an optimal stage of maturity is very important to get good quality mangoes. This study aimed to determine the best harvesting/maturity stage and storage duration in terms of optimal ripeness with good quality characteristics of two important mango cultivars i.e., Dashehri and Banganapalli. The physiological weight loss (%) was significantly lesser in the Dashehri cultivar during storage as compared to the Banganapalli cultivar (Fig. 22). The maximum weight loss (%) was reported in the late harvested fruits of both cultivars. The harvested at early stage of maturity showed the maximum peel hardness as compared to the other stages in both cultivars. The L value was progressively increased significantly in all stages of the harvesting and during storage in both the cultivars. However, the L value of Banganapalli cultivar was reported higher as compared to the Dashehri. The maximum L value was reported in the late harvested Banganapalli cultivar mangoes during the 6th day of storage while the minimum L value was found in early harvested Dashehri mangoes. Total soluble solids (TSS) content for Banganapalli cultivar was increased from 16.2 to 23.6 °Brix from the early to late harvesting stage during eight days of storage. In contrast, the TSS value varied from 9.8 °Brix to 23.3°Brix Dashehri. These maturity indicators could provide an excellent basis for making reliable and informed decision about optimal maturity stage and storage period for the mangoes based on the market supply and demand

a)



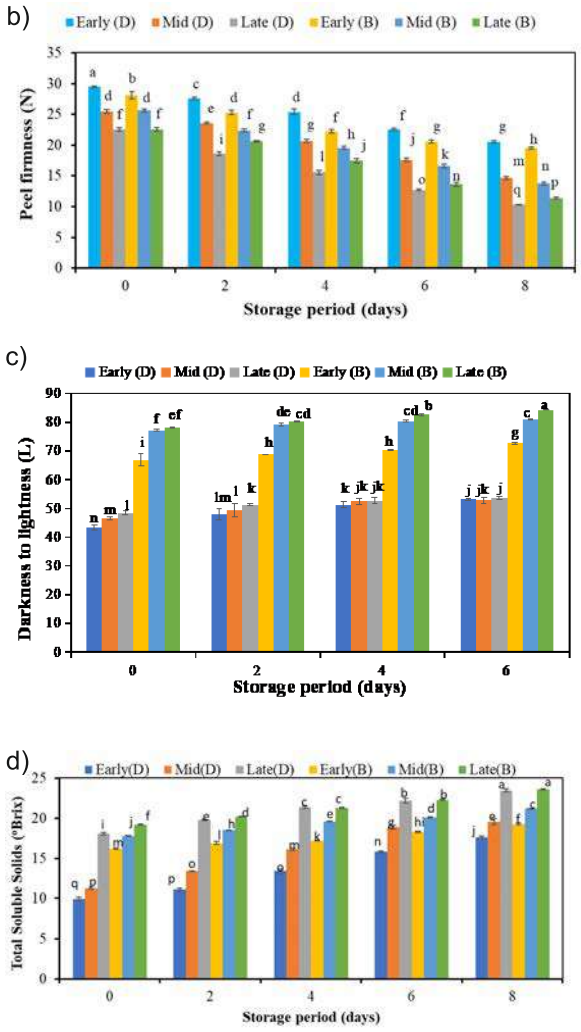


Fig. 22. Effect of Harvesting, Storage Period and Cultivar a) Weight Loss (%), b) Peel Firmness c) Colour Value (L), and d) Total Soluble Solids (˚Brix) of Dashehri (D) and Banganapalli (B) Cultivars

1.3.5 Effect of Fermentation on the Physicochemical Attributes of Two Soybean Varieties

Soybeans, well-known for their high oil and protein content, are widely used in the food industry. Despite their nutritional advantages, soybeans contain anti-nutritional components that impede nutrient absorption. To tackle this issue, the present study investigated the influence of various processing stages (soaking, cooking, and fermentation) involved in the production of hawaijar, a traditional fermented product from Manipur. Two varieties of soybean seeds were used for the preparation of hawaijar i.e., small seeds (Local variety; LV) and big seeds (JS335). Hawaijar, distinguished by its unique flavor and stickiness, is a natural blend of microorganisms that facilitate fermentation. In this study effect of fermentation on physicochemical attributes of two soybean varieties was studied. The fermented soybeans showed phenolic content (5.99 and 6.17 mg GAE/g) and flavonoid content (4.55 and 4.88 mg QE/g) for LV and JS335, respectively. Additionally, a substantial reduction in phytic acid (89.2% and 91.2%) and tannin content (65% and 53%) was observed for LV and JS335, respectively as compared to control. The hardness of the seeds decreased significantly after each processing step, resulting in a soft, sticky texture of soybean. The rheological studies showed that the loss modulus and storage modulus experience a slight elevation as the angular frequency increases, indicating the frequency-dependent viscoelastic characteristics of soybean pastes. The findings underscored that fermentation is an effective method for enhancing the nutritional profile of soybeans, leading to a nutrient-rich fermented product like hawaijar.

1.3.6 Development of RGB-D Module for Detection and Localization of Apple Fruits

RGB-D module has been developed with user interface to extract depth information of RGB-D frames acquired from RGB-depth imaging sensor. User Interface of RGB-D module developed using C# for user Interface and camera control, and Python for backend and API. The whole development is done in python platform. Virtual environments and python library dependencies installed on Anaconda (python distribution platform). Intel RealSense SDK API has been used for camera interfacing with RGB-D module's GUI. The RGB frame has been used to detect objects using YOLO detection model (Fig. 23). The network returns class and bounding boxes of the detected object. The coordinates of bounding boxes are used to get depth data of corresponding bounding box from the depth frame. The developed vision system can identify apples within its range in an outdoor orchard environment. Leveraging deep learning techniques, the system excels in positively identifying apples occluded by the branches of a tree. Furthermore, it possesses the capability to recognize and categorize obstacles, including leaves and branches, enabling it to calculate the optimal trajectory for extracting the apples. The RGB-D module has been integrated with 6 Degrees of Freedom (DoF) robotic arm developed by CDAC Kolkata (Fig. 24). The X, Y, and Z coordinates of the

1.3.5 Effect of Fermentation on the Physicochemical Attributes of Two Soybean Varieties

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Fig. 23. Detection of Apples in High Density Orchard

Fig. 24. Robotic Arm Developed at CDAC Kolkata & Operating on AI Protocols Developed at ICAR-CIPHET

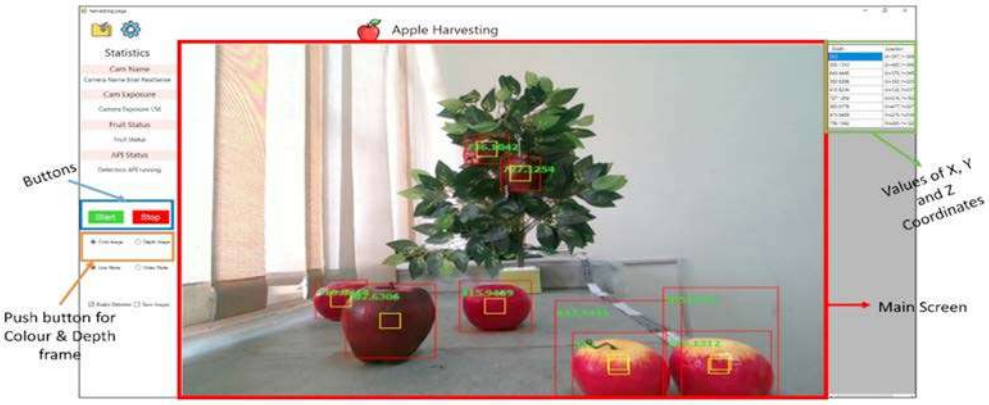

Fig. 25. User Interface of Module

1.3.7 Creation of Image Corpus

A dataset of apple fruits images for object detection in the complex lighting environment of high density orchards has been created for two apple varieties grown in Kashmir region (Table 1). These images were captured in complex background in different natural lighting conditions (Fig. 26). RGB-depth imaging sensor is used for depth video frames. This dataset offers more pixel information and higher imaging quality, as well as with depth information. These variations in complex lighting conditions pose additional challenges for apple object detection. The dataset can be used for image processing, image identification, image classification, object detection, computer vision, artificial intelligence, and deep learning, yield forecasting/estimation etc.

Fig. 26. Sample Image Captured from Image Corpus

Table 1: Image Corpus for Apple

Dataset Object	Apple	
Category	Red Velox, Red Gala	
Type of Data	Images, videos, and text files	
Data Set Size	Red Velox: 1.2 TB	Red Gala: 300GB
Statistical Classification of Fruit Instances	Red Velox: 42,357	Red Gala: 9223
Image Resolution	6000x4000 (24MP)	
Data Format	Raw and Analyzed	
Data Acquisition Devices	Canon EOS 1500 D for images, DJI pocket 4k for high resolution videos, RealSense D455 for depth data, Gimbal for stabilization of camera	
How Data is Captured	Images with various factors including shading, overlapping, and different light at different angles are collected, and the apple trees are captured at different angles and distances. Apples close to the camera are used as closed object targets, and those far away from the camera are used as small object targets to fulfil more conditions of dataset.	
Data Source Location and Time	High density apple orchards in Kashmir during harvesting season of 2022	
Dataset Complexity	The dataset is further enriched by the presence of complex ambient lighting. Dataset have images with low lighting conditions and cloudy conditions.	

1.3.8 Identification of Parasitoids against Pulse Beetle

Parasitoids play a crucial role in biological control strategies against any storage insects. *Anisopteromalus calandrae* (Howard) is a notable parasitoid known for its effectiveness in controlling storage pests, particularly the pulse beetle (Callosobruchus spp.). The natural parasitoid infestation on pulse beetle culture was observed and the efforts were made for their identification. With the support of ICAR-NBAIR, Bengaluru, the parasitoid was identified as *Anisopteromalus calandrae,* which is a tiny wasp belonging to the Pteromalidae family, and it has shown a remarkable ability to parasitize eggs and larvae of pulse beetles (Fig. 27). The sequence of the parasitoid has been also registered in genebank jointly by ICAR-CIPHET and ICAR-NBAIR and got the accession numbers OM349564 and OM368669.

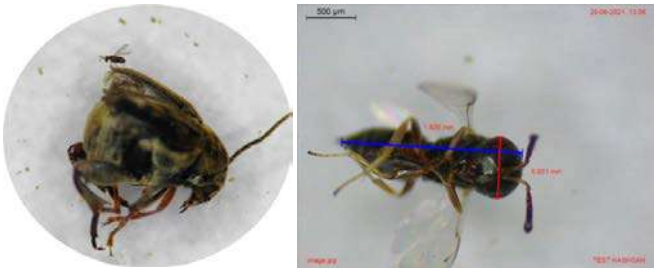

Fig. 27. Pulse Beetle Parasitoid, *Anisopteromalus Calandrae*

2.1. AICRP-PHET

2.1.1 Mahua Stamen Remover (OUAT, Bhubaneswar)

Conventionally dried mahua flower is heaped on the cemented floor and beaten by wooden planks followed by winnowing to remove the detached stamen. In the developed machine, stamen is detached from the flower by abrasion & shear imparted by rotating drum, which are then separated by an oscillating screen. The machine consists of a frame, rasp bar mounted cylindrical drum (150 mm dia, 250 mm length), concave assembly, oscillating sieve, 0.5 hp motor and feed hopper. Capacity of the machine is 20 kg/h. the operation is to be carried out at 900 rpm cylindrical drum speed, 9.5 mm concave clearance and mahua flower moisture content of 11 %, for highest stamen removal efficiency (Fig. 28).

Fig. 28. Mahua Stamen Remover Machine

2.1.2 Development of Dehumidification Unit and Pneumatic Aspirator for Modern Jaggery Plant (RARS, Anakapalle)

The dehumidification unit 100kg/h capacity is designed to remove moisture from granular jaggery (Fig. 29). Also a pneumatic aspirator (Fig. 30) has been designed and developed for conveyance of dried granular jaggery to bagging unit. Both are installed in the modern jaggery plant established at Anakapalle. The dehumidifier consists of chilled cater unit (3 TR) and chilling coils and electrical heating coils to produce cool air of 20°C and 40% RH. The unit consists of FINNED type coils for cooling air by chilled water with minimum size 300(L)x350(W)x300 (H) mm and an insulated tank of 500 l to use as chilled water tank and a water pump of 1 hp for circulation of chilled water. Also, the unit consists of FINNED type coils for heating coil by hot water or steam condensate with minimum size 300(L)x350(W)x350 (H) mm. The Heating coils is provided with supporting frame with conveying air inlet and a flap value for adjustment of air flow in the conveyance system.

Fig. 29. Dehumidifier for Removal of Moisture from Granular Jaggery

Fig. 30. Pneumatic Aspiration System for Conveyance of Granular Jaggery

2.1.3 Vacuum Assisted Ohmic Heating System (PAU, Ludhiana)

A vacuum assisted ohmic heating system of 5 litre capacity for pasteurization and concentration of juices has been developed (Fig. 31). The main components of the developed system are electrodes, vacuum chamber, electric control box, variable transformer, fresh and concentrated juice tanks, vacuum pump, piping and pumping systems and condensation assembly. The developed system has been evaluated at different input voltage gradient (7.5V/cm to 12.5 V/cm) based on system performance coefficient, variations in electrical conductivity V-I characteristics and heating rate of treated juice. The System Performance Coefficient (SPC) of developed system ranged from 0.81 to 0.90, depending on the input voltage gradient. It has been observed that the minimum SPC (0.69) is recorded for 7.5 V cm^{-1}, while highest (0.90) in the case of 10 V cm^{-1} voltage gradient.

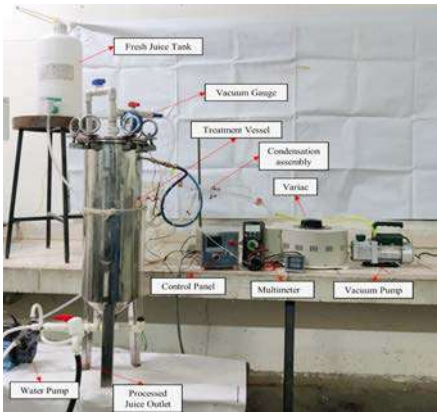

Fig. 31. Vacuum Assisted Ohmic Heating System for Juices

2.1.4 Vacuum Assisted Ohmic Heating Porotype for Bread Baking (IIT, Kharagpur)

A prototype has been developed for preparation of millet-based composite bread. The machine is composed of two main design parts, Electrode assembly and Vacuum chamber. Electrode assembly consists of base of 2 cm thick polycarbonate, sides of 1.5 cm thick clear acrylic, Electrode dimensions: L=30 cm; H=15 cm . Vacuum chamber is made with 2 cm thick acrylic sheet. The electrode assembly is connected to an AC source of 150 V with a voltage regulator for controlling the heating rate (Fig. 32). The system is also equipped with the temperature and electrical sensor for measurement and process optimization.

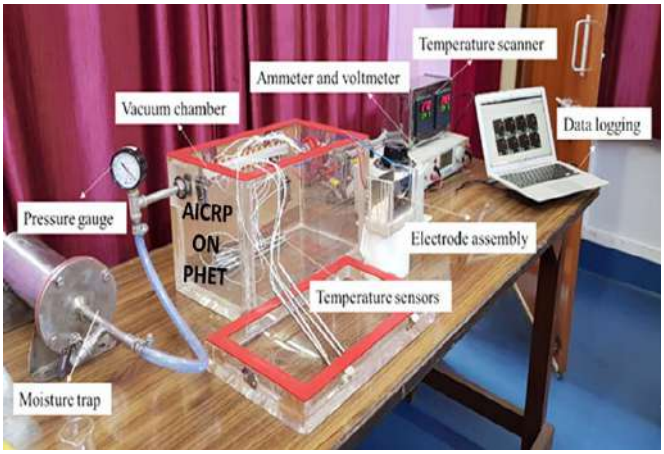

Fig. 32. Prototype for Vacuum assisted Ohmic Heating for Bread Baking

Millet/ or any cereal based flour is mixed with desired amount of water and other ingredients required for bread such as (salt, sugar, yeast and oil) and kneaded. The dough is placed between the electrodes and the voltage is set low with partial application of vacuum (up to 40 kPa) for proofing. The proofing comprehends in about 45-60 min followed by baking at 60V, the baking is completed in 15-20 min depending upon composition.

2.1.5 Development of Neem Fruit Depulper (TNAU, Coimbatore Centre)

A single drum neem fruit depulper has been developed with a dimension of 1010 × 482 × 1135 mm. The developed depulper consists of a feed hopper, supporting frame, depulping unit, motor with pulley, water recirculation tank with filters and 2 outlets. Depulping unit consisted of drum cylinder with perforations, shaft bounded by roller, drum cylinder cover, water supply pipe and tapered plate (Fig. 33).

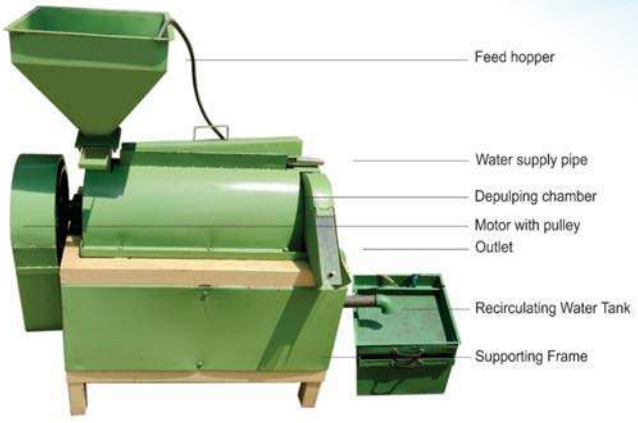

Fig. 33. Neem Fruit Depulper

The drum cylinder is made up of mild steel (18-gauge thickness) of length 750 mm and diameter of 203 mm and provided with rectangular holes of 20×10 mm with 5 mm gap between each hole throughout the drum to separate the pulp slurry with water.

2.1.6 Thresher for Grain Amaranthus (TNAU, Coimbatore)

Grain Amaranthus thresher removes the grains of the amaranthus from the panicles and then separates the seeds from the cob. It consists of threshing unit, sieve walker, blower, mainframe, shafts with bearings, V belt, pulley power transmission, and a single-phase 2 hp electric motor. The overall dimension of the thresher is 650x1020x1225 mm (Fig. 34). Power required to operate the thresher is 2 hp electric motor and the capacity of the thresher is 13 kg/h. The grain amaranthus cobs are fed through the feed hopper and reached the threshing drum and undergo the threshing operation. The threshed grains reach the oscillating sieve mechanism and the empty cobs are separated. The threshed grains are collected at the seed outlet in the thresher.

Fig. 34. Grain Amaranthus Thresher

2.1.7 Onion Spoilage Detection Device (Dr. PDKV, Akola)

The onion spoilage detection device with single electronic gas sensor unit was developed for detecting the spoilage of onions from 2.5 tons of onion storage and total 10 gas sensor can attach to the device. The onion spoilage detection device consists of Mega-Arduino Board, SIM 900A GSM GPRS Module, Robocraze 3.5 TFT Colour Screen Module, 4 Channel Relay Module, Blower and cooling system. The developed device was technically feasible and economically viable for early detection of onion spoilage in onion storage structure (Fig. 35).

Fig. 35. Onion Spoilage Detection Device

2.1.8 Preparation and Characterization of Cocoa Pod Activated Carbon and its Application in Purification of Oil (KAU, Tavanur)

Cocoa pod produces about 70% weight of cocoa fruit. Generally, cocoa pod contains very high lignin around 14-28%, cellulose 19.7-26.1%, hemicellulose 8.7-12.8% which can be converted to carbon after pyrolysis process (Fig. 36). At the preparatory stage, the cocoa fruits were broken and seeds were removed. Empty cocoa pods were cut into small pieces and sun dried to a moisture content of 7% w.b. The resulting product was then weighed, grinded and sieved through a mesh size of 80 µm. Carbonization was done using pyrolysis process in a muffle furnace. The charcoal obtained after the carbonization stage was filtered using an 80µm sieve. The resultant powder was then treated with HCl solution for 24 h for chemical activation. The activated carbon was filtered and washed using distilled water until it reached a pH of 7.0, then drained and dried at 110℃ in a cabinet drier for 1 h (Fig. 37). Preliminary trials revealed that the quality parameters of developed activated carbon were at par with ASTM standards.

Fig. 36. Pyrolysed Carbon @ 300°C

Fig. 37. Activation by HCl

2.1.9 A Process Protocol for the Preparation of Hill Lemon and Apple Juice Blended *RTS* Beverage (YSPUH& F, Solan)

Hill lemon is an important citrus fruit commonly known as "*galgal"* whose nutritional value lies in its high content of acidity, ascorbic acid, minerals and phenolics. Its utilization is limited because of its highly acidic nature. Therefore, there is need to utilize its functional attributes with other fruits of Himachal Pradesh to enhance the functional value and flavour of the processed products. A process protocol for the preparation of Hill lemon and apple juice blended ready to serve RTS beverage has been developed (Fig. 38). For this, different proportions of Hill lemon and apple juices were mixed. To achieve the desirable acidity and taste, a concentration of 5% of each juice was utilized and this combination also displayed the highest scores for colour (8.0), flavour (7.8), and overall acceptability (8.0). No artificial citric acid or chemical preservative was added in the beverage.

Fig. 38. Hill Lemon Juice and Apple Juice Blended Drink

2.1.10 Process Protocol for the Preparation of Hill Lemon Peel Supplemented Cookies (YSPUH& F, Solan)

Hill lemon peel in the form of powder has been utilized to enhance the functional value of bakery products. Hill lemon fruit peel is water blanched for 2.5 minutes. Subsequently, the blanched peel is a dried at (55±2°C) till the moisture reached a constant value. Then the dried peel is finely powdered through sieve with a mesh size of 250 µm. This resulting powder was utilized as a supplement in the production of cookies.Cookies were prepared by the standardized recipe using the ingredients i.e. wheat flour and refined wheat flour 250 g each, refined oil 250 mL and powdered sugar 200 g, and honey 300 g was used to get desired sweetness (Fig. 39). Further this combination was combined with different levels of peel powder varying from 2.5, 5.0, 7.5, and 10.0 per cent. All the ingredients were mixed to form dough. Different cookie dough's were rolled into sheets by rolling pin and cut in equal batter weight followed by baking in oven at 175°C for 12 minutes. The cookies were then cooled on a wire rack at room temperature for 30 minutes before packing. Different combinations of Hill lemon peel supplemented cookies were organoleptically evaluated and the formulation with the addition of 7.5 per cent of Hill lemon powder was selected to prepare Hill lemon supplemented cookies on the basis of best sensory scores on nine-point hedonic scale.

Fig. 39. Hill Lemon Peel Powder Supplemented Cookies

2.1.11 Process Protocol for the Preparation of Comminuted Hill Lemon Fruit Juice RTS Beverage:

The peel of Hill lemon which comprises of 30% of the fruit, holds more ascorbic acid, phenolics, and minerals than fruit segments and are usually thrown away as waste after processing of fruit. Comminuted Hill lemon juice containing both parts (peel and juice) can be used to enhance functional value of beverages. In the present study, a process protocol for the preparation of comminuted Hill lemon juice RTS beverage has been developed (Fig. 40). After washing and Hill lemon fruit is cut into equal halves along with peel. Seeds are removed and cut fruit halves are made in to slurry with use of a pulper. The resulting slurry is then transferred to hydraulic press to extract comminuted Hill lemon juice. Afterward, extracted Hill lemon juice is filtered through muslin cloth. To develop RTS beverage with desired acidity level of 0.3% acidity, extracted comminuted Hill lemon juice in various combinations was used. Addition of juice at 7 % is optimized on the basis of scores for colour (8.2), flavour (8.5), and overall acceptability (8.3). Furthermore, comminuted drink showed significantly enhanced antioxidant activity (7.6%) and phenolic content of prepared RTS beverages than the resulting values obtained for RTS drinks made up from of Hill lemon juice (without peel).

Fig. 40. Hill Lemon Comminuted Juice RTS Beverage

2.1.12 Development of a Functional Probiotic Pork Spread (AAU, Khanapara)

Pork spread was prepared by the addition of probiotics (*Lactobacillus acidophilus* and *Bifidobacterium animalis*). The meat was cooked along with all the non-meat ingredients and minced into a fine paste. The paste was then divided equally into four groups and pasteurized. The probiotic strains *viz. Lactobacillus acidophilus* (LA 5) and *Bifidobacterium animalis* (BB 12) were added as liquid inoculums to obtain a final concentration of 10^7-10^8 cfu/ g in the product. The four groups prepared were- (T1): Control, T2: Meat spread with LA5, T3: Meat spread with BB12 and T4: Meat spread with combination of LA5 and BB12. After addition of the probiotic preparation, the spread was kept for ripening and after ripening, the spread was stored at refrigeration temperature (4±1°C). The physico-chemical, proximate, microbiological, sensory evaluation revealed probiotic added pork spread was found to be better than the control group. In terms of sensory evaluation, T2 group was found to be best than the other probiotic added spread. The shelf life of the probiotic added pork spread was found to be 42 days at refrigeration temperature.

2.1.13 Process Protocol Standardization for Preparation of Jaggery based Kulfi (RARS, Anakapalle)

Jaggery based kulfi has been prepared by adding full fat milk, jaggery powder, cashews, almonds pieces and heated upto it thickens (Fig. 41). The mixture was poured into kulfi moulds and kept in a refrigerated condition for 8-10 hours (overnight). Nutritional composition for 100g jaggery based kulfi is Energy 698kcal, Protein 16.6g, Carbohydrates 76.4g, Calcium 3.94mg, Iron 5.2mg. Five different combinations were prepared i.e., Jaggery kulfi, Jaggery powder kulfi, Almond jaggery kulfi, Coconut Jaggery kulfi, Custard powder jaggery kulfi. Sensory evaluation was carried out for above five combinations of jaggery based kulfi by using Fuzzy logic concept.

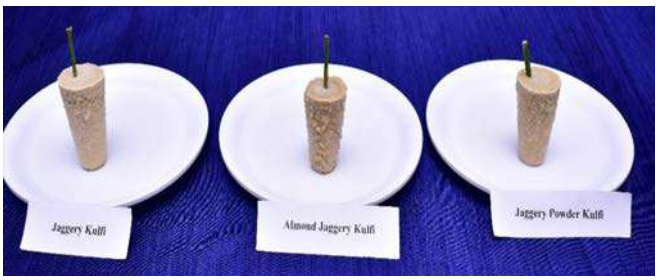

Fig. 41. Jaggery Based Kulfi

2.1.14 Non-chemical Disinfestation Technique for Storing Dried Turmeric Rhizomes (TNAU, Coimbatore)

The turmeric rhizomes were treated in Radio Frequency system operating at 40.68 MHz with a power of 10 KW by varying the conveyor speed, product bed thickness and electrode height (Fig. 42). Insect mortality and quality attributes in RF treated dried turmeric rhizomes during storage was compared with the chemical fumigation method. The optimized condition for the treatment was found to be 8.4 m/h of conveyor speed, 203 mm of electrode height and 75 mm of bed thickness. Quality attributes including curcumin, colour, moisture and oleoresin were determined during storage and there were no significance differences ($p>0.05$) observed during a storage period of 6 months for RF treated samples. In contrast, chemical fumigated samples showed significant differences in quality parameters and insect infestation as well. Hence, RF treatments could offer a viable, efficient, and eco-friendly approach for disinfesting dried turmeric finger rhizomes.

Fig. 42. RF System for Treating Turmeric Rhizomes

3.1 AICRP-PEASEM

3.1.1 Aquaponics System under a Polyhouse Structure (PAU, Ludhiana)

An aquaponics System has been fabricated under a Polyhouse structure. The setup consists of a fiberglass reinforced plastic (FRP) circular fish culture unit (ø 2×1m), solid separation unit, and bio filtration unit consisting of two high-density polyethylene (HDPE) blue barrels (ø 0.56×0.9m) separately, 0.5 hp timer-based pumping unit, and 18 Un-Plasticized Polyvinyl Chloride (UPVC) rectangular channels as hydroponics unit (Fig. 43). The bio filters are pre-conditioned to grow the bacteria. Water from the aquaculture unit comes to the solid separation unit by the siphon system, and an elbow at the exit point of the siphon pipe delivers water tangentially to the tank's sidewall and is circulated to separate the solids from it. Subsequently, water is transferred to the bio-filtration unit by gravitational flow. Bio-balls are used as the bio-filtration media to grow nitrifying bacteria. After bioconversion in the bio-filters, water is pumped and separated into two parts: one to the fish tank and the other to the hydroponics unit. A flow rate of 1 l/min is maintained in each nutrient film technique (NFT) channel in the hydroponic unit.

Fig. 43. Complete Setup of Developed Aquaponics System

3.1.2 Plant Factory using Artificial Light (PAU, Ludhiana)

In this plant factory (Fig. 44), plants are grown indoors using hydroponic cultivation (growing plants without soil) with artificial light and nutrient solutions. This is a four-tier system. The complete system consists of an insulated room with a double-door entry system and an automated air curtain, two racks of hydroponics system (nutrient film technique) with a capacity for growing 1296 plants, artificial lighting system, carbon dioxide supplementation and monitoring, temperature and humidity control, automated fertigation system, UV filtration of the leachate, oxygation system, and power backup system for a 24 × 7 power supply. All different parameters can be monitored on the cloud.

Fig. 44. Plant Factory

3.1.3 An Indigenous Soil Moisture Sensor for Real-time Irrigation Scheduling (ICAR-VPKAS, Almora)

Developed sensor includes, GSM Module SIMCOM, Programmable Microcontroller – GSM 28 Pin, Solar Charge Controller 25W, Solar Panel 25W, Capacitance Sensor Module, Lithium Polymer Battery 500mA etc. (Fig. 45). These components are selected because they are easily available, low cost, and simple to use. A solar panel with battery 12 Volt and a programmed controller has been integrated to operate the system in situations of unreliable electricity availability. The developed sensor works on capacitance principle and coefficient of determination (R^2) is found to be 0.79 and 0.81, respectively against gravimetric methods at 20 and 30 cm, soil depth. The working principle of this system is that the irrigation pump is switched on when the soil moisture level is depleted to the predefined lower limit and switched off when soil moisture reaches field capacity or any other predetermined upper limit of soil moisture content. The software designed for the operation of the irrigation system has the option of scheduling irrigation either on a time or soil moisture sensor basis. The irrigation system is controlled using a special device called a timer controller and receiver. This receiver consists of a GSM, an Internet modem, and a timer programmed according to the

duration of irrigation. The receiver, receives commands in the form of sensor code number from the DSS/user's mobile phone to switch on/off the solenoid valve and pump of a particular plot. The performance evaluation of the developed sensor has been calibrated using gravimetric methods and compared with time-domain reflectometry, and satisfactory results were obtained. The commercial utilization of the system needs to be strengthened for irrigation scheduling for different crops.

Fig. 45. Indigenous Soil Moisture Sensor

3.1.4 Vermi-Composting Unit (ICAR-NRCY, Dirang)

Vermi-composting unit for farm waste utilization at high altitude has been developed (Fig. 46). A plastic based vermi-composting polyhouse unit of size 12 x 14 x 8.6 feet (W x L x H) was fabricated with CPVC pipes (40mm and 25mm diameter), GI anchoring pegs (32 mm diameter), CPVC pipe snap clamps (40mm, 32mm & 25mm), CPVC pipe fittings (Tee, Elbow and Union) with modifications and 5 layer UV stabilized polyethylene sheet of 200 micron thickness. The fabricated structure was pitched for keeping two-tier HDPE vermi-beds (size 12' X 4' X 2' each; total 4 beds) for composting of farmyard waste into vermin-compost at high altitude cold climate.

Fig. 46. Vermi-Composting Unit

3.1.5 Agri Voltaic Greenhouse System (JAU, Junagadh)

Agrivoltaic Greenhouse System has been developed for solving the problem of greenhouse overheating during the summer and low temperature during the winter due to the seasonal air temperature and solar radiation. For a greenhouse size of 12 m Length x 6 m Arc Width, total PV Panels of 36 panels x 150 W (5.40 kW installed capacity) were installed including panel dimension of 1495 x 670 mm (150 W/panel) and Chess Board Pattern design configuration. The design of Agrivoltaic Greenhouse was evaluated by considering the prevailing loading conditions on the structures like; dead load, imposed loads, installations, wind load and snow and seismic load. The energy generated from the solar panel will be utilized by fan and pad cooling system, irrigation and fertigation. The installation of solar panel on roof may reduce the solar insulation inside the structure. The various climatic parameters like temperature, humidity, light intensity and solar insulation will be measured to study the green energy based fan and pad poly house system (Fig. 47).

Fig. 47. Installation of Solar Panel on Roof of Fan Pad Cooling Poly House

3.1.6 Development of Plastic Check Dam for Water Management in Hilly and Semi-arid Regions (ICAR-VPKAS, Almora)

For water management in the hilly region, FRP blocks with dimensions (60 × 30 × 20 cm) have been fabricated and tested under field conditions. The shear force acting on the block size is 44.1 N/m^2. The horizontal water pressure acting on the box is 11.25 kg. The design of plastic check dams has been modified based on the field testing results, and the fabrication of the structure is in progress using FRP (Fig. 48). The design of the check dam in the prototype phase requires further testing in river/small-stream hilly regions.

Fig. 48. Plastic Check Dam for Water Management in Hilly and Semi-arid Region

3.1.7 Upgradation of the Sandwich Portable Plastic Enclosures (ICAR-CIRG, Mathura)

A portable plastic enclosure using sandwiched portable plastic panel technology has been developed to protect goat kids from inclement weather conditions. The normally recommended minimum temperature inside the shed for goat kids (up to 3 months) is above 10°C. Accordingly, the sheds in organized farms are given additional protection using gunny bags and thatch panels. However, small goat keepers who do not have permanent shelters or migratory farmers face huge losses due to child mortality and reduced production due to cold stress. This sandwiched panel technology uses the principle of thermal insulation properties of foam or sheep wool to conserve the heat generated by the goat kids and heat the enclosure to the desired temperature. The enclosure using Sandwiched Portable Plastic Panels made of fibre-reinforced plastic (FRP) sheets, mosquito wire mesh, and polyurethane foam (PUF) are fabricated in open paddocks of a goat shed with a floor area of 2.967 m^2 which can accommodate 10-12 new born kids of 0-3 months of age. One panel of these enclosures should be opened and tied in a slanting position along with the door opening for cross ventilation and drying of floors, removing accumulated gases during sunlight hours, and fixed during night hours (Fig. 49). The enclosures made of panels provides higher T_{min} (wool: 4.88 °C, Foam: 3.26 °C) recorded inside the structure during days with ⩽ 5℃ temperature during night hours. Growth performance of the kids housed in low cost PPE enclosures (ADG of 72.02±3.31g and 75.51±4.52g in foam and wool) are as comparable as that of conventional kidding shed.

Fig. 49. Sandwich Portable Plastic Enclosures

4.1 CRP on SA

4.1.1 Design and Fabrication of Mechanical Makhana Seed Collection System

A makhana seed collection system has been designed and fabricated to reduce the labor involved in the process of harvesting and collection of makhana seeds. A pond (Depth-4m) was simulated and makhana seeds were artificially introduced in the pond. The equipment designed is based on suction of makhana seeds from the bottom surface of the pond with water. The preliminary design of machine which included impeller and suction end powered by a 5 HP, 3-phase induction motor was mounted on the railings fitted above the surface of the pond and was tested. Based on the preliminary trials conducted to improve the efficiency of the system, width of the suction end was gradually increased from 4ft to 5ft. The motor was also replaced by a petrol engine of 11.8 HP *via* pulley belt arrangement. The present system operates with 80% efficiency.

4.1.2 Optimization of Process Parameters for Extraction of Hesperidin from Immature Droppings of Kinnow Fruits (IDKF)

The immature droppings of kinnow (*Citrus reticulata)* fruits (IDKF) previously considered as a farm waste, are now being considered of economic importance due to their phytochemical properties. Hesperidin, a prevalent flavonoid, associated with numerous health benefits, and pectin having number of food applications has been reported to be present in significant concentrations in citrus fruits (Fig. 50 a & b). However, there is dearth of scientific data on extraction of hesperidin and pectin from IDKF. The Present study has been conducted to optimize process parameters to extract hesperidin and pectin from IDKF.

The process was investigated based on central composite design (CCD) using response surface methodology (RSM) *via* single-factor experiments. Three independent variables including extraction temperature (50-70℃), extraction time (45-120 mins), and sample-to-solvent ratio (1:5 to 1:15 w/v) were assessed with a total of 20 experimental runs, where hesperidin yield (HY%) served as a response function and ranged from 0.16%- 4.97%. For predicting the ideal extraction conditions and to derive quadratic polynomial equations, multiple regression analysis was carried out. The HY% was found to be significantly affected by linear terms of temperature and extraction solvent, quadratic terms of temperature and interaction of temperature with time and solvent. The optimized model obtained from the CCD design showed a desirability of 0.97 showing HY% of 4.8 with R^2 =0.95 and the model has been validated. The extraction of pectin was performed by varying four variables *viz* temperature, time, solvent concentration, and solvent ratio and optimized conditions were 96.25°C 118.89 min, 1:17, and 6.05% giving maximum yield of 23.10%. Therefore, results depicted that hesperidin and pectin could be effectively extracted from IDKF using optimized conditions along with these phenolic enriched extract and fibre-rich powder residual powder is obtained.

Fig. 50 (a) Extracted Hesperidin

Fig. 50. (b) Extracted Pectin

AWARDS AND RECOGNITION

Name of Awardee	Name of Award
भा.कृ.अनु.प.-सीफेट लुधियाना	नगर राजभाषा कार्यान्वयन समिति, लुधियाना, पंजाब द्वारा 28 अगस्त 2023 को पुरस्कार वितरण समारोह में सीफेट को बड़े केंद्रीय सरकारी कार्यालयों की श्रेणी में विशेष पुरस्कार से सम्मानित किया गया
विकास कुमार	संस्थान की राजभाषा हिन्दी में उत्कृष्ट कार्य करने के लिए न.रा.का.स., लुधियाना, पंजाब द्वारा 28 अगस्त 2023 को पुरस्कार वितरण समारोह में 'राजभाषा पुरस्कार' से सम्मानित किया गया
B. M. Ghodki	Young Researcher Award at 9 th Venus International Research Awards (VIRA 2023) & 9th Annual Research Meet – ARM 2023 held on 7 Jan 2023 at Green Park, Chennai, Tamil Nadu
Renu Balakrishnan Sandeep Mann Arvind Kumar Rajiv Sharma	Best Presentation Award at International Extension Education Conference on "Innovative Applications in Agricultural Extension for Sustainable Food & Environmental Security" held on 27-30 Jan 2023 at Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh
Surya Tushir	Best Poster Award at 63rd Annual International Conference of Association of Microbiologists of India (AMI) held on 2-4 Feb 2023 at Maharshi Dayanand University (MDU), Rohtak, Haryana
Th. Bidyalakshmi Devi	Best Oral Presentation Award at International Conference on Natural Farming for Revitalizing Environment and Resilient Agriculture (NF-RERA) held on 17-19 Mar 2023 at College of Agriculture (CAU), Imphal, Manipur
Guru P. N.	Best Researcher Award at VDGOOD Professional Association held on 15-16 Apr 2023 at Pallavaram, Chennai, Tamil Nadu
Poonam Choudhary	Best Oral Presentation Award at 6th International Conference on Strategies and Challenges in Agricultural and Life Science (SCALFE - 2023), held on 28 - 30 Apr 2023 at Himachal Pradesh University, Summer Hill, Shimla, Himachal Pradesh
Nachiket Kotwaliwale	Awarded for eminent services at ICAR- CIPHET during 35th National Convention of Agricultural Engineers held on 12-13 Sep 2023 at Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur, Madhya Pradesh
Guru P. N.	Best Oral Presentation Award at National Symposium on "Crop Health Management: Safeguarding Crop through Diagnostics and Innovations" held on 29-30 Sep 2023 at ICAR- Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS), Almora, Uttarakhand
Surya Tushir	Best Scientist Award for the year 2023 on 35 th Foundation Day of ICAR-CIPHET held on 3 Oct 2023 at ICAR-CIPHET, Ludhiana, Punjab
Pragya Singh	Best Technical Employee Award on 35 th Foundation Day of ICAR-CIPHET held on 3 Oct 2023 at ICAR-CIPHET, Ludhiana, Punjab
Sunita Rana	Best Administrative Staff Award on 35th Foundation Day of ICAR-CIPHET held on 3 Oct 2023 at ICAR-CIPHET, Ludhiana, Punjab
Sandeep Mann Bhupendra M. Ghodki Thingujam B. Devi Yogesh B. Kalnar Sandeep P. Dawange	Best JAE Research Paper Award received at ISAE Annual Convention 2023 held on 6-8 Nov 2023 at University of Agricultural Sciences (UAS), Raichur, Karnataka

Name of Awardee	Name of Award
Sandeep Mann	Commendation Medal awarded at ISAE Annual Convention 2023 held on 6-8 Nov 2023 at University of Agricultural Sciences (UAS), Raichur, Karnataka
Leena Kumari	Best Oral Presentation Award at ISAE Annual Convention 2023 held on 6-8 Nov 2023 at University of Agricultural Sciences (UAS), Raichur, Karnataka
Shaghaf Kaukab	Best Oral Presentation Award at ISAE Annual Convention 2023 held on 6-8 Nov 2023 at University of Agricultural Sciences (UAS), Raichur, Karnataka
Manju Bala	Award of Fellow of The Indian Society of Agricultural Biochemists at National conference on 'Current Trends in Biological Sciences for Sustainable Agriculture, Environment and Health Under Climate Change & XV Convention of the Indian Society of Agricultural Biochemists' held on 23-25 Nov 2023 at University of Lucknow, Uttar Pradesh
Surya Tushir	Best Oral presentation Award at 64th Annual International Conference of Association of Microbiologists of India held on 1- 3 Dec 2023 at Bundelkhand University, Jhansi, Uttar Pradesh
Dhritiman Saha	2023 CSBE/SCGAB Graduate Thesis Award (PhD) by The Canadian Society for Bioengineering (CSBE) / Société Canadienne de Génie Agroalimentaire et de Bioingénierie (SCGAB), Winnipeg, Manitoba, Canada.

निदेशक, सीफेट, न.रा.का.स., लुधियाना, पंजाब द्वारा
विशेष पुरस्कार प्राप्त करते हुए

Dr. Nachiket Kotwaliwale receiving Eminent Service Award during 35th National Convention of Agricultural Engineers


Dr. Manju Bala receiving Award of Fellow of The Indian Society of Agricultural Biochemists during XV Convention


Dr. Sandeep Mann receiving Commendation Medal Award during ISAE Annual Convention


Smt. Surya Tushir receiving Best Oral Presentation Award during Annual International Conference

डा. विकास कुमार, न.रा.का.स., लुधियाना, पंजाब द्वारा
राजभाषा पुरस्कार प्राप्त करते हुए

Academic Excellence

Ph D

Name of Awardee	Name of Award
Navnath S. Indore	Awarded PhD (Bio systems Engineering) on 11 Dec 2023 for thesis entitled "Elucidation of Changes in Food Grains Due to Spoilage in Bulk Storage Using Advanced Imaging for Post-Harvest Management" under ICAR Netaji International fellowship 2021-23 and Natural Sciences and Engineering Research Council of CanadaUniversity of Manitoba, Winnipeg, Canada

Recognition

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

Staff at ICAR-CIPHET was awarded for their significance contributions and services to the institute during 35th Foundation Day of ICAR-CIPHET held on 3 Oct 2023 at ICAR-CIPHET, Ludhiana, Punjab. List of staff that completed their 10 years and 25 years of service at ICAR-CIPHET:

Name of the Official	Designation
10 Years Service:	
Dr. Sandeep Mann	Principal Scientist & Head, AS&EC Division
Dr. Manju Bala	Principal Scientist & Head (Act.), FG&OP Division
Dr. Armaan Ullah Muzaddadi	Principal Scientist & Head (Act.), TOT Division
Mrs. Surya Tushir	Scientist
25 Years Service:	
Dr. S.K. Tyagi	Principal Scientist
Sh. Yashpal Singh	Senior Technical Assistant
Sh. Satwinder Singh	Senior Technician
Sh. Sukhbir Singh	Skilled Support Staff
Sh. Pardeep Kumar	Senior Technical Assistant
Sh. Hardeep Singh	Technical Officer
Smt. Sonia Rani	Technical Officer
Sh. Dalu Ram	Technical Officer

TECHNOLOGY COMMERCIALIZED

The institute has commercialized 8 technologies to 12 licencees, generating a total revenue of 5.2 lakh during 2023.

Technology	Firm	Date of Licensing
Process for Preparation of Fat Free Flavoured Makhana	M/s Veganor Healthcare LLP P. I. T. Colony L2/11, Near Jaleshwar Mahadev Mandir, Kankarbagh, Patna, Bihar	20 Jan 2023
Process Technology for Preparation of Rice Bran Protein	M/s HAUCH Ecovations Pvt. Ltd. Sector 32-A, Chandigarh Road, Ludhiana, Punjab	13 Feb 2023
Mechanized System for Primary Roasting of Raw Makhana Seeds and Process Thereof	M/s Agrofarm Solutions Pvt. Ltd., Khalil Mansion, Ward No- 31, Saharsa Basti, Saharsa, Bihar	14 Feb 2023
Mechanized System for Popping and Decortication of Makhana Seeds	M/s Agrofarm Solutions Pvt. Ltd., Khalil Mansion, Ward No- 31, Saharsa Basti, Saharsa, Bihar	14 Feb 2023
Groundnut Based Flavoured Beverage, Curd and Paneer	M/s Yasoda Enterprise, Near Japla Road, Chhattarpur, Palamu, Jharkhand	15 Mar 2023
	Mr. Siddarth Sarda, Bikaner, Rajasthan	28 Mar 2023
	M/s Bikaji Foods International Ltd., 39 to 41 Aroon Industrial Estate-1, Kanchpada Ramchandra Ext Lane, Malad (W), Maharashtra	28 Apr 2023
	Mr. Varun Singhwani, S/o Mr. Suresh Kumar Singhwani, 112/2 – a flat no -301, Benajhabar road Kanpur, Swarup Nagar, Kanpur, Uttar Pradesh	28 Apr 2023
	Ms. Anita Rajesh Jain, B-401, Sunrise Residency, Near Someshwara Square, Vesu, Surat City, Gujarat	6 Sep 2023
Buckwheat Dehuller	M/s M.S.Roll Products, 807/1, Punjab Mata Nagar, Jawaddi Road, Ludhiana, Punjab	3 Oct 2023
Process for Preparation of Maize Based Gluten Free Muffins	Ms. Simran Kaur, D/O Gurmeet Singh, Post Office Bhoman, Gurdaspur, Punjab	29 Nov 2023
Pearl Millet Based Composite Extrudates	M/s Komalika Farmer Producer Company Ltd., Near Vivekanand Engineering College, Old Mathura By-Pass, Nada Chauraha, Koil, Aligarh, Uttar Pradesh	14 Dec 2023


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EXIT
निकास
EXIT
निकास


AICRP-PHET


ICAR

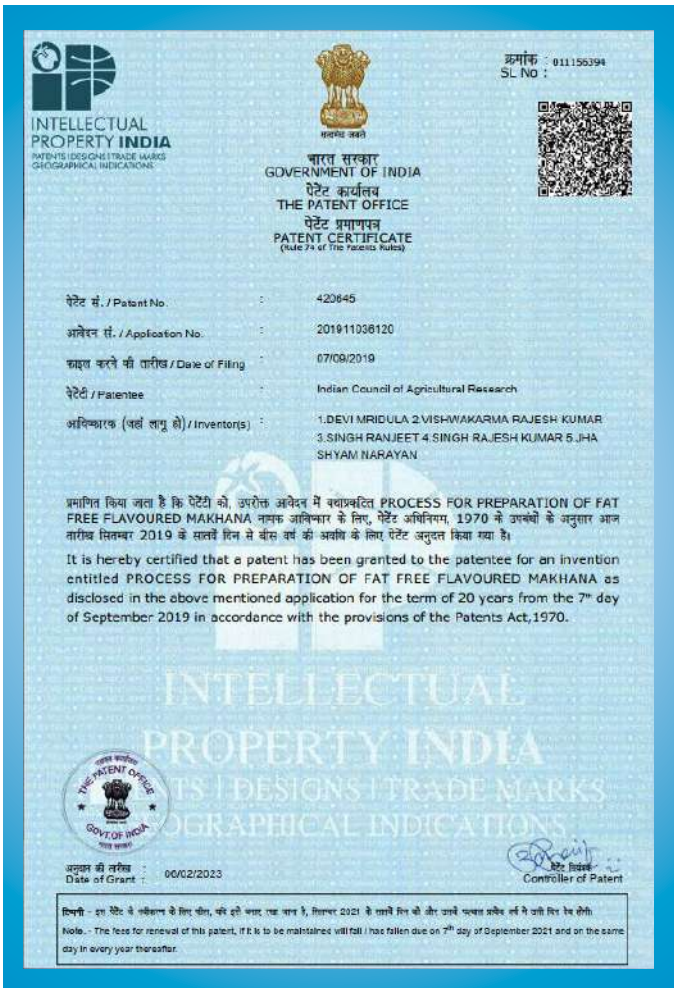
PATENT

Patent Filed

Title	Application No.	Inventors	Date of Filing
Visible Light Insect Trap	202311072493	Dr. Guru P.N., Dr. D. Saha, Er. Yogesh Kalnar, Mr. Virinder Kumar, Dr. Manju Bala, Dr. Nachiket Kotwaliwale	25 Oct 2023

Patent Granted

Title	Application No.	Inventors	Date of Grant	Patent No.
Process for Preparation of Fat Free Flavoured Makhana	201911036120	Dr. Mridula Devi, Dr. R.K. Vishwakarma, Dr. Ranjeet Singh, Dr. R.K. Singh, Dr. S.N. Jha	6 Feb 2023	420645
Mechanized System for Popping and Decortications of Makhana Seeds (*Gorgon Nut, Euryale Ferox*)	674/DEL/2013	Dr. S.N. Jha, Dr. R.K. Vishwakarma	8 Jun 2023	43144



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

क्रमांक : 011156394
SL No :

सत्यमेव जयते
भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 420645
आवेदन सं. / Application No. : 201911036120
फाइल करने की तारीख / Date of Filing : 07/09/2019
पेटेंटी / Patentee : Indian Council of Agricultural Research
अविष्कारक (कर्ता लागू हो) / Inventor(s) : 1.DEVI MRIDULA 2.VISHWAKARMA RAJESH KUMAR 3.SINGH RANJEET 4.SINGH RAJESH KUMAR 5.JHA SHYAM NARAYAN

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित PROCESS FOR PREPARATION OF FAT FREE FLAVOURED MAKHANA नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख सितम्बर 2019 के सातवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

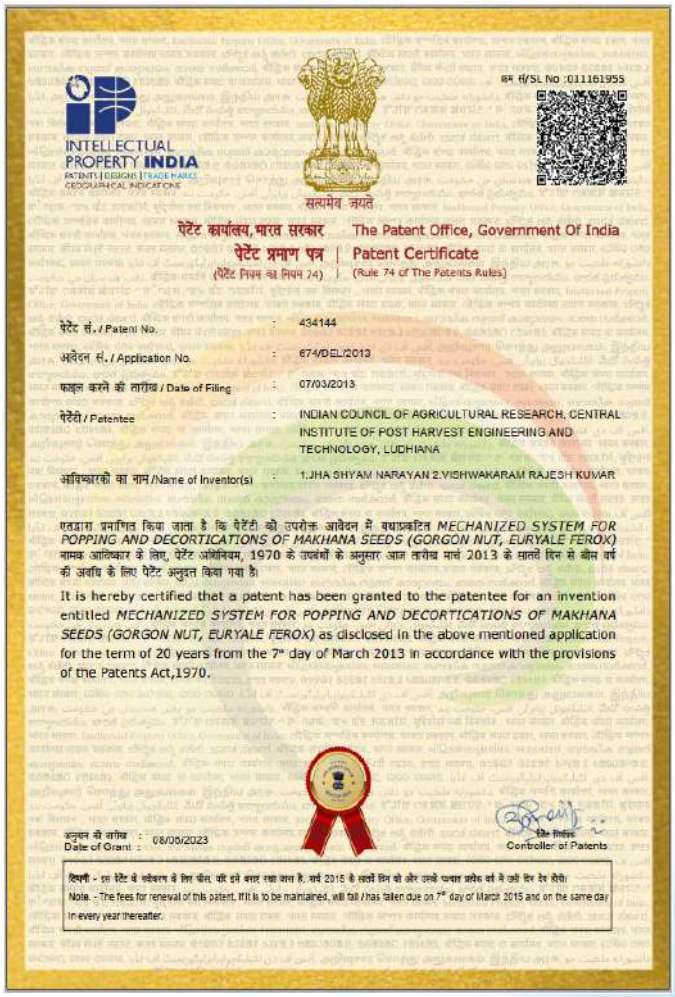
It is hereby certified that a patent has been granted to the patentee for an invention entitled PROCESS FOR PREPARATION OF FAT FREE FLAVOURED MAKHANA as disclosed in the above mentioned application for the term of 20 years from the 7th day of September 2019 in accordance with the provisions of the Patents Act,1970.

THE PATENT OFFICE GOVT OF INDIA

अनुदान की तारीख : 06/02/2023
Date of Grant :

पेटेंट नियंत्रक
Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, सितम्बर 2021 के सातवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।
Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 7th day of September 2021 and on the same day in every year thereafter.



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

क्रम सं/SL No :011161955

सत्यमेव जयते
पेटेंट कार्यालय, भारत सरकार The Patent Office, Government Of India
पेटेंट प्रमाण पत्र | Patent Certificate
(पेटेंट नियम का नियम 74) | (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 434144
आवेदन सं. / Application No. : 674/DEL/2013
फाइल करने की तारीख / Date of Filing : 07/03/2013
पेटेंटी / Patentee : INDIAN COUNCIL OF AGRICULTURAL RESEARCH, CENTRAL INSTITUTE OF POST HARVEST ENGINEERING AND TECHNOLOGY, LUDHIANA
अविष्कारकों का नाम / Name of Inventor(s) : 1.JHA SHYAM NARAYAN 2.VISHWAKARAM RAJESH KUMAR

एतद्वारा प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में यथाप्रकटित MECHANIZED SYSTEM FOR POPPING AND DECORTICATIONS OF MAKHANA SEEDS (GORGON NUT, EURYALE FEROX) नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2013 के सातवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled MECHANIZED SYSTEM FOR POPPING AND DECORTICATIONS OF MAKHANA SEEDS (GORGON NUT, EURYALE FEROX) as disclosed in the above mentioned application for the term of 20 years from the 7th day of March 2013 in accordance with the provisions of the Patents Act,1970.

अनुदान की तारीख : 08/06/2023
Date of Grant :

पेटेंट नियंत्रक
Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2015 के सातवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।
Note. - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 7th day of March 2015 and on the same day in every year thereafter.

Linkages and Collaborations

MoUs Signed

Universities/ Institutions	Date of Signing
Sanvi Trade Inc., Vadodara, Gujarat	17 Jan 2023
Agnext Technologies Pvt. Ltd, 6th Floor, Software Tech, Park of India, Sector 75, Mohali, Punjab	16 Feb 2023
Sher-e-Kashmir University of Agricultural Sciences & Technology (SKUAS&T), Kashmir, Jammu & Kashmir	10 May 2023
Maharashi Dayanand University (MDU), Rohtak, Haryana	18 May 2023
Laxmi Jan Kalyan Sewa Sansthan (LJKSS) Rawli Road, Muradnagar, Ghaziabad, Uttar Pradesh	23 May 2023
M/s Osaw Industrial Products Private Limited (INDOSAW), Osaw Complex, Jagadhari Road, Ambala Cantt., Ambala, Haryana	9 Jun 2023
Department of Consumer Affairs (DOCA), Ministry of Consumer Affais, Food & Public Distribution, Govt. of India, Krishi Bhavan, New Delhi	23 Jun 2023
M/S Upjao Agrotech LLP, Ahmedabad, Gujarat	11 Jul 2023
Chhattisgarh State Minor Forest Produce (Trading and Development) Co-operative Federation Limited, Nava Raipur, Chattisgarh	1 Aug 2023
M/s HAUCH Ecovations Pvt. Ltd. Sector 32-A, Chandigarh Road, Ludhiana, Punjab	5 Aug 2023
M/s B.G. Innovatech (OPC) Pvt. Ltd. Ludhiana, Punjab	3 Oct 2023

Post-Harvest Machinery & Equipment Testing Centre

The PHMETC tested 69 machines from 1 Jan-31 Dec 2023, generating a total testing fee of around Rs 87 lakh.

Name of Machinery	Manufacturer
Oil Mill (2 hp)	Dharti Industries, Rajkot, Gujarat
Wet Dal Mill Grinder	
Pulverizer	
Spice Processing Unit (Pulverizer)	B.K. Engineering Workshop, Hojai, Assam
Ginger Processing Unit	
Mini Oil Mill	
Multipurpose Pulverizer with Stabilizer	
Multipurpose Pulverizer (Single Chamber)	
Millet Processing and Value Addition Plant (Pre-Cleaner, De-stoner, De-Huller double chamber, Polisher with elevator) up to 1000 kg/hr	Sidhharth Enterprises, District Durg, Chhattisgarh
Dehuller Double Chamber (For All Millets)	
De-Stoner 3 in 1 (Aspirator, Blower cum Grader) (3 hp)	
Polisher For All Millets (3 hp)	
De-Huller Single Chamber (For all Millets), (2 hp)	
Pulverizer (Flour Mill) (5 hp)	
Pulverizer (Flour Mill 2 in 1) (3 hp)	
Flour Mill (3 hp)	
Spiral Grader	
Mini Dal Mill (3 hp)	
Mini Oil Mill (5 hp)	
Mini Oil Mill (3 hp)	
Mini Oil Mill (2 hp)	
Power Operated Pulverizer(2hp Single Phase)	
Seed/ Grain Cleaner cum Grader (up to 10 Tph)	Osaw Agro Industries pvt. Ltd., Ambala Cantt, Ambala, Haryana
Seed/ Grain Cleaner cum Grader (up to 5 Tph)	
Oil Mill	Baba Basukinath Krishi Kendra, Banka, Bihar
Flour Mill (3 hp)	
Multi Grain Cleaner/Paddy Lifter cum Cleaner	Prince Dhandiwalia Agri Works, Barnala, Punjab
Vibro De-Stoner	Agro Asian Industries, Ambala, Haryana
Mini Rice Mill (Tractor PTO Operated)	Krishi Vikas Udyog, Ambedkar Nagar, Uttar Pradesh
Dung Log Making Machine (5 hp)	Sidhharth Enterprises, District Durg, Chhattisgarh
Dung Log Making Machine (3 hp)	
Dung/Waste Dewatering Machine (5 hp)	
Dung/Waste Dewatering Machine (3 hp)	
Seed Pre-Cleaner	M/s Osaw Industrial Products Pvt. Ltd. Ambala, Haryana
Groundnut Decorticator	Shreeji Engineering, Rajkot, Gujarat
Mini Dal Mill	Satyam Agro Company, Bihar
Mini Oil Mill	
Rice Mill (Tractor PTO Operated)	Kushwaha Agriculture Pvt Ltd, Bihar
Gravity Separator	KPMC Technology Limited, Indore, Madhya Pradesh
De-Stoner (5Tph)	Tulsi Agro Engi Mech Pvt. Ltd., Rajkot, Gujarat
Gravity Separator (5Tph)	
Vibro Cleaner cum Grader (5Tph)	
De-Stoner	Radient Equipment Company, Ambala, Haryana
Pre-Cleaner	
Multigrain De-Stoner	KPMC Technology Limited, Indore, Madhya Pradesh



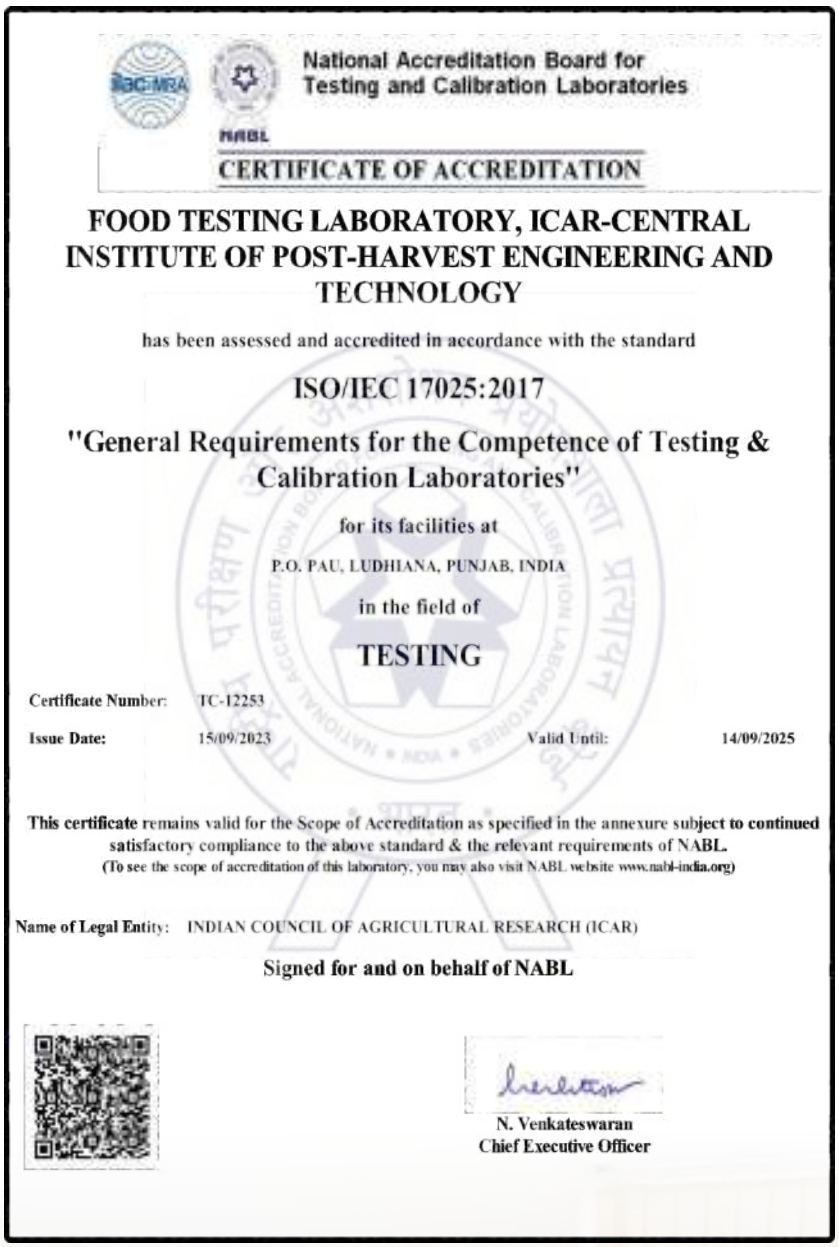




Food Testing Laboratory

Food Testing Laboratory, funded by the Ministry of Food Processing Industries (MoFPI), New Delhi is an adequately equipped lab that contains both basic and semi-advanced equipment designed for food analysis and the assessment of food product safety. This facility serves the food testing, needs of diverse stakeholders and, aids entrepreneurs in testing their samples. Validated testing protocols are in place for specific parameters such as water quality, fat, protein, fibre analysis, mineral contents, and more. Through this facility, the institute addresses the testing requirements of processors, entrepreneurs, small and medium enterprises, and the industry based on their specific needs, all at reasonable testing charges. In the year 2023, the laboratory received a substantial number of commercial samples for testing and the revenue generated by the laboratory from its testing and training activities amounted to Rs. 1.27 lakh.

Food Testing Laboratory at ICAR-CIPHET, Ludhiana has been granted NABL Accreditation. *w.e.f.* 15 Sep 2023 for 38 parameters under its scope in the field of chemical testing with two groups namely Food & Agricultural Products and Residues in Food Products.



National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

FOOD TESTING LABORATORY, ICAR-CENTRAL INSTITUTE OF POST-HARVEST ENGINEERING AND TECHNOLOGY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

P.O. PAU, LUDHIANA, PUNJAB, INDIA

in the field of

TESTING

Certificate Number: TC-12253

Issue Date: 15/09/2023 Valid Until: 14/09/2025

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Entity: INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

Human Resource Development and Capacity Building Programme
HRD Programme Attended

Scientific Staff	Title of Programme	Organized by	Duration
Dr. Poonam	Tools and Techniques for Analysis of Bio Molecules (Online)	Division of Biochemistry, ICAR-Indian Agricultural Research Institute (IARI), New Delhi	18-31 Jan 2023
Dr. Ramesh Chand Kasana	Parali –Ek Punji	Commission for Air Quality Management in National Capital Region and Adjoining Areas, New Delhi at Mohali, Punjab	20 Feb 2023
Dr. Sandeep Dawange	38th Annual Workshop of AICRP on PHET	ICAR- Central Plantation Crops Research Institute (CPCRI), Kasaragod, Kerala	20-22 Feb 2023
Dr. Ranjeet Singh and Dr. Renu Balakrishnan	ICAR-Industry Stakeholder Consultation Meet	National Agricultural Science Complex (NASC), New Delhi	6 Mar 2023
Dr. Abhinav Dubey, Er. Urhe Sumit Bhausaheb, Dr. Shrikrishna Nishani, Dr. Shilpa S Selvan, Ms. Soumya S. Mohapatra	112th Foundation Course for Agriculture Research Service (FOCARS)	ICAR-National Academy of Agricultural Research Management (NAARM) Hyderabad	11 Apr-10 Jul 2023
Er. Ritu Bharat Kukde	113th Foundation Course for Agriculture Research Service (FOCARS)	ICAR-National Academy of Agricultural Research Management (NAARM) Hyderabad	18 Jul-17 Oct 2023
Dr. Shilpa S Selvan	Professional Attachment Training (Refractance window drying charactertics of Button mushroom (*Agaricus bisporus* L.) slices	ICAR-Central Institute of Agricultural Engineering, Bhopal	28 Aug-28 Nov 2023
Er. Urhe Sumit Bhausaheb	Professional Attachment Training (Biosensor Intervention in Detection of Aflatoxin in Maize)	Department of Chemistry, Birla Institute of Technology & Science (BITS), Pilani, KK Birla Goa Campus, Goa	11 Sep-10 Oct 2023
Dr. Vikas Kumar	ABI-Samagra- Enabling the Incubators	ICAR- Intellectual Property & Technology Management (IP&TM) Unit, New Delhi	17-18 Oct 2023
डॉ. विकास कुमार	कंठस्थ 2.0	राजभाषा विभाग, गृह मंत्रालय, भारत सरकार, नई दिल्ली	29 Nov 2023
Dr. Khwairakpam Bembem	ICAR sponsored winter school on 'Igniting the Millet Renaissance: Advancing the Millet Year with Post-Harvest Engineering and Technology for Nutritional Security, Loss Minimization and Enhanced Profitability'	ICAR-CIPHET, Ludhiana	1-21 Dec 2023

Technical Staff	Title of Programme	Organized by	Duration
Ms. Pragya Singh, Technical Assistant	Principles and Production Techniques of Hybrid Seeds in Vegetables	Indian Institute of Vegetable Research (IIVR), Varanasi, Uttar Pradesh	16-30 Jan 2023
Mr. Jagtar Singh, Sr. Technical Assistant	Food Processing, Packaging and value addition of Agriculture and Livestock Produce	ICAR-CIPHET, Ludhiana, Punjab	14-25 Nov 2023
Mr. Pradeep Kumar Sr. Technical Assistant			

Administrative Staff	Title of Programme	Organized by	Duration
Sh. R.C. Meena	Entry Court Cases (Online)	Legal Information Management & Briefing System (LIMBS), Department of Legal Affairs, Ministry of Law & Justice, Government of India, New Delhi	13 Feb 2023
Sh. Kunwar Singh			
Sh. Gurdial Singh			

HRD Programme Organized

Training Title	Number of participants	Duration
Winter School		
Igniting the Millet Renaissance: Advancing the Millet Year with Post-Harvest Engineering and Technology for Nutritional Security, Loss Minimization and Enhanced Profitability	25	1-21 Dec 2023
ICAR's HRD Training for Technical Staffs		
Food Processing, Packaging and Value Addition of Agriculture and Livestock Produce	11	14-25 Nov 2023
Capacity Building Programme		
Capacity Building of Agricultural Extension Professionals of ATARI Zone-III to Promote Agro Processing	13	14-16 Feb 2023
Capacity Building of Agricultural Extension Professionals of ATARI Zone-IV and V for Promoting Agro-Processing	2	21-23 Feb 2023
Capacity Building of Agricultural Extension Professionals of ATARI Zone VI for Promoting Agro-Processing	8	16-18 May 2023
Capacity Building of Agricultural Extension Professionals of ATARI Zone-VIII for Promoting Agro-Processing	36	7-11 Aug 2023
Capacity Building Training Programme for Agricultural Extension professionals of ATARI Zone -IX for Promoting Agro-Processing	5	11-15 Sep 2023
ATMA Sponsored Farmers Training		
Post-Harvest Technology for Agricultural Produce	20	9-13 Jan 2023
Post-Harvest Technologies and Management of Agricultural Produce	15	16-20 Jan 2023
Post-Harvest Management of Agricultural Produce	15	30 Jan - 3 Feb 2023
Post-Harvest Management of Agricultural Produce	15	20-24 Feb 2023
Post-Harvest Management of Agricultural Produce	16	13-17 Mar 2023
Post-Harvest Management of Agricultural Produce	19	15-19 May 2023
Introduction to Post-Harvest Technologies for Agricultural Produce	6	18 May-30 Jun 2023
Post-Harvest Management of Agricultural Produce	20	5-9 Jun 2023
Post-Harvest Management of Agricultural Produce	10	3-7 Jul 2023
Post-Harvest Management of Agricultural Produce	22	24-28 Jul 2023
Post-Harvest Management of Agricultural Produce	25	16-20 Oct 2023
SLFMTTC Govt. of Odisha Sponsored Training		
Testing of Post-Harvest Machinery	4	3-7 Jul 2023
SMART Project Sponsored		
Post-Harvest Management of Agricultural Produce	35	27-31 Mar 2023
Post-Harvest Management of Agricultural Produce	14	10-14 Apr 2023
MANAGE Sponsored Collaborative Training		
Value Chain Management of Agricultural Commodities for Income Enhancement of Stakeholders (Online mode)	35	14-16 Jun 2023
Student's Training		
M. Tech. student from Dr. Nandamuri Taraka Rama Rao College of Agril. Engg., Acharya N. G. Ranga Agricultural University (ANGRAU), Andhra Pradesh	1	10 Apr-9 May 2023
B. Tech. students from college of Agricultural Engineering and Technology, Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar	8	1-30 Jun 2023
B. Tech. students from Sardar Vallabh Bhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh	3	1-31 Aug 2023

Training Title	Number of participants	Duration
B. Tech. students from Suresh Gyan Vihar University, Jaipur, Rajasthan (at ICAR-CIPHET, Abohar)	3	1-31 Aug 2023
B. Tech. students from College of Technology and Engineering, Maharana Pratap University of Agriculture & Technol ogy (MPUAT), Udaipur, Rajasthan (at ICAR-CIPHET, Abohar)	3	1-31 Aug 2023
B. Tech. students from College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur, Madhya Pradesh (at ICAR-CIPHET, Abohar)	9	1-31 Aug 2023
B.Tech students from Sardar Vallabh Bhai Patel University of Agricultural Technology, Meerut and Swami Vivekanand College of Agricultural Engineering and Technology, Indira Gandhi Agricultural University (IGKV), Raipur, Chhatisgarh	17	1-31 Aug 2023
B.Tech students from College of Agricultural Engineering & Technology, Punjab Agricultural University (PAU), Ludhiana, Punjab	7	7 Aug -5 Oct 2023
B. Tech. (Agril. Engg.) students from Dr. D. Y. Patil College of Agril. Engg. & Tech., (Affiliated to Mahatma Phule Krishi Vidyapeeth , Rahuri) Talsande, Hatkanangale, Kolhapur, Maharashtra	6	16 Aug -18 Sep 2023
B.Tech. (Agril. Engg.) students from College of Agricultural Engineering & Technology, Dr. Rajendra Prasad Central Agricultural University (RPCAU), Pusa, Samastipur, Bihar	7	24 Aug - 22 Sep 2023
B. Tech. (Agril. Engg.) students from K.K. Wagh College of Agricultural Engineering & Technology, Saraswati Nagar, Panchavati, Nashik, Maharashtra, Shriram College of Agricultural Engineering, Paniv (Affiliated to Mahatma Phule Krishi Vidyapeeth, Rahuri), Tal -Malshiras, Solapur, Maharashtra, Swami Vivekananda College of Agricultural Engineering and Technology & Research Station, Faculty of Agricultural Engineering, Indira Gandhi Agricultural University (IGKV), Raipur, Chhattisgarh, Bhawani Sao Ramlal Sao Memorial (BRSM) College of Agricultural Engineering and Technology & Research Station, Indira Gandhi Krishi Vishwavidyalaya (IGKV), Pandariya Road, Mungeli, Chhattisgarh, College of Agriculture Engineering & Technology, Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), Parbhani, Maharashtra	28	1-30 Sep 2023
B. Tech. students from Vasant Rao Naik Marathwada Krishi VidyaPeeth, Parbhani, Maharashtra	5	1-30 Sep 2023
B. Tech. students from Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhatisgarh	10	3-31 Sep 2023
B.Tech. (Agril. Engg.) students from College of Agricultural Engineering & Technology, Punjab Agricultural University (PAU), Ludhiana, Punjab	7	7 Sep-5 Oct 2023
B. Tech. (Agril . Engg.) students from Dr. NTR College of Agricultural Engineering, Bapatla, Acharya N. G. Ranga Agricultural University (ANGRAU), Andhra Pradesh	7	11 Sep -10 Oct 2023
B. Tech. (Agril. Engg.) students from Swami Vivekananda College of Agricultural Engineering and Technology & Research Station, Faculty of Agricultural Engineering, Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur, Chhattisgarh	7	6 Oct -5 Nov 2023

Winter School on Igniting the Millet Renaissance

Capacity Building Programmes

SMART Project Sponsored

ICAR's HRD Training for Technical Staff

ATMA Sponsored Farmers Training

Student's Training

Specialized Training

Training Title	Number of Participants	Duration
Processing Techniques for Value Addition of Rose Petals (CRP-SA project on Bioactive Compounds)	2	13-14 Jul 2023
Jamun Processing	14	23-27 Sep 2023
Jamun Processing	15	15-20 Oct 2023
Testing and quality analysis of selected minor forest produce of Chhattisgarh State	8	13-23 Dec 2023

Agri Business Incubation (ABI)

Through ABI, the Institute has conducted numerous training sessions, business meet and awareness/ sensitization programs, besides serving as an incubation center for startups. In 2023, the ABI center organized 4 sensitization programs, three business meets and supported the incubation of entrepreneurs.

Sensitization Programs Organized

Title	Venue	Date	No. of Participants
Agribusiness Entrepreneurship Development through Agro Processing	Village Ajnod, Ludhiana, Punjab	1 Feb 2023	50
Agribusiness Entrepreneurship Development through Agro Processing	Village Malakpur Bet, Ludhiana, Punjab	20 Feb 2023	50
Agribusiness Entrepreneurship Development through Agro Processing	Village Sarinh, Ludhiana, Punjab	3 Mar 2023	50
Agribusiness Entrepreneurship Development through Agro Processing	Village Barmalipur, Ludhiana, Punjab	3 Mar 2023	50

Incubation Provided

Title	Contracting Party	Duration
Spice Processing	Mr. Paramjot Singh, Mandi Ahmedgarh, Punjab	1 Apr-1 Jul 2023
Kodo Millet Processing Plant	Mr. Sukhvir Singh, Fatehgarh Sahib, Punjab	1 Oct 2023 (ongoing)
Kodo Millet Processing Plant	Mr. Gurmel Singh, Nabha, Patiala, Punjab	1 Oct 2023 (ongoing)
Makhana Pasta Production	M/s Saurath Agro Pvt Ltd, Darbhanga, Bihar	1 Oct 2023 (ongoing)

Industry Interface Meetings

Three industry interface meetings were organized during 3-5 Oct 2023.

1. ***Empowering Food Processing and Value Addition: Industry Partnership Event:*** During this meeting discussions were held on food processing advancements, sustainability in response to consumer demands, the importance of research-industry collaboration, and enhancing product marketability through online platforms.
2. ***Weaving the Future: Natural Fibres Processing Symposium:*** This meeting focused on natural fibres. The session covered discussions on the extraction and processing technologies of natural fibres and their potential applications as alternatives to plastic. Textile industry representatives from Ludhiana expressed interest in collaborating with ICAR-Central Institute for Research on Cotton Technology (CIRCOT) and ICAR- National Institute of Natural Fibre Engineering and Technology (NINFET) for sustainable fibre product development. Small-scale industry representatives emphasized the need for economical and scalable techniques for small-scale cotton processors.
3. ***Seeds of Innovation:*** Post-Harvest Industry Connect: This interface meeting was led by different industries, support departments of the Central and Punjab Governments and ICAR-CIPHET as technology providers. The session emphasized crop diversification and explored market opportunities for agri-start-ups. Start-up Punjab provided insights into subsidies and seed grants, while the Punjab State Council on Science & Technology discussed grassroots innovator selection criteria. Speakers highlighted the support for farmers in the dairy and food businesses, with a focus on technology dissemination, training, and involvement of women in processing.

EXTENSION ACTIVITIES

Processing and Marketing of Honey

Beekeepers from Bandi, Bathinda, have been trained in the scientific production of high-quality honey using the Honey Processing Unit set up under the Farmer FIRST Project. Also, a Honey Processing unit (25-30 kg/batch) was handed over to Farmer Interest Group of Bandi, Bathinda, Punjab on 6 Apr 2023. These farmers have obtained FSSAI registration and are marketing their products in the market under the brand names "Grewal Processing Center" (FSSAI No: 22123008000182).

Industry Interface Meeting Cum Awareness Camp in Collaboration with National Horticulture Board (NHB)

An industry interface meeting cum awareness camp for horticultural crop production and processing was organized at ICAR-CIPHET, Abohar in collaboration with National Horticulture Board, Chandigarh on 14 Jun 2023.

Setting up of Commercial-Scale Millet Processing Unit

A complete set-up of a commercial millet processing unit and its value chain has been developed at ICAR-CIPHET to promote the millets in Punjab and to benefit the farmers with training, demonstration, and custom hiring services. In this commercial millet processing unit, a comprehensive millet processing setup has machines for cleaning, grading, destoning, dehulling, polishing, and separation of millets. A cleaner cum grader with aspirator (100 kg/h), destoner (100 kg/h), and specific gravity separator (100 kg/h) has been adopted and used for primary processing operations of millets. In addition to these, four distinct dehulling machines developed at the Institute, have been installed to cater to the dehulling of different types of millets, from easy-to-dehull to difficult-to-dehull. An abrasive type dehuller (100 kg/h) developed by ICAR-CIPHET is used for easy-to-dehull millets such as Little, Foxtail, Proso, and Buckwheat (a pseudo-millet). A centrifugal-type dehuller (100 kg/h) developed by ICAR-CIPHET is used for the dehulling requirements of oats and millets like Barnyard and Browntop. An emery roller type dehuller (500 kg/h) is used for the dehulling and pearling of major millets like Finger millet, Pearl millet, and Sorghum.

Commercial Scale Millet Processing Machines at Millet Processing Centre

ICAR CIPHET-IIFA & Kisan Mela 2023

CIPHET-IIFA & Kisan Mela 2023 comprised various activities, including Industry Interface Meets, live demonstrations of drone applications in agriculture, knowledge sharing, networking opportunities, and exploration of business prospects. Prominent institutions such as ICAR-CIPHET, ICAR- National Institute of Natural Fibre Engineering and Technology (NINFET), ICAR- Indian Institute of Maize Research (IIMR), ICAR- Central Institute for Research on Cotton Technology (CIRCOT), National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Punjab Agricultural University (PAU), and Guru Angad Dev Veterinary and Animal Science Universiy (GADVASU) along with farmers', rural and urban entrepreneurs from diverse regions showcased post-harvest and value-addition techniques and innovative products through approximately 80 stalls. Visitors had the opportunity to explore and purchase value-added products, including gluten-free bakery items, extruded snacks, millet-based products, jaggery, and handicrafts. Kisan Goshthi and three Industry Interface Meetings were also organized. This prestigious event, held from 3-5 Oct 2023, attracted luminaries and stakeholders from the agricultural and agro-processing sectors and served as a platform for fostering partnerships between agricultural processing and farming communities.

Minimal Processing of Horticultural Crops

The Farmer First Project team gave live demonstration of cling wrapping machines for retail packaging of vegetables (cauliflower, peas, mushroom, capsicum). Farmers were also shown different type of flexible and rigid packaging materials for packaging of various types of horticultural crops. The project Team also handed over two cling wrapping machines to farmer so that they can start sale of packaged vegetables in market.

Production of Chemical Free Candy Shaped Jaggery through Silicon Moulds

Sh. Gurpal Singh (farmer) from Rahon, Punjab was given training for production on small candy shaped jaggery. The Farmer First Project, ICAR-CIPHET also distributed some silicon moulds of different shapes and sizes to him. Project team also gave training on hygienic production of chemical free jaggery through these moulds.

Farmer interest group & commodity interest group created under farmer first project

Group	Place	No. of farmers
Farmer interest group	Bathinda (honey)	20
Farmer interest group	Sangrur (honey)	20
Farmer interest group	Nawashahr (Agro processing centre)	50
Commodity interest group	Nawashahr (Jaggery)	25

Participation in Exhibitions

Programme Title	Venue	Duration
India Agri Process Expo	Ludhiana Exhibition Centre, Sahnewal, Ludhiana, Punjab	20-22 Jan 2023
Krishi Darshan Expo 2023	Northern Region Farm Machinery Training & Testing Institute, Hisar, Haryana	18-20 Feb 2023
Brainstorming	Punjab Agricultural University, Ludhiana, Punjab	16 May 2023
G20 Leaders Summit & Spouse Meet	NASC Complex, New Delhi	9-10 Sep 2023

SCHEDULE CASTE SUB PLAN (SCSP)

ICAR-CIPHET is implementing SCSP scheme with the main objective of improving the socio-economic status of the SC community. Under this scheme, various training/capacity-building programmes are being organized for scheduled caste farmer, farm women and youths to enhance the incomes of the target group through the processing of agricultural produce. During this period ten programmes were organized in two states *viz.* Punjab and Chhatisgarh for the benefit of the SC community.

Title of Training/ Program/ Activities carried out under SCSP	Location	No. of Participants	Duration
Awareness Programme on Millets	Village Ajnoud, Tehsil Payal, Distt. Ludhiana, Punjab	50	1 Feb 2023
Awareness Programme on Millets	Village Malakpur, Distt. Ludhiana, Punjab	46	22 Feb 2023
Awareness Programme on Millets	Village Sarinh, Distt. Ludhiana, Punjab	50	3 Mar 2023
Awareness Programme on Millets	Village Baramalipur, Tehsil - Payal, Distt. Ludhiana, Punjab	50	3 Mar 2023
Awareness cum Training Programme on 'Entrepreneurship Development and Input Distribution'	Grain Market, Distt. Fazilka, Punjab	302	1-3 Mar 2023
Skill development Training on Value Addition of Cereal and Millets for Nutritional Security	KVK Samrala and ICAR-CIPHET, Ludhiana, Punjab	50	13-15 Mar 2023
Skill Development Training on Primary Processing and Value Addition of Millets	Dau Shri Vasudev Chandarakar Kamdhenu Vishwavidyalaya Durg, Chattisgarh	50	14-16 Mar 2023
Exposure Visit of Farmers to Post-harvest technologies during IIFA Kisan Mela 2023	ICAR-CIPHET, Ludhiana , Punjab	595	3-5 Oct 2023
Training on title 'Protein-Enriched Cereal and Millet Based Value Added Products'	ICAR-CIPHET, Ludhiana , Punjab	50	18-20 Oct 2023
Awareness cum Technology Demonstration Camp	ICAR-CIPHET, Abohar, Punjab	120	7-9 Nov 2023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Krishi Vigyan Kendra
Jalandhar (Nurmahal)


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VISITORS

Officials

Address of Visitors	Number of Visitors	Date
Delegates of Department of Agriculture and Farmers' Welfare, Amritsar , Punjab Agricultural Management & Extension Training Institute (PAMETI), PAU, Ludhiana, Punjab	18	21 Feb 2023
Delegates of Department of Agriculture and Farmers' Welfare, Amritsar, Punjab	13	22 Feb 2023
Delegates of Department of Agriculture and Farmers' Welfare, Amritsar , Punjab, PAMETI, PAU, Ludhiana, Punjab	20	28 Feb 2023
Extension Officials, Punjab Agricultural Management & Extension Training Institute (PAMETI), Punjab Agricultural University, Ludhiana, Punjab	10	18 May 2023
Delegate of ICAR-Indian Institute of Wheat and Barley Research, Karnal, Haryana	1	9 Jun 2023
Dr. S.N. Jha, Deputy Director General (Agricultural Engineering), ICAR, New Delhi	1	19 Jun 2023
Dr. D.B. Shakyawar, Director, ICAR -National Institute of Natural Fibre Engineering and Technology, Kolkata	1	21 Aug 2023
Delegates of Riyat Institute of Management & Technology (RIMT), University School of Agricultural Sciences and Technology , Mandi Gobindgarh, Punjab	21	24 Aug 2023
Dr. Munil Kumar Sukham, Principal Scientist, ICAR- Central Institute of Fisheries Education (CIFE), Mumbai, Maharashtra	1	24 Aug 2023
Officers from ICAR- Agricultural Technology Application Research Institute (ATARI), Zone -1 Ludhiana, Punjab	4	29 Sep 2023

Farmers

Farmers' Group	Number of Visitors	Date
Farmers from Godra, Panchmahal, Gujarat	52	14 Mar 2023
Farmers from Villages Surrounding Abohar, Punjab	26	20 Jun 2023
Farmers from Rahman Khera, Government Farm, Uttar Pradesh	3	10 Aug 2023
Self-Help Groups (SHG) Women	27	10 Aug 2023
ICAR-CIPHET, Ludhiana for IIFA -2023 (under CRM)	55	3 Oct 2023
Scheduled Caste Participants for IIFA-2023 (under SCSP plan)	232	3-5 Oct 2023
Farmers from Agricultural Technology Management Agency (ATMA) Jodhpur, Rajasthan	35	12 Oct 2023

Student's Educational Visits

Address of Visitors	Number of Participants	Date
Rani Lakshmibai Central Agricultural University (RLBCAU), Jhansi, Uttar Pradesh	25	2 Jan 2023
Govt. Sen. Sec. School, Abohar, Punjab	31	18 Jan 2023
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (DBSKVM), Ratnagiri, Maharashtra	46	20 Jan 2023
Govt. Girls Sen. Sec. School, Abohar, Punjab	60	3 Feb 2023
Govt. Sen. Sec. School, Abohar, Punjab	50	6 Feb 2023
Govt. Sen. Sec. School, Danger Khera, Fazilka, Punjab	50	8 Feb 2023
Sen. Sec. School, Abohar, Punjab	100	10 Feb 2023
Govt. Sen. Sec. School, Karam Patti, Punjab	60	13 Feb 2023
Model Sen. Sec. School, Ranikhet, Uttarkhand	20	16 Feb 2023
Lovely Professional University, Jalandhar, Punjab	28	16 Feb 2023
Govt. Sen. Sec. School Dhab, Abohar, Punjab	33	16 Feb 2023
Government Senior Secondary School, Purain, Punjab	28	17 Feb 2023
Govt. High. School, Mohala Dharang wala, Abohar, Punjab	40	17 Feb 2023
College of Agriculture, Kalaburagi, Raichur, Karnataka	73	21 Feb 2023
National Institute of Food Technology Entrepreneurship and Management, Thanjavur, Tamil Nadu	69	28 Feb 2023
College of Agriculture, Kerala Agric ultural University Vellanikkara, Thiruvanthapuram, Kerala	164	2 Mar 2023
College of Agriculture, Kerala Agricultural University , Vellanikkara , Thiruvanthapuram	156	2 Mar 2023
College of Agriculture, Central Agricultural University (Imphal), Pasighat, Arunachal Pradesh	19	3 Mar 2023
College of Food Technology, Lamphel, Imphal, Manipur	15	10 Mar 2023
Lovely Professional University, Phagwara, Punjab	53	16 Apr 2023
APEX Agriculture College Chaiya, Rawatsar, Rajasthan	30	25 May 2023
Riyat Institute of Management & Technology (RIMT), Gobindgarh, Punjab	20	24 Aug 2023
College of Agricultural Engineering & Technology (CAET), Anand Agricultural University (AAU), Gujarat	30	24 Sep 2023

EVENTS ORGANIZED

Republic Day Celebration

ICAR-CIPHET celebrated 73rd Republic Day on 26th Jan 2023 to honour the date on which the Constitution of India came into effect. On this occasion Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET, hoisted the tricolour and addressed the staff of the institute. Different cultural and sports activities were organized for staff and their family members after the flag hoisting ceremony. Awards were distributed to the wards of staffs achieving excellence in 10th and 12th standards.

National Science Day

National Science Day was celebrated on 28th Feb 2023 at ICAR-CIPHET, Ludhiana. To commemorate the event a Lecture cum Interaction meeting was organized in collaboration with ISAE Punjab Chapter. Dr. Digvir Jayas, President & Vice-Chancellor, University of Lethbrdige Canada was the speaker on this occasion.

International Women's Day Celebration

ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana celebrated 'International Women's Day' on 7 Mar 2023. Two women entrepreneurs Ms. Navnoor Kaur, Founder and CEO, JaggerCane and Smt. Sarabjit Kaur, Owner, Soya Plus were invited as the Guest speakers on this occasion. The programme was coordinated by Dr. Deepika Goswami, Dr. T. Sunita Devi, Mrs. Jasvir Kaur and Ms. Pragya Singh.

ICAR-CIPHET, Abohar also celebrated 'International women's day' in collaboration with Crop Life NGO, Abohar in which Dr. Rekha Sood Handa was the chief guest. Following lectures were delivered during this program:

Name & Designation	Topic of Lecture
Dr. Rekha Sood Handa (Principal Gopi Chand Arya Mahila College, Abohar)	Girl Child Discrimination & Education
Smt. Maya Devi (Agriculture Sub Inspector, Abohar)	Women Contribution in Sustaining Agriculture
Mr. Desh Raj Kamboj (Advocate District Legal Services Authority, Fazilka)	Women Rights, Laws & Social Security Schemes
Ms. Gauri Sachdeva (In-charge of Sakhi Centre, Fazilka)	Women Help Line (Sakhi Center for Affected Women)
Ms. Navdeep Kaur (CDPO, Abohar)	Social Security Women & Child Development, Importance of Women Day Celebration, Importance of Family & Society
Ms. Gagandeep Kaur (BDPO Khuain Sarwar, Fazilka)	Women Empowerment & Leadership

The beneficiaries of KVK Smt. Sumitra Devi Ramsara and Smt. Kanchan Chaudhary Jandhwala were honoured for their small scale entrepreneurial establishment. In this programme total 250 women participated. The programme was co-ordinated by Dr. Rupender Kaur, SMS, KVK, Fazilka.

Inauguration of Regional Station, Abohar

The Horticulture and Crop Processing Division of ICAR-CIPHET, Abohar has been upgraded to Regional Centre, CIPHET, Abohar on 20 Jun 2023. A stakeholder meeting was also organized on the occasion of inauguration of the centre. The chief guest of the meeting was Dr. S.N. Jha, Deputy Director General, Agricultural Engineering, ICAR, New Delhi and special guests of honour were Dr. Nachiket Kotwaliwale, Director CIPHET, Ludhiana, Dr. Anil Sangwan, Director, Punjab Agricultural University Regional Center, Abohar. In this meeting, entrepreneurs and progressive farmers including women of Self-Help Groups (SHG) associated with CIPHET, Abohar and Krishi Vigyan Kendra also participated. A total of 26 participants made this event successful through their active participation. In this meeting, various problems of stakeholders were discussed and they were guided about government policies and schemes.

International Day of Yoga-2023

International Day of Yoga 2023 was celebrated at ICAR-CIPHET, Ludhiana jointly by ICAR-CIPHET Ludhiana and Abohar, ICAR-ATARI Zone-1, Ludhiana, ICAR-NRC on Makhana, Darbhanga and Yog Bharti, Ludhiana on 21 Jun 2023 in hybrid mode. Participants included the scientific, administrative, technical and supporting staff, students and other Indian citizens of the three institutes. Around 110 participants participated physically, while around 20 participants from the ICAR-CIPHET Regional Station, ICAR-NRC on Makhana and other participated online during the programme.

Independence Day Celebration

The institute celebrated 76th Independence Day at both campuses on 15 Aug 2023. Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET unfurled the Tricolour in Ludhiana campus and addressed the staff on the occasion. He highlighted the achievements of the Institute during this year and stressed upon the importance of post-harvest management along with emphasis on keeping and maintain a clean, healthy & hygienic environment.

Vigilance Awareness Campaign

Both ICAR-CIPHET, Ludhiana and Abohar Campus observed the Vigilance Awareness Campaign and organized different activities during 16 Aug – 15 Nov 2023. The Campaign started with the pledge taking ceremony by Dr. Manju Bala, I/c Director, all the scientific, technical and administrative staff of the institute. During this campaign awareness was made on Public Interest Disclosure & Protection of Informer (PIDPI) to farmers, students and other stake holders during different training programs held in this duration at the institute. An invited guest lecture on “Say no to corruption; commit to the Nation" was delivered by Sh. Ashok Kumar, State Tax Officer, Ludhiana. Different awareness programs were also conducted at Abohar and surrounding villages during the campaign. KVK Abohar organized a Gram Sabha for farmers to create awareness among rural people and 82 farmers attended the programme. The programme was coordinated by Dr. R. C. Kasana, Vigilance Officer, Dr. Chandan Solanki, Scientist, Dr. Poonam, Scientist, Sh. R. C. Meena, CAO, and Sh. Permod Sharma, FAO, ICAR-CIPHET, Ludhiana.

Meri Mati Mera Desh

ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana organized an extempore competition and oath activities to celebrate the *'Meri Mati Mera Desh'* initiative of the Government of India. An extempore was organized on the theme 'Veeron Ka Vandan' on 1 Sep 2023. ICAR-CIPHET staff and the trainees (B.Tech students from 4 different Agricultural Engineering Colleges in India) participated in this competitive event. The top 3 performers were conferred with 1st, 2nd, and 3rd prizes and 2 other performers were awarded consolation prizes. Dr. S.K. Tyagi, Principal Scientist, FG&OP Division and Dr. Sandeep Mann, Principal Scientist cum Head, AS&EC Division, ICAR-CIPHET, Ludhiana evaluated the participants. The program was organized by Dr. Armaan Ullah Muzaddadi, Principal Scientist cum Head, TOT Division, ICAR-CIPHET, Ludhiana and Dr. Vikas Kumar, Scientist, TOT Division, ICAR-CIPHET, Ludhiana. On 6 Sep 2023, 'Panch Pran' oath was taken by all the staff of the institute in the presence of Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET, Ludhiana.

Communal Harmony Campaign Week

ICAR-CIPHET observed Communal Harmony Campaign week during 19-25 Nov 2023 and Flag Day on 25 Nov 2023. Flag Day spread the message of Communal Harmony and National Integration to the people of the country utilized for fund raising to enhance resources of the Foundation. On Flag Day, flags were distributed to employees of the institute and they were encouraged to donate generously.

International Year of Millet 2023

ICAR-CIPHET celebrated the International Year of Millet 2023 from 1 Jan 2023 to 31 Dec 2023. During this celebration a number of activities i.e. one day workshop, exhibitions, melas, demonstrations, training programmes which were held to spread the awareness about the millet processing and its value addition, a complete millet processing value chain has been established at ICAR-CIPHET. A one day workshop on millet and its nutrition was held on 23 Apr 2023 at ICAR-CIPHET, Ludhiana with joint efforts of Aarogya Bharti, Ludhiana. The workshop was coordinated by Dr. Manju Bala, Head & Principal Scientist, Dr. Swati Sethi, Senior Scientist and Dr. Chandan Solanki, Scientist, Food Grains & Oilseeds Processing Division and Dr. Chandan Solanki, Scientist & Nodal Officer at ICAR-CIPHET, Ludhiana.

SWACHH BHARAT ABHIYAN

The Swachh Bharat Abhiyan activities during the reporting period were actively conducted under the council's directives. Throughout the year, initiatives including a cleanliness drive, awareness campaigns, digitalization of office documents, weeding out of files, disposal of outdated materials, campus beautification initiatives, and the hanging of banners emphasizing the significace of Swachchhta were conducted.

Swachchhta Pakhwada 2023

The Swachchhta Pakhwada held at ICAR-CIPHET, Ludhiana, between December 16th and 31st, 2023, encapsulated an array of impactful initiatives promoting cleanliness and hygiene.

Commencing with an inaugural ceremony the fortnight-long event saw active participation from the staff. It began with a pledge to uphold cleanliness, accompanied by banner displays across the campus as a visual reminder of the commitment. A comprehensive overview of planned activities ensured a well-structured and purposeful approach.

The subsequent days witnessed diverse engagements. The Administrative Block underwent meticulous cleaning and organization, emphasizing digitization efforts. A robust cleanliness drive at Village Talwara, Hambran Road, Ludhiana, covering residential, marketplace, and field areas with a focus on waste segregation and proper disposal was organised.

The institute's campus showcased dedicated cleanliness activities, well-documented through photographic evidence. The momentum was made with green waste collection for composting, contributing to organic manure creation.

Extending beyond the institute, spotlighted educating village youth on sewage sanitation. A practical demonstration enhanced their understanding of the criticality of clean sewage systems for community well-being.

An insightful debate was organised among staff, stressing the significance of daily cleanliness practices.

'Kisan Diwas' at Malakpur Village enlightened local farmers on post-harvest techniques, offering insights for increased crop quality and income. Village-level programs, plastic waste awareness at Abohar, and educational initiatives were also organised.

Efforts culminated in extensive cleaning drives, gardening enhancements, educational institution engagements, and media outreach. The association with the College of Community Science, PAU Ludhiana, and a comprehensive press note disseminated through media agencies showcased the impactful endeavours during Swachchhta Pakhwada.

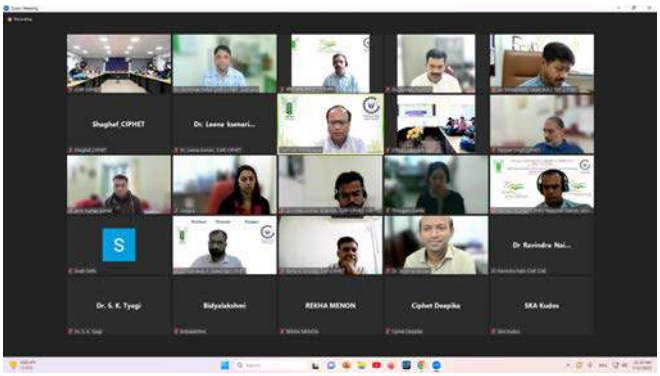
In essence, the Swachchhta Pakhwada at ICAR-CIPHET, Ludhiana, symbolized collective dedication and enthusiastic engagement, fostering a culture of cleanliness and responsible waste management within and beyond the institute.

Azadi Ka Amrit Mahotsav

Azadi Ka Amrit Mahotsav is an initiative of the Government of India to celebrate and commemorate 75 years of progressive India and the glorious history of its people, culture and achievements. In commemoration of this theme, ICAR-CIPHET, Ludhiana commenced various programmes i.e. online webinar on 3D printing in food, millet processing and value addition and orientation program cum exposure visit for school students.

Online webinar on 3D Printing in Food

Online Webinar on '3D Printing in Food', was organized on 12 Jul-2023 at ICAR-CIPHET, Ludhiana, Punjab. The guest speaker Dr. Jeyan Arthur Moses, Assistant Professor, Computational Modeling and Nanoscale Processing Unit, Indian Institute of Food Processing Technology (IIFPT), Thanjavur, Tamil Nadu, conducted this online event *via* the Zoom platform. He delivered the talk on 3D printing in Food including various aspects of 3D printing technology's influence on the culinary landscape.

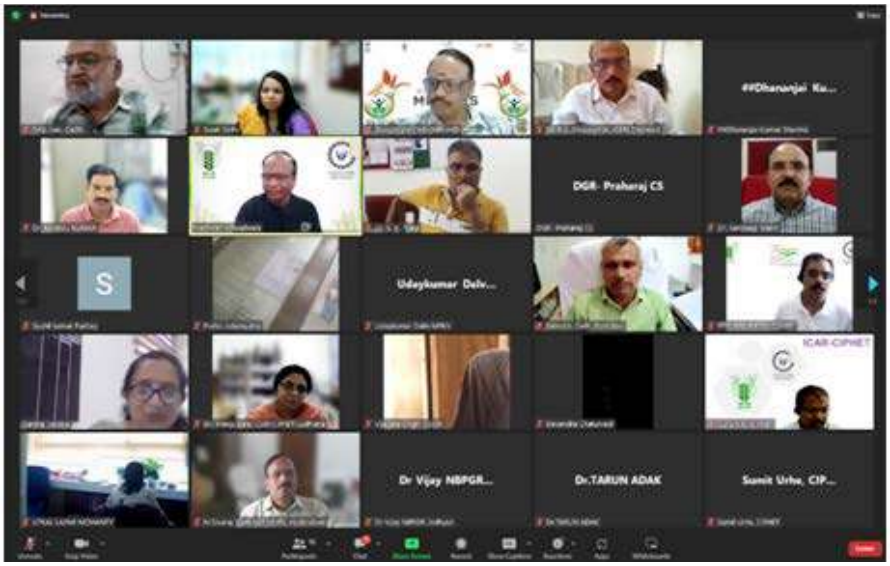


Orientation Program cum Exposure Visit for School Students

The ICAR-CIPHET, Ludhiana organised an orientation program on 'Opportunities in Millet Processing and Value Addition' cum exposure visit for school students from Partap Public School, Ludhiana on 25 Jul 2023. This program was organized under the National Campaign to celebrate the 'Azadi Ka Amrit Mahotsav' for commemorating 75 years of India's Independence and the international year of millets. Different facilities of the institute such as Agro-processing centre, millet processing centre, workshops and other laboratories were visited and demonstrated. Dr. Sandeep Mann, Principal Scientist cum Head, AS&EC Division, ICAR-CIPHET, Ludhiana and Dr. Manju Bala, Principal Scientist & Head (Act.) FG&OP Division, ICAR-CIPHET, Ludhiana highlighted the importance of the millets in diet. Dr. R. C. Kasana, Principal Scientist, motivated the students to keep at least one millet-based product in their diet to improve their nutrition. The program coordinators Dr. Deepika Goswami (Senior Scientist, FG&OP Division), Dr. Chandan Solanki (Scientist, FG&OP Division) and Dr. Guru P. N., Scientist (Agricultural Entomology) guided the students about various opportunities of millets processing and value addition along with a short knowledge based quiz. 25 students of grade 12 with science & commerce background attended the program along with their coordinator Mr. Sahil Nagpal. Ms. Parvinder Kohli, Principal, Partap Public School, Ludhiana and Mr. Rajnish Guru, Senior Coordinator supported the activity of the institute and appreciated the efforts of ICAR-CIPHET for this successful program.

Online Webinar on Millet Processing and Value Addition

An online webinar under 'Azadi Ka Amrit Mahotsav' was organized on 31 Jul 2023. During this webinar 2 lectures were delivered by eminent speakers on millet processing. First lecture on 'Millet Processing and Value addition' was delivered by Dr. V Palanimuthu, Director, National Institute of Food Technology, Entrepreneurship and Management (NIFTEM-T), Thanjavur, Tamilnadu. He presented information related to various machineries required for primary processing of millets. Another lecture on 'Rediscovering Minor Millets for their Nutritional Profile and Nutraceutical Potential' was delivered by Dr. Devina Vaidya, Professor, Dr. Y.S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh. The webinar was attended by 115 participants including Directors, Scientists and Students from different research institutes and universities.



हिन्दी पखवाड़ा/कार्यशाला

हिंदी पखवाड़ा 2023

इस वर्ष दिनांक 14 से 29 सितम्बर, 2023 तक राजभाषा हिन्दी पखवाड़ा का आयोजन किया गया। समारोह का उद्घाटन दिनांक 14 सितम्बर 2023 को डॉ. नचिकेत कोतवालीवाले, निदेशक, भाकृअनुप–सीफेट, लुधियाना द्वारा किया गया। हिंदी पखवाड़ा के दौरान 10 अलग–अलग प्रतियोगिताएं जैसे हिंदी टिप्पण एवं प्रारूप लेखन, प्रार्थना पत्र, कंप्यूटर पर हिंदी में टाइपिंग, हिंदी निबंध, हिंदी काव्य पाठ, विज्ञान संबंधी शोध पत्र, पोस्टर, हिंदी अनुवाद प्रतियोगिता आदि विभिन्न संयोजकों एवं सह–संयोजकों के सहयोग से करवाई गई, जिनमें 7 प्रतियोगिताएं भाकृअनुप–सीफेट लुधियाना एवं अबोहर परिसर द्वारा संयुक्त रूप से आयोजित की गई। राजभाषा हिन्दी पखवाडा द्वारा अन्तर्गत आयोजित सभी प्रतियोगिताओं में संस्थान के सभी अधिकारियों एवं कर्मचारियों ने बढ़–चढ़कर हिस्सा लिया। दिनांक 29 सितम्बर 2023 को पखवाड़ा के समापन के दौरान निदेशक एवं आमंत्रित मुख्य अतिथि ई. दलजीत सिंह, अधीक्षण अभियंता, पीएसपीसीएल, पंजाब द्वारा विजेताओं को पुरस्कार प्रदान किये गये एवं अधिक से अधिक हिन्दी में कार्य करने का आह्वान किया गया।

हिंदी कार्यशाला 2023

तिमाही	हिंदी कार्यशाला की तिथी	आमंत्रित वक्ता का नाम एवं पदनाम	आमंत्रित वक्ता के वक्तव्य का विषय
जनवरी–मार्च 2023	6 जनवरी 2023 (ऑफलाइन)	श्रीमती सीमा चोपड़ा, निदेशक (राजभाषा)	राजभाषा विभाग एवं परिषद् की अपेक्षाएं, हिंदी पुरस्कार के लिए संस्थान के चयन की आवश्यक शर्तें, चुनौतियां एवं समाधान
अप्रैल–जून 2023	6 अप्रैल 2023 (ऑनलाइन)	श्री आर.डी. शर्मा, उप–निदेशक (राजभाषा) भाकृअनुप–नई दिल्ली	संसदीय राजभाषा समिति की निरीक्षण का स्वरूप एवं संस्थान द्वारा आवश्यक तैयारी
जुलाई–सितंबर 2023	23 अगस्त 2023 (ऑफलाइन)	श्री राजिंदर सिंह बेवली, सहायक महाप्रबंधक / एजीएम (राजभाषा) (सेवानिवृत), पंजाब एंड सिंध बैंक	राजभाषा हिंदी में उत्कृष्ट कार्य के लिए राजभाषा एवं मानव संसाधन के व्यवहार ज्ञान एवं सफल सम्पादन के गूढ़ तथ्य
अक्टूबर–दिसम्बर 2023	22 दिसम्बर 2023 (ऑफलाइन)	डॉ जसप्रीत कौर फलक, कवियत्री एवं संस्थापक	काव्य की रचना प्रक्रिया और उसकी सामाजिक उपयोगिता

KRISHI VIGYAN KENDRA (KVK), FAZILKA, PUNJAB

Krishi Vigyan Kendra, an innovative science-based institution, was established to accelerate the agricultural production and post-harvest management and to improve the socioeconomic conditions of the farming community of Fazilka district. This KVK was reestablished at ICAR-Central Institute of Post-Harvest Engineering and Technology, Abohar (Fazilka) on 20 October 2016. This KVK is involved in vocational training programme, on-farm testing and front-line demonstration on major agricultural technologies in order to make the training of farmers' location specific, need based and resource orientated. It runs the need based skilled oriented training programme for creating job opportunities for rural community. It also acts as a facilitator departments for the benefit of the farmers. The KVK also helps in disseminating post-harvest management technologies for improving the economic status of the rural community.

Trainings Organized

Vocational Trainings

Programme Title	Number of Participants	Duration
Value Addition of Clothes through Tie & Dye	27	6-8 Feb 2023
Beekeeping	23	13-15 Mar 2023
Value Addition of Pulses and Cereals	15	27-29 Mar 2023
Millet Production, Nutrition and Value Addition	27	7-9 Aug 2023
Beekeeping	34	17-19 Oct 2023

On-Campus Trainings

Programme Title	Number of Participants	Duration
Fruit Drop and Disorder Management in Kinnow	18	17 Mar 2023
Improved Techniques for Summer Vegetables Production	13	12 Apr 2023
Soil and Nutrient Management in Kharif Crops	18	11 May 2023
Pest and Disease Management in Kharif Crops	21	13 Jul 2023
Preparation of Vermicompost	30	14 Jul 2023
Poshtic Dalia	54	3 Aug 2023
Nursery Management	20	22-24 Aug 2023
Training on Crop Residue Management (CRM)	22	30-30 Oct 2023
Protected Cultivation of Vegetables	22	7-9 Nov 2023

Off-Campus Trainings

Programme Title	Number of Participants	Duration
Poshan Vatica	53	21 Feb 2023
Entrepreneurship Development	302	1-3 Mar 2023
Package and Practices for Millets Cultivation	10	12 May 2023
Pickle Making	31	12 Jul 2023
Animal Feed Management	55	25 Aug 2023

Extension Trainings

Programme Title	Number of Participants	Duration
Anganwadi Workers Training on Value Addition and Processing of Millets	30	20-24 Nov 2023
Anganwadi Workers Training on Development of Low Cost Balance Diet	31	11-13 Dec 2023

Crop Residue Management Activities

Field Day

Dr. Rupender Kaur, Subject Matter Specialist (SMS), Home Science organized a two-days field programme on Crop Residue Management (CRM) for farmers. In total 77 farmers participated in this programme (47 farmers were from Dhani Sucha Singh, District Fazilka and 30 farmers were from Jodhpur, District Fazilka). Soil health, crop diseases management and importance of *In-situ* management were shown to the farmers.

Sh. Prithvi Raj, Asstistant Chief Technical Officer (ACTO) organized field day on mustard on 28 Mar 2023 in village Bhagsar, Punjab. A total of 32 farmers participated in this field day. During this event farmers were shown the status of demonstration plot in comparison with control plot and they were also made aware about the benefits of good variety and package of practices.

Awareness Campaign

Programme Title	Venue	Duration	Number of Beneficiaries
Awareness Campaign on Processing of Horticultural Crops	ICAR-CIPHET, Abohar, Punjab	11-12 Jan 2023	16
Plantation Campaign under *'Meri Maati Mera Desh'* Campaign	ICAR-CIPHET, Abohar, Punjab	18 Aug 2023	52
18th Parthenium Awareness Programme	ICAR-CIPHET, Abohar, Punjab	18 Aug 2023	52
Awareness Program under *'Meri Maati Mera Desh'* and Parthenium Awareness Campaign	Mayadevi Memorial Adarsh School, V.P.O Kera Khera, Ferozepur, Punjab	21 Aug 2023	63

Crop Residue Management (CRM) Programmme

Programme Title	Venue	Number of Participants	Duration
District Level Awareness Program on CRM	Dana Mandi, Fazilka, Punjab	110	31 Jan 2023
Village Level Awareness Program on CRM	Khippanwali, Fazilka, Punjab	72	25 Sep 2023
School Level Awareness Program on CRM	Govt. Senior Secondary Smart School, Khui Khera, Fazilka, Punjab	200	29 Sep 2023
District Level Awareness Program on CRM	Krishi Vigyan Kendra (KVK), ICAR-CIPHET, Abohar, Punjab	160	11 Oct 2023
Block Level Awareness Program on CRM	Krishi Vigyan Kendra (KVK), ICAR-CIPHET, Abohar, Punjab	60	2 Nov 2023
College Level Awareness Program on CRM	DAV College of Education, Abohar, Punjab	160	30 Nov 2023

Special Day Celebration

Programme Title	Number of Participants	Duration
International Women's Day	250	8 Mar 2023
Environment Day	40	5 Jun 2023
Industry Interface Meeting cum Awareness Camp in Collaboration with National Horticulture Board (NHB)	100	14 Jun 2023
Inauguration of Regional Station, Abohar, Punjab	26	20 Jun 2023
'Har Ghar Tiranga' Abhiyan	50	14 Aug 2023
Hindi Diwas	50	14 Aug 2023
Hindi Pakhwara Celebration	30	14-28 Aug 2023
Independence Day Celebration	80	15 Aug 2023
PM Kisan Sammelan	47	27 Aug 2023
Vigilance Week	17	2-9 Nov 2023
World Soil Day	29	5 Dec 2023

Exhibitions

Programme Title	Venue	Duration
Technology Day and Exhibition on ICAR Foundation Day	KVK, ICAR-CIPHET, Abohar, Punjab	16-18 Aug 2023
Exhibition on Poshan Mah Organized by Institute for Communication and Development Action (ICDA), Abohar, Punjab	DAV College of Education Abohar, Punjab	23 Sep 2023
Exhibition on Industry Interface Fair (IIFA), Kisan Mela	ICAR-CIPHET, Ludhiana, Punjab	3-5 Oct 2023

Technology Demonstrations/ FLDs/ OFTs

Technologies	Demonstrated at	Duration	Occasion
Drone Demonstration	ICAR-CIPHET, Ludhiana, Punjab	3-5 Oct 2023	IIFA-2023
Lemon Processing and Pickle Making	KVK, Abohar, Punjab	13 Oct 2023	Visit and Workshop

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for Nutritional Security, Loss Minimization and Enhanced Profitability." (Eds. Manju Bala, Swati Sethi and Pankaj Kumar) ICAR-CIPHET, Ludhiana during 1-21 Dec 2023. Pp 181-191.

Tushir, S., and Yadav, D. N., (2023). Extraction of protein concentrates or isolates from millets in winter school compendium on "Igniting the Millet Renaissance: Advancing the Millet year with Post-Harvest Engineering & Technology for Nutritional Security, Loss Minimization and Enhanced Profitability." (Eds. Manju Bala, Swati Sethi and Pankaj Kumar) ICAR-CIPHET, Ludhiana during 1-21 Dec 2023. Pp 92-101.

Participation in conference/symposia/ workshops / meetings

Arvind Kumar Ahalawat, attended Review Workshop on CRM held at ICAR-ATARI, Zone - 1, Ludhiana, Punjab, during 10-11 Sep 2023.

Arvind Kumar Ahlawat participated in Parali Parbadhan Chetna yatra during Stakeholder Meet on CRM held at ICAR-ATARI, Zone-1 Ludhiana,on 29 Sep 2023.

Chandan Solanki delivered oral presentation on "Effect of dehulling on nutritional profile, phenolic compounds and antioxidant potential of kodo millet" in 'National Seminar on Engineering Interventions for Millet Production and its Value Addition held at Northern Region Farm Machinery Training and Testing Institute, Tractor Nagar, Sirsa Road, Hisar,Haryana, during 19-20 Feb 2023.

Chandan Solanki attended and delivered oral presentation on 'Effect of pre-processing on dehulling of difficult-to-dehull millets' in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Chandan Solanki attended the special symposium on "Natural Resource Management for Sustainable Millet Production in India" and presented an invited oral talk on Processing, Value Addition, and Secondary Agricultural Options for Millets in India in 87th Annual Convention by Indian Society of Soil Science, held at the Indian Institute of Soil Science (IISS), Bhopal, on 4 Oct 2023.

Deepika Goswami attended and presented a poster on 'Effect of hydrocolloid on quality characteristics of selected millet based gluten free muffins' in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Dhritiman Saha delivered oral presentation on "Application of near-infrared (NIR) hyperspectral imaging system for protein content prediction in chickpea flour" in International Conference on Agriculture-Centric Computation (ICA 2023) held at IIT Ropar, during 11-13 May 2023.

Dhritiman Saha & Sandeep Mann delivered presentation on "Transforming traditional foods through the Internet of Things (IoT) and Artificial Intelligence (AI)" at ISAE Conference during Dec 2023.

Guru P. N. delivered a poster presentation 'Insect Disinfestation using Microwaves and its Effect on Milling in Kodo Millet' in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Guru P. N. delivered an oral presentation entitled 'Utilization of Microwave radiations for disinfestation of major legumes in storage' during National Symposium on "Crop Health Management: Safeguarding Crop through diagnostics and Innovations" held at ICAR-VPKAS, Almora, during 29-30 Sep 2023.

Leena Kumari attended and presented poster on 'Millets: Futuristic Food Inks for 3D Food Printing' in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Leena Kumari presented a paper on 'Sensor based system for environmental monitoring of

Banana during Transportation' and received first Oral presentation awards during ISAE annual convention on 'Agri-Food Systems' Transformation Through Engineering Innovations' and International Symposium on "Engineering Interventions for Making Millets a Global Food" at Raichur on 6-8 Nov, 2023.

Manju Bala delivered oral presentation on "Effect of dehulling on nutritional profile, phenolic compounds and antioxidant potential of kodo millet" in 'National Seminar on Engineering Interventions for Millet Production and its Value Addition held at Northern Region Farm Machinery Training and Testing Institute, Tractor Nagar, Sirsa Road, Hisar,Haryana, during 19-20 February, 2023.

Manju Bala delivered oral presentation on "Nutritional and Biochemical Profiling of Immature Dropped Kinnow Fruits" in National conference on 'Current trends in biological sciences for sustainable agriculture, environment and health under climate change & XV Convention of the Indian Society of Agricultural Biochemists' University of Lucknow, Lucknow,UP, during 23-25 Nov 2023.

Manju Bala presented invited talk on "Role of nutraceuticals in human health". In International Conference on One Health-One World held at Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya (RVSKVV), Gwalior, MP, during 28-29 Dec 2023.

Pankaj Kumar delivered oral presentation on "The Rheology of composite Mazie Dough Enriched with Extruded Finger Millet Flour" in 'National Seminar on Engineering Interventions for Millet Production and its Value Addition held at Northern Region Farm Machinery Training and Testing Institute, Tractor Nagar, Sirsa Road, Hisar, Haryana, during 19-20 Feb 2023.

Pankaj Kumar attended online National Conference on Generative AI in practice for empowering agricultural research productivity' Pune Chapter of the National Academy of Agricultural Sciences and Society for Advancement of Viticulture and Ecology, held at ICAR-National Research Centre for Grapes, Pune, during 11-12 Sep 2023.

Poonam Choudhary participated in International Conference on Summer Strategies and Challenges in Agricultural and Life Science for Food Security and Sustainable Environment (SCALFE-2023), held at Himachal Pradesh University, Summer Hill, Shimla, HP, during 28 - 30 Apr 2023.

Ramesh Chand Kasana attended one day workshop on "Parali –Ek Punji" organized by Commission for Air Quality Management in National Capital Region and Adjoining Areas, New Delhi at Mohali (Chandigarh) on 20 Feb 2023.

Ramesh Chand Kasana participated in National Conference on Natural & Organic Farming for Ecological, Economical & Nutritional Security organized by Organic Agricultural Society of India, held at Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya (CSKHPKV), Palampur, HP, during 7-9 Jun 2023.

Ranjeet Singh attended and participated in the ICAR-Industry Stakeholder Consultation meet organized by Agri innovate India Ltd., New Delhi, held at Bharat Ratna Subramaniam Auditorium, NASC Complex, New Delhi, on 6 Mar 2023.

Renu Balakrishnan and Ranjeet Singh attended participated in the ICAR-Industry Stakeholder Consultation meet at Bharat Ratna Subramaniam Auditorium, NASC Complex, New Delhi on 6 Mar 2023 organized by Agrinnovate India Ltd., New Delhi.

Renu Balakrishnan attended Zonal KVK Workshop 2023 organized jointly by ATARI Zone –I, Ludhiana & GB Pant University of Agriculture & Technology held at ATARI, Zone-1, Ludhiana, Punjab, during 26-28 Jun 2023.

Rupinder Kaur attended Zonal KVK Workshop 2023 organized jointly by ATARI Zone –I, Ludhiana & GB Pant University of Agriculture & Technology held at ATARI, Zone-1, Ludhiana, Punjab, during 26-28 Jun 2023.

Rupinder Kaur, attended Review Workshop on CRM held during 10-11 Sept. 2023 at ICAR ATARI, Zone -1, Ludhiana, Punjab, during 10-11 Sep 2023.

Sandeep Dawange attended 38th Annual

Workshop of AICRP on PHET during 20-22 Feb 2023 at ICAR- Central Plantation Crops Research Institute (CPCRI), Kasaragod, Kerala.

Sandeep Mann delivered lead lecture on "Entrepreneurship Opportunities through Millet Processing" in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Sandeep Mann, Leena Kumari, Shagahf Kaukab, Thingujam Bidyalakshmi delivered presentation on Entrepreneurship development through Agro Processing under theme of Novel Bio-based interventions to enhance food quality and functionality in 13th Idea Convention & International Conference on Recent Advances in Engineering Applications for Sustainable Dairying held at College of Dairy Science and Technology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, during 13-14 Oct 2023.

Sandeep Mann delivered presentation on ISAE annual convention and International Symposium on "Engineering Interventions for Making Millets a Global Food" held at University of Raichur, Karnataka from 6-8 Nov 2023.

Shaghaf Kaukab presented oral paper on "Enhancing Apple quality control: A deep learning-Based segmentation technique for surface defect detection" during ISAE Annual Convention on Agri Food System (AFS) Transformation Through Engineering Innovations & International Symposium on "Engineering Interventions for Making Millets a Global Food" at Raichur on 6-8 Nov 2023.

Shaghaf Kaukab delivered oral presentation on "Machine learning based approach for detection and size estimation for on-field harvesting and sorting of Apple during (International Conference on Systems and Technologies for Smart Agriculture)" held at Kolkata on 19-20 Dec 2023.

Surya Tushir delivered presentation on "Microbes for Life-Lifestyle for the Environment : A Strategy for Wellbeing" in 64th Annual International Conference of Association of Microbiologists of India (AMI) on "Microbes for Life-Lifestyle for the Environment: A Strategy for wellbeing held at Bundelkhand University, Jhansi,U.P., during 1- 3 Dec 2023.

Swati Sethi attended and presented a poster on "Co-extrusion of kodo millet and quinoa for the development of ready-to-eat extruded snack food" in the International Conference on Millets for Achieving Nutritional and Economic Security (ICMANES-2023) held at National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Kundali, Sonepat, Haryana, during 21-23 Sep 2023.

Thingujam Bidyalakshmi attended online workshop on CAD held at ICAR-CIAE, Bhopal, MP, during 7 Jul - 6 Aug 2023.

Thingujam Bidyalakshmi presented paper on "Effect of processing methods on the physicochemical characteristics of two types of soybeans for hawaijar production" during ISAE Conference Presentation during Dec 2023.

Prioritization, Monitoring and Evaluation (PME) Cell

Prioritization, Monitoring and Evaluation (PME) Cell

This cell helps in setting a unified priority and monitoring of externally funded and in-house projects. PME cell of the institute conducts Institute Research Council meeting and maintains the record of research projects. The monthly and quarterly reports of individual scientists are collected and compiled into progress reports, quarterly and half yearly performance review reports. It also acts as a link between the council and the institute scientists. The parliament questions and their answers, action taken reports and issues related to scientific activities of the institute are dealt by PME cell. The research information related to ongoing and completed research projects is uploaded through Project Information and Management System (PIMS) software for digital management of research projects.

Research Projects (2023)

Institute Funded

Project Name	Project Leader & Associates	Period of Association	
		From	To
Development of Lab-on-a-Chip Method for Detection of Animal Species in Meat Products	Dr. Yogesh Kumar (PI)	1 Apr 2019	31 Mar 2022
	Dr. Tanbir Ahmad (Co -PI)		30 Nov 2019
	Dr. K. Narsaiah (Co-PI)		28 Oct 2022
	Dr. Poonam (Co-PI)		31 Mar 2023
	Dr. Poonam (PI)	1 Jul 2022	31 Mar 2023
Development of Phase Change Material Based Assembled Type Fruit Ripening Chamber	Dr. Sakharam Kale (PI)	1 Apr 2020	29 Oct 2021
	Dr. Mahesh Kumar Samota (PI)	1 Apr 2022	31 Mar 2023
Development and Updating of Post- Harvest Machineries & Technologies Database	Dr. Sandeep Mann (PI)	1 Oct 2020	30 Sep 2023
	Dr. Sandeep P. Dawange (Co -PI)		30 Sep 2023
	Er. Akhoon Asrar Bashir (Co -PI)		23 Jun 2022
	Er. Navnath Indore (Co-PI)		7 Jan 2021
Development of Enzyme Assisted Technology for Enhancing Protein Extraction from De-oiled Rice Bran	Mrs. Surya (PI) Dr. D.N. Yadav (Co -PI) Dr. Rajeev K. Kapoor (Co-PI), Maharshi Dayanand University (MDU), Rohtak, Haryana	1 Oct 2020	31 Mar 2023
Development of Photoreactor for Ethylene Degradation during Storage of Banana and Guava	Dr. Bhupendra M Ghodki (PI)	1 Oct 2020	28 Aug 2023
	Er. Yogesh Kalnar (Co -PI)		28 Oct 2022
	Dr. Poonam (Co-PI)		30 Sep 2023
Development of Table Top Vaccum Frying System	Dr. Swati Sethi (PI) Dr. Pankaj Kumar (Co-PI)	1 Oct 2020	31 Mar 2023

Project Name	Project Leader & Associates	Period of Association	
		From	To
Microbial Production of PolyHydroxy Butyrate (bioplastic) using Mango By- products	Dr. R.C. Kasana (PI) Dr. Ramesh Kumar (Co-PI) Dr. Mahesh Kumar Samota (Co-PI)	1 Jul 2021 1 Jul 2021 1 Oct 2020	31 Mar 2023
	Dr. Ajinath Dukare (PI)	1 Oct 2020	2 Mar 2021
	Dr. Bibwe Bhushan Ratnagar (Co-PI)	1 Oct 2020	13 Nov 2020
IoT-Based Real-Time Intelligent Monitoring and Controlling System for Cold Storage	Dr. Thongam Sunita Devi (PI) Dr. Nachiket Kotwaliwale (Co-PI) Er. Shaghaf Kaukab (Co-PI)	1 Jul 2021	30 Jun 2023
	Er. Yogesh B. Kalnar (Co-PI)		28 Oct 2022
Development of Process for Improved Head Rice Recovery from Long Grain Paddy	Dr. Swati Sethi (PI) Dr. R. K. Vishwakarma (Co-PI)	1 Jul 2021	30 Jun 2023
	Dr. Mridula D. (Co-PI)	1 Jul 2021	11 Sep 2022
Development of On- farm Maize Cob Drying System for Effective Value Chain	Dr. Pankaj Kumar (PI) Er. Shaghaf Kaukab (Co-PI) Dr. Sumit Kumar Aggarwal (Co-PI), ICAR-Indian Institute of Maize Research (IIMR), Ludhiana	1 Jul 2021	30 Jun 2023
Safe Storage of Pulses Using Microwave Assisted Disinfestation	Dr. Guru P. N. (PI)	1 Jul 2021	30 Jun 2023
Development of Commercial-Scale Millet Processing Plant	Dr. Chandan Solanki (PI) Dr. R.K. Vishwakarma (Co-PI)	1 Jul 2021	30 Jun 2023
Capacity Building of Agricultural Extension Professionals to Promote Agro Processing	Dr. Renu Balakrishnan (PI) Dr. Khwairakpam Bembem (Co-PI) Dr. Vikas Kumar (Co-PI)	1 Jul 2021	30 Jun 2024
	Dr. Deep Narayan Yadav (Co-PI)	1 Jul 2021	28 Apr 2022
Techno-Economic Feasibility Assessment and Socio-Economic Impact Analysis of Selected Post-Harvest Technologies	Dr. Renu Balakrishnan, Scientist (PI) Dr. Sandeep Mann, Pr. Scientist (Co-PI) Dr. Reshma Gills, Scientist (Co-PI) - ICAR- Central Marine Fisheries Research Institute (CMFRI), Cochin	1 Jul 2021	30 Jun 2024
Development of Mushroom Mycelium Based Eco-Friendly Packaging Materials Utilizing Crop Residues	Dr. R.C. Kasana (PI) Dr. Anil Kumar (Co-PI), ICAR-Directorate of Mushroom Research (DMR) Solan	1 Jul 2021	30 Jun 2024
	Dr. B.M. Ghodki (Co-PI)	1 Jul 2021	28 Aug 2023
Development and Optimization of 3D Food Printing System for Designer Foods	Dr. Leena Kumari (PI) Dr. Deepika Goswami (Co-PI) Dr. Thongam Sunita Devi (Co-PI)	1 Jul 2021	30 Jun 2024

Project Name	Project Leader & Associates	Period of Association	
		From	To
Valorisation of By-Products from Peanut (*Arachis hypogea* L.) Milk Processing	Dr. K. Bembem (PI)	1 Jul 2021	30 Jun 2024
	Dr. D.N. Yadav (Co-PI)		28 Apr 2022
Biospeckle Laser Technique for Post-Harvest Quality and Safety Evaluation of Peach and Maize	Er. Shaghaf Kaukab (PI) Dr. R. C. Kasana, (Co-PI) Dr. Khwairakpam Bembem (Co-PI)	1 Jul 2021	30 Jun 2025
Development of Enzyme Assisted Technology for Enhancing Protein Extraction from De-Oiled Rice Bran	Mrs. Surya (PI)	1 Apr 2023	31 Mar 2024
Newer Methods for Energy-Efficient Oil Extraction and Novel Product Development from Mustard Seed	Dr. S. K. Tyagi (PI)	1 Aug 2023	31 Jul 2024
Metabolite Profiling and Sprouting Inhibition of Onions for Prolonged Storage	Dr. Mahesh Kumar Samota (PI) Dr. Poonam Choudhary (Co-PI)	1 Aug 2023	31 Jul 2025
Real-Time Fruit Quality Monitoring using Digital Twins and Machine Learning During Storage	Dr. Dhritiman Saha (PI) Dr. Thongam Sunita Devi (Co-PI) Dr. Ranjeet Singh (Co-PI) Dr. Vishwas Rathi (Co-PI) (Thapar Institute of Engineering & Technology (TIET), Patiala)	1 Aug 2023	31 Jul 2026
Development of Functional Coating for Preservation of Minimally Processed Fruits and Vegetables	Dr. Ramesh Kumar (PI) Dr. Amit Nath (Co-PI) Dr. Sandeep Raheja, Plant Pathologist, Punjab Agricultural University, Abohar Campus (Co-PI)	1 Aug 2023	31 Jul 2026
Development and Evaluation of a Waterless Live Fish Transportation System for Freshwater Fish	Dr. Armaan U. Muzaddadi (PI) Dr. Vikas Kumar (Co-PI)	1 Aug 2023	31 Jul 2026
ICAR Funded			
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) Dr. A.K. Dixit, Pr. Scientist, ICAR-National Dairy Research Institute (NDRI), Karnal (Co-PI) Dr. Rahul Kumar Anurag (Co-PI) Dr. Renu Balakrishnan (Co-PI) Dr. B.V.C Mahajan (Co-PI) Director & Prof., Punjab Horticultural Postharvest Technology Centre (PHPTC)	1 Apr 2020	31 Mar 2024
	Er. Yogesh Kalnar (Co-PI)		28 Oct 2022
Reformation of Makhana Processing and Value-Addition Industry Through Mechanization and Automation	Dr. R.K. Vishwakarma (PI) Dr. Kh. Bembem (Co-PI) Dr. Ranjeet Singh (Co-PI)	1 Apr 2021	31 Mar 2026
	Dr. Guru P.N. (Co-PI)	1 Sep 2022	
	Dr. Mridula D. (Co-PI)	1 Apr 2021	11 Nov 2022

Project Name	Project Leader & Associates	Period of Association	
		From	To
Establishment of Agri-Business Incubation (ABI) Centre under XII Plan Scheme for National Agriculture Innovation Fund (NAIF) at ICAR-CIPHET, Ludhiana, Punjab	Dr. V.E. Nambi (PI)	1 Jan 2016	30 Oct 2016
	Dr. Ranjit Singh (Co-PI)	21 Sep 2016	30 Oct 2016
	Dr. Ranjit Singh (PI)	31 Oct 2016	Till date
	Dr. Vikas Kumar (Co-PI)	21 Sep 2016	
	Dr. Renu Balakrishnan (Co-PI)	21 Sep 2016	
Extraction of Bioactive Compounds and Value Addition of By-Products of Agri-Produce	Dr. Mridula D. (PI)	1 Apr 2021	11 Nov 2022
	Dr. Manju Bala (Co-PI)	1 Sep 2022	20 Dec 2022
	Dr. Manju Bala (PI)	21 Dec 2022	31 Mar 2026
	Dr. Deepika Goswami (Co-PI)	1 Apr 2021	
	Er. Akhoon Asrar Bashir (Co -PI)	1 Apr 2021	23 Jun 2022
Externally Funded			
Development of Hand-Held Instrument for Non-Destructive Quality Testing of Mango *(ICAR-IARI, New Delhi)*	Dr. K. Narsaiah (PI)	1 Oct 2019	28 Oct 2022
	Dr. Poonam Chaudhary (Co-PI)	10 Dec 2022	30 Nov 2023
Storage Study on "Performance Evaluation of Hermetic Bags on selected Commodities"	Dr. Sandeep Mann (Pr. Scientist & PI)	1 Oct 2020	31 Oct 2023
	Dr. R.K. Singh, Director, ICAR-CIPHET (Co-PI)	1 Oct 2020	11 Oct 2020
	Mrs. Surya (Scientist & Co-PI) Dr. Guru P.N. , Scientist (Co -PI)		31 Mar 2023
Non-chemical Management of Stored-Grain Moths using Flexible Light-Trap	Dr. Guru P.N. (PI)	1 Oct 2020	31 Mar 2024
	Er. Yogesh Kalnar (Co -PI)		28 Oct 2022
	Dr. Dhritiman Saha (Co-PI)	13 Jan 2023	31 Mar 2024
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 *Co-operating Center under ICAR-Network Project on Precision Agriculture (NePPA)*	Dr. Nachiket Kotwaliwale, Director (Mentor)	8 Sep 2021	28 Oct 2022
	Dr. K. Narsaiah, Pr. Scientist & Acting Head, AS&EC Division (PI)		
	Er. Yogesh B. Kalnar, Scientist, A&ST Division (Co-PI)		
	Dr. Bhupendra M. Ghodki, Scientist, AS&EC Division (Co-PI) Dr. Leena Kumari, Scientist, A&ST Division (Co-PI) & PI Dr. Bhupendra M. Ghodki, Scientist, AS&EC Division (Co-PI) Dr. Thingujam Bidyalakshmi Devi, Scientist, AS&EC Division (Co-PI) Dr. Thongam Sunita Devi, Scientist, AST Division (Co-PI) Dr. P. Suresh Kumar, ICAR -NRC, Banana (Co-PI)	8 Sep 2021	28 Aug 2023
	Dr. Dhritiman Saha Scientist (Co-PI)	8 May 2023	7 Sep 2025

Project Name	Project Leader & Associates	Period of Association	
		From	To
Mechanized System for Making Hawaijar - A Traditional Fermented Food of North-East India *(Under Technology Development and Utilization Programme for Women (TDUPW), Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, New Delhi)*	Dr. Thingujam Bidyalakshmi Devi (PI) Mrs. Surya (Co-PI) Dr. Khwairakpam Bembem (Co-PI) Dr. N.G. Joy Kumar (Co-PI) from College of Fisheries (CoF), Central Agricultural University (CAU), Imphal, Manipur	1 Oct 2021	31 Mar 2024
Vision Guided AI-Enabled Robotic Apple Harvestor Under National Programme on Electronics and ICT Applications in Agriculture and Environment (AgrienIcs) funded by MeitY-GOI-C-DAC, Kolkata	Er. Yogesh B. Kalnar (PI) 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)	15 Nov 2022	16 Mar 2024
Performance Evaluation of Agnext Grain Quality Analyzer (SpecX Visio) Device	Dr. Bhupendra Ghodki (PI) Er. Shaghaf Kaukab (Co-PI) Dr. R.K. Vishwakarma (Co-PI) Dr. Nachiket Kotwaliwale (Co-PI)	16 Feb 2023	12 Apr 2023
Confidential Test Report on Performance of Evaluation of "Sinar Make Moisture Meter CP 7070"	Er. Shaghaf Kaukab (PI) Dr. Dhritiman Saha (Co-PI) Dr. R.K. Vishwakarma (Co-PI) Dr. Nachiket Kotwaliwale (Co-PI)	13 Mar 2023	4 Jun 2023
Collaborative Contract Research Project entitled “Development of Grain Image Processing Software for Rice and Paddy”	Dr. Dhritiman Saha (PI) Dr. Ranjeet Singh (Co-PI) Dr. Nachiket Kotwaliwale (Co-PI)	9 Jun 2023	8 Dec 2023
Development of Rice Bran Protein-based Gummies and Flavoured Powder Premix	Mrs. Surya (PI) Dr. D.N. Yadav (Co-PI)	5 Aug 2023	31 Jul 2024
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 Chhattisgarh State Minor Forest Produce (Trading & Development) Co-operative Federation Ltd. (CGMFPFED), Raipur, Chhatisgarh	Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET (Mentor) Dr. R.K. Vishwakarma, Principal Scientist & PC PHET (Mentor) Dr. Manju Bala (PI) Dr. Sandeep Mann (Co-PI) Mrs. Surya (Co-PI) Dr. Swati Sethi (Co-PI) Dr. Chandan Solanki (Co-PI) Dr. Pankaj Kumar (Co-PI) Dr. Poonam (Co-PI) Dr. Th. Bidyalakshmi Devi (Co-PI) Dr. Sandeep P. Dawange (Co-PI) Dr. Guru P.N. (Co-PI)	24 Aug 2023	23 Aug 2028

Project Name	Project Leader & Associates	Period of Association	
		From	To
Revised Consultancy Project entitled "Performance Evaluation of RGB Camera and AI & Mobile ased Grain Analyzer (EASY 360)" Consultancy Project entitled, "Performance Evaluation of Stand-Alone Industrial Camera and Mobile Based Grain Analyzer (EASY 360)"	Dr. Bhupendra M. Ghodki, (PI)	11 Sep 2023	4 Nov 2023
	Dr. Th. Bidyalakshmi Devi, (Co-PI)	11 Sep 2023	
	Dr. R.K. Vishwakarma, (Co-PI)	11 Sep 2023	
	Dr. Nachiket Kotwaliwale (Co-PI)	11 Sep 2023	
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) Dr. R. K. Vishwakarma (PI) Dr. Guru P. N. (Co-PI) Dr. Thingujam Bidyalakshmi Devi (Co-PI) Dr. Sandeep P. Dawange (Co-PI Er. Shaghaf Kaukab (Co-PI)	14 Sep 2023	13 Mar 2027

Research & Administrative Meetings

25th Research Advisory Committee Meeting (RAC)

The ICAR vide File No. Ag. Engg./2/10/2020-IA-II Efile No. 104118 dated 14 Jan 2021 constituted Research Advisory Committee for ICAR-CIPHET, Ludhiana for a period of three years w.e.f. 31 Jan 2021-30 Jan 2024. The Third meeting of the Research Advisory Committee (RAC) was held during 20-22 Mar 2023 at ICAR-CIPHET, Ludhiana, through online mode as well as physical presence of the members. The Chairman and RAC members attended the meeting along with the all Heads, Project Coordinators & Scientists of ICAR-CIPHET.

Research Advisory Committee

Dr. D. C. Joshi Vice Chancellor, Agriculture University, Kota, Rajasthan	Chairman
Dr. R. Viswanathan Former Prof. & Head, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	Member
Dr. H. N. Mishra Professor, I/c & Nodal Officer, Agri Business Incubation Centre Indian Institute of Technology, Kharagpur, West Bengal	Member
Dr. Meenakshi Singh Chief Scientist (Formerly at CFTRI and FSSAI), Technology Management Directorate – SeMI, New Delhi	Member
Dr. Kriti Bardhan Gupta Faculty, Center for Food and Agri-Business Management, Indian Institute of Management (IIM), Lucknow, UP	Member
Dr. Sunil Bhand Dean, Sponsored Research and Consultancy & Professor Department of Chemistry, BITS Pilani, Goa Campus, Goa	Member
Dr. K. Narsaiah Assistant Director General (PE), Division of Agricultural Engineering ICAR, Krishi Anusandhan Bhawan (KAB)- II, New Delhi	Member (Ex-Official)
Dr. Nachiket Kotwaliwale Director, ICAR-CIPHET, Ludhiana, Punjab	Member
Dr. Sandeep Mann Principal Scientist, ToT Division & Incharge, PME, ICAR-CIPHET, Ludhiana, Punjab	Member Secretary

Quinquennial Review Team (QRT) Meeting

The ICAR vide File No. Ag. Engg./02/12/2022 dated 18 Jan 2023 constituted Quinquennial Review Team (QRT) to review the work done by the ICAR-CIPHET, including its schemes AICRP on PEASEM, AICRP on PHET & CRP on SA for the period 2017-22.

Quinquennial Review Team

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), Kundali,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 & I/c PME ICAR-CIPHET, Ludhiana, Punjab	Member Secretary

Institute Research Council (IRC) Meeting

The 34th Institute Research Council Meeting of ICAR-CIPHET, Ludhiana was held during 20-21 Jul 2023 at ICAR-CIPHET, Ludhiana under the chairmanship of Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET, Ludhiana and Chairman Indian Research Council (IRC).

Institute Management Committee Meeting

The 36th Institute Management Committee was held on 21 Aug 2023 at ICAR-CIPHET, Ludhiana under the chairmanship of Dr. Nachiket Kotwaliwale, Director, ICAR-CIPHET, Ludhiana. During the meeting action taken report of previous Institute Management Committee meeting was discussed. The committee expressed satisfaction on research achievements, infrastructure development and financial progress of the institute. Maximum proposed agenda items were considered and recommended by this Institute Management Committee.

IJSC Meeting

An Institute Joint Staff Council meeting was held on 30 November 2023 at ICAR-CIPHET, Ludhiana to discuss the ATR of previous IJSC meeting and new agendas of the staff of the Institute.

Institute Advisory Committee Meeting of Farmer First Programme

This meeting was conducted at ICAR-CIPHET on of project, Establishment of millet processing unit in Punjab, Establishment of honey processing unit at KVK, Abohar, Integration of traditional jaggery production units with modern 3-pan chemical free jaggery production unit, Establishment of farm level pack house for fruit and vegetable (9m x 6m), with provision of washing, sorting, grading, packaging and storage space in Patran, Patiala, Punjab

PERSONALIA

Appointment/ Recruitment/ New Joining

Name of the Official	Date of Joining	Designation
Dr. Abhinav Dubey	11 Apr 2023	Scientist (AS&PE)
Dr. Ravi Parkash	11 Apr 2023	Scientist (AS&PE)
Ms. Shilpa S. Selvan	11 Apr 2023	Scientist (AS&PE)
Dr. Shrikrishna Shrinivas Nishani	11 Apr 2023	Scientist (AS&PE)
Ms. Soumya Subhashree Mohapatra	11 Apr 2023	Scientist (Agril. Economics)
Dr. Urhe Sumit Bhausaheb	11 Apr 2023	Scientist (AS&PE)
Dr. R.K. Vishwakarma	8 May 2023	PC (PHET)
Dr. Sandeep Maan	11 Jul 2023	Head (AS&EC)
Dr. Amit Nath	11 Jul 2023	Head (HCP)
Ms. Ritu Bharat Kukde	18 Jul 2023	Scientist (AS&PE)
Dr. Arvind Kumar Ahlawat	1 Sep 2023	Sr. Scientist-cum-Head
Dr. Ranjeet Singh	28 Nov 2023	Head (ToT)
Dr. Rakesh Sharda	22 Dec 2023	PC (PEASEM)

Superannuation

Name of the Official	Date of Retirement	Designation
Sh. Gurdeep Singh	31 Jan 2023	Technical Officer
Sh. Bhajan Singh	30 Nov 2023	Technical Officer

Promotion

Name of the Official	Date of Promotion (CAS)	Designation
Scientific Staff		
Dr. Rahul Kumar	11 May 2022	Senior Scientist (Food Technology)
Dr. Guru P.N.	2 Jul 2022	Scientist (SS, Agril. Entomology)
Dr. Swati Sethi	1 Jan 2023	Senior Scientist (Food Technology)
Technical Staff		
Sh. Dalu Ram	31 Jan 2023	Technical Officer
Sh. Tarsem Singh Purba	9 Oct 2023	Asstt. Administrative Officer

Transfer

Name of the Official	Date of Transfer	Place of Transfer
Sh. B.C. Katoch	31 Mar 2023	ICAR-IIMR, Ludhiana
Sh. Manni Lal	5 Apr 2023	ICAR-IIMR, Ludhiana
Dr. D.N. Yadav	28 Apr 2023	ICAR-NDRI, Karnal
Dr. R.K. Singh	23 Jun 2023	ICAR-IISWC, Dehradun
Sh. Pawan Kumar, Assistant Administrative Officer	31 Aug 2023	ICAR-NRCE, Hisar

Resignation

Dr. Bhupendra M. Ghodki	28 Aug 2023	Indian Institute of Technology, Kharagpur

Institutional Staff - Ludhiana Campus

Scientific Staff

Name of the Official	Designation	Discipline
Dr. Nachiket Kotwaliwale	Director	Agricultural Structures & Process Engineering
Dr. R. K. Vishwakarma	PC (PHET)	Agricultural Structures & Process Engineering
Dr. R.K. Sharda	PC (PEASEM)	Soil & Water Engineering
Dr. Sandeep Mann	Head (AS&EC)	Agricultural Structures & Process Engineering
Dr. Ranjeet Singh	Head (ToT)	Agricultural Structures & Process Engineering
Dr. Manju Bala	Head (Act.) FG&OP	Plant Biochemistry
Dr. S. K. Tyagi	Principal Scientist	Chemical Engineering
Dr. A. U .Muzaddadi	Principal Scientist	Fish Processing Technology
Dr. Ramesh Chand Kasana	Principal Scientist	Microbiology
Dr. Rahul K Anurag	Senior Scientist	Food Technology
Dr. Deepika Goswami	Senior Scientist	Food Technology
Dr. Swati Sethi	Senior Scientist	Food Technology
Dr. Leena Kumari	Scientist (SS)	Electronics & Instrumentation
Smt. Surya Tushir	Scientist (SS)	Agricultural Microbiology
Dr. Chandan Solanki	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Dhritiman Saha	Scientist (SS)	Agricultural Structures & Process Engineering
Er. Akhoon Asrar Bashir**	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Navnath Indore	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Vikas Kumar	Scientist (SS)	Fish Processing Technology
Dr. Khwairakpam Bembem	Scientist (SS)	Home Science
Dr. Renu Balakrishnan	Scientist (SS)	Agricultural Extension
Er. Kalnar Yogesh**	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Pankaj Kumar	Scientist (SS)	Agricultural Structures & Process Engineering

Name of the Official	Designation	Discipline
Dr. Poonam	Scientist (SS)	Plant Biochemistry
Dr. Sandeep Dawange	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Th. Bidyalakshmi Devi	Scientist (SS)	Agricultural Structures & Process Engineering
Dr. Guru P. N.	Scientist (SS)	Agricultural Entomology
Er. Shaghaf Kaukab	Scientist	Agricultural Structures & Process Engineering
Dr. Thongam Sunita Devi	Scientist	Agricultural Structures & Process Engineering
Dr. Ravi Parkash	Scientist	Agricultural Structures & Process Engineering
Dr. Shrikrishna Shrinivas Nishani	Scientist	Agricultural Structures & Process Engineering
Sh. Abhinav Dubey	Scientist	Agricultural Structures & Process Engineering
Sh. Urhe Sumit Bhausaheb	Scientist	Agricultural Structures & Process Engineering
Ms. Soumya Subhashree Mohapatra	Scientist	Agril. Economics
Mr. Ritu Bharat Kukde	Scientist	Agricultural Structures & Process Engineering

** On study leave

Administrative Staff

Name	Designation
Sh. Ramesh Chand Meena	Chief Administrative Officer
Sh. Permod Sharma	Finance & Account Officer
Sh. Ram Chand	Principal Private Secretary
Sh. S. S. Verma	Personal Secretary
Sh. Kunwar Singh	Assistant Administrative Officer
Sh. Avtar Singh	Assistant Administrative Officer
Smt. Jasvir Kaur	Assistant
Sh. Gurdial Singh	Assistant
Sh. Iqbal Singh	Assistant
Sh. Ashwani Kumar	Assistant
Sh. R. K. Raheja	Upper Division Clerk
Smt. Sunita Rana	Upper Division Clerk
Sh. R. K. Yadav	Upper Division Clerk
Sh. S. K. Gaur	Upper Division Clerk
Sh. Ajay Kumar	Lower Division Clerk

Technical Staff

Sh. Hardev Singh Sekhon	Technical Officer
Sh. Vishal Kumar	Technical Officer
Sh. Beant Singh	Technical Officer
Sh. Rajiv Sharma	Technical Officer
Sh. Lakhwinder Singh	Technical Officer
Sh. Jaswant Singh	Technical Officer
Sh. Jaswinder Singh	Senior Technical Assistant
Sh. Hardeep Singh	Technical Officer
Smt. Sonia Rani	Technical Officer
Sh. Pradip Kumar	Senior Technical Assistant
Sh. Jagtar Singh	Senior Technical Assistant
Sh. Yashpal Singh	Senior Technical Assistant
Smt. Pragya Singh	Technical Assistant
Sh. Sukhwinder Singh Sekhon	Technical Assistant
Sh. Sarup Singh	Senior Technician
Sh. Satwinder Singh	Technical Assistant
Sh. Manoj Kumar	Technician

Supporting Staff

Name	Designation
Sh. Sukhbir Singh	Skilled Supporting Staff

Institutional Staff - Abohar Campus

Scientific Staff

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

Administrative Staff

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

Technical Staff

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

Supporting Staff

Name	Designation
Sh. Surinder Kumar	Skilled Supporting Staff

Institutional Staff - KVK Fazilka, Abohar

Scientist

Name	Designation
Dr. Arvind Kumar Ahlawat	Sr. Scientist-cum-Head

Technical

Name	Designation
Dr. Rupender Kaur	Subject Matter Specialist (Home Science)

ICAR-CIPHET in News

Heat-generating cotton fab+ hogs the spotlight on Day 2

आंगनवाड़ी कार्यकर्ताओं के लिए प्रशिक्षण कार्यक्रम का आयोजन

दैनिक सवेरा

डीएवी शिक्षा महाविद्यालय में पराली प्रबंधन विषय पर जागरूकता कार्य

लुधियाना जागरण

ਪਰਾਲੀ ਪ੍ਰਬੰਧਨ ਤੇ ਸਕੂਲ ਸਤਰੀਯ ਜਾਗਰੂਕਤਾ ਕਾਰਯਕ੍ਰਮ ਕਰਵਾਯਾ

फसल अवशेष प्रबंधन पर जिला स्तरीय जागरूकता शिविर का आयोजन

CITY AIR NEWS

R-CIPHET Ludhiana gave licensing of rl millet based extrudates to Komalika mer Producer Company Ltd., Aligarh

दैनिक सवेरा

फल-सब्जियों की संरक्षित खेती पर प्रशिक्षण कार्यक्रम का आयोजन

KRISHI VIGYAN KENDRA

दैनिक सवेरा

पराली प्रबंधन पर प्रशिक्षण कार्यक्रम का आयोजन

दैनिक सवेरा

पराली प्रबंधन पर ब्लॉक स्त का जागरूकता शिविर लगाया

दैनिक सवेरा

मधुमक्खी पालन पर 3 दिवसीय प्रशिक्षण कार्यक्रम का आयोजन

ग्रामीण स्तर का जागरूकता कार्यक्रम आयोजि

जमीन की उर्वरा शक्ति में गिरावट चिंतनीय: डा. अहलावत

दैनिक जागरण

जूट से बनेंगे गर्म परिधान, तैयार किया विशेष धागा

जागरण विशेष

ਖਤਾ 'ਚ ਤਕਨਾਲੋਜੀ ਅਪਣਾਉਣ ਦਾ ਮੌ

ਮੌਕਟ-ਲੋਕਤੇ ਪ੍ਰੋਸੈਸਿੰਗ ਉਦਯੋਗ ਇੰਟਰਫੇਸ ਤੇ ਕਿਸਾਨ ਮੇਲੇ ਦਾ ਆਗਾਜ਼

कृषि-प्रसंस्करण में नवाचार को बढ़ावा देने के उद्देश्य से सिफेट-आईफा और किसान मेले का उद्घाटन

पंजाब जागरण

विशेषज्ञ बोले, पराली प्रबंधन के लिए कृषि इंजीनियरों को नियुक्त करे पंजाब सरकार

जागरण सिटी लुधियाना

फूड प्रोसेसिंग की ट्रेनिंग लेने हरियाणा से पहुंचीं महिल

Agri-engg units crucial to boost mechanisation, says ICAR DDG

CIPHET-IIFA & KISAN MELA 2023 AIMS TO FOSTER COLLAB BETWEEN AGRICULTURAL PROCESSING AND FARMING COMMUNITIES

CIPHET-IIFA अते किसान मेला २०२३ दा अधिकारत तौर 'ते कीता उद्घाट

दैनिक सवेरा

किसान केवल मान्यता प्राप्त एग्रीकल्च साइंटिस्ट की सलाह को ही मानें: डॉ. झ

जागरण सिटी लुधियाना

सिफेट में तीन दिवसीय किसान मेला शुरू

Confluence of agri processing, farmin communities at CIPHET-IIFA 2023

Himachal Times

Ludhiana: Scientists develop herbal drink from lotx leaves

आईसीएआर-सीफेट, लुधियाना ने हाइब्रिड मो में अंतर्राष्ट्रीय योग दिवस 2023 मनाया

SKUAST-K hosts Quinquennial Review Meeting

SKUAST-K hosts Quinquennial Review Meeting

Rising Kashmir

SKUAST-K hosts Quinquennial Review Meeting

टेक्नोवन

हमें हर हालत में फास्ट फूड से स्लो फूड की तरफ बढ़ना होगा : डॉ. सिंह

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान में कृषि मेले का दूसरा दिन

जिवंत मासे वाहतूक केंद्राच्या पहिल्या युनिटचे हस्तांत

तीन दिवसीय कृषि प्रदर्शनी किसान मेले का समा


Skill devpt Training organised at Kamdhenu University
DURG, Mar 15
A THREE-DAY workshop on primary processing and value addition of food grains under the Scheduled Castes sub-scheme for skill development has been organised under the joint auspices of Dau Shri Vasudev Chandrakar Kamdhenu University Durg and Indian Council of Agricultural Research's Central Institute of Post-Harvest Engineering and Technology Ludhiana, from March 14 to March 16.
Guests releasing the training manual during the inaugural session.
श्री अन्न का प्राथमिक प्रसंस्करण व मूल्यवर्धन विषय पर कार्यशाला आयोजित
Ludhiana
Training program on "Value Addition of Cereals and Mille for Nutritional Security"
ICAR–Central Institute of Post–Harvest Engineering and Technology, Ludhiana along with ICAR-ATARI Ludhiana in collaboration with KVK Ludhiana (Samrala) organized a three-day training program on "Value Addition of Cereals and Millets for Nutritional Security" from 13th to 15st March, 2023 under the Scheduled Caste Sub Plan scheme of Government of India.
City Air News Mar 15, 2023 04:33
ਅਰੋਗਿਆ ਭਾਰਤੀ ਤੇ ਆਈਸੀਏਆਰ ਵੱਲੋਂ ਵਰਕਸ਼ਾਪ
ਪਲਵਿੰਦਰ ਸਿੰਘ ਢੁੱਡੀਕੇ, ਲੁਧਿਆਣਾ
ਪੰਜਾਬੀ ਜਾਗਰ
HOME NATION PUNJAB BUSINESS EDUCATION SPORTS LIFESTYLE
CITY AIR NEWS
Ludhiana
ICAR-CIPHET grants license of processing machineries to Biha
In recent years price of makhana has increased due to increase well as foreign markets.
ICAR-CIPHET
ਗੁਰਦੁਆਰਾ ਸ੍ਰੀ ਗੁਰੂ ਸਿੰਘ ਸਭਾ
AR-CIPHET grants license for preparati rice bran protein to Ludhiana based fir
ਸਵੱਛਤਾ ਮੁਹਿੰਮ ਦੌਰਾਨ ਲੋਕਾਂ ਨੂੰ ਸ
ਦੀ ਮਹੱਤਤਾ ਤੋਂ ਕਰਵਾਇਆ ਜਾਣੂ
HAMPTON HOMES
Home Styled To Suit Your Affordable Luxurious Lifestyle
Ready To Move In
Ludhiana, February 14, 2023: In recent years price of makhana has increased due to increase in demand from domestic as well as foreign markets. Makhana presently is processed by traditional method which is laborious, time consuming and causes injuries to the processor's hands as it involves handling of hot roasted nuts manually. Makhana processing is popularizing day by day and has a very bright potential. The prominent technologies viz. preliminary roaster for makhana and makhana popping machine were transferred to Shahid Pervez, Director Agrofarm Solutions Pvt. Ltd.,Bihar who has approached ICAR-CIPHET for licensing of this technologies. Dr. S.N. Jha, DDG(Engg.), ICAR New Delhi and key inventor of the technology along with Dr. Nachiket Kotwaliwale Director, ICAR-CIPHET, Ludhiana awarded licensing certificate to the entrepreneur in presence of other dignitaries.
Project Hallmarks
ਪਲਵਿੰਦਰ ਸਿੰਘ ਢੁੱਡੀਕੇ, ਲੁਧਿ

जमीन की उर्वरा शक्ति में गिरावट चिंतनीयः डा. अहलाव

संवाद सहयोगी, फाजिल्काः ग्लोबल वार्मिंग की समस्या से निपटने के लिए प्रधानमंत्री नरेन्द्र मोदी द्वारा शुरू की गई पीएम प्रणाम योजना के तहत अबोहर में स्थित प्रांतीय कृषि विज्ञान केंद्र के विशेषज्ञों सहित किसानों और विद्यार्थियों ने जिले के गांव पैंचवाली में स्थित देश के पहले प्लांट का दौरा किया।

इस दौरान कृषि विज्ञान केंद्र के प्रमुख डा. अरविंद अहलावत की अगुआई में शिष्टमंडल में शामिल डा. रूपिंदर कौर, पृथ्वीराज सहित किसानों और विद्यार्थियों ने जहां प्लांट में पराली और गोबर के साथ तैयार होती आर्गेनिक खाद सहित पराली के द्वारा तैयार होती गैस और बिजली बोर्ड को दी जाती बिजली के प्लांट को देखा। वहीं इस पराली से तैयार खाद व कीटनाशक

फाजिल्का के गांव पैंचवाली का दौरा करके प्लांट के बारे में जानकारी हासिल करते केंद्र के माहिर, किसान व विद्यार्थी • सौ. आयोजक

पीएम प्रणाम योजना को धरती बचाओ वातावरण बचाओ के नारे को बुलंद करने वाले प्लांट के संचालक इंजीनियर संजीव नागपाल ने कृषि विज्ञान केंद्र के विशेषज्ञों

के बारे में जानकारी दी। इस मौके कृषि विज्ञान केंद्र के प्रमुख डा. अरविंद अहलावत ने कहा कि पराली को आग नहीं लगाएंगे और तजुर्बे

कृषि विज्ञान केंद्र के विशेषज्ञों, वि
के साथ-साथ विद्यार्थियों ने किया
पराली प्रबंधन प्लांट का दौरा, गांव
तैयार खाद का प्रयोग करने की अ

काम हो जाते है।

उन्होंने कहा उन्होंने इस प्लांट
कई महत्वपूर्ण जानकारी ली है,
प्लांट के जरिए न केवल पराली
प्रबंधन हो रहा है बल्कि गोबर का
प्रबंधन अच्छे तरीके के साथ कि
जा रहा है। उन्होंने कहा कि परा
प्रबंधन के साथ-साथ पराली अ
गोबर से तैयार खाद और कीटनाश
से नतीजे काफी कारगर है। इस मौ
किसानों ने प्रण लिया कि वह पराल

तैयार की गई पराली औ

दैनिक सवेरा टाइम्स

उद्योग इंटरफेस व बागवानी फसलों पर जागरूकता कार्यक्रम का आयोजन

सवेरा न्यूज/कथूरिया, अबोहर : सीफेट अबोहर द्वारा राष्ट्रीय बागवानी बोर्ड चंडीगढ़ के सहयोग से संयुक्त रूप से उद्योग इंटरफेस व बागवानी फसलों पर जागरूकता कार्यक्रम का आयोजन डा. रमेश कुमार प्रभारी क्षेत्रीय केंद्र सीफेट अबोहर एवं डा. एसके दुबे उपनिदेशक राष्ट्रीय बागवानी बोर्ड चंडीगढ़ द्वारा किया गया। इस कार्यक्रम में बागवानी विभाग के अधिकारीगण पी ए यू के विशेषज्ञ, 100 प्रगतिशील किसान एवं उद्यमियों ने भाग लिया। इस अवसर पर डा. रमेश कुमार द्वारा प्रतिभागियों का स्वागत करते हुए सीफे अबोहर पर किसानों एवं उद्यमियों के लिए उपलब्ध सुविधाओं एवं फल प्रसंस्कर

कार्यक्रम में हिस्सा लेते हुए प्रतिभागी।

दैनिक सवेरा टाइम्स

बाजरा उत्पादन, पोषण व मूल्य संवर्धन पर 3 दिवसीय प्रशिक्षण कार

सवेरा न्यूज/कथूरिया

अबोहर, 11 अगस्त : कृषि विज्ञान केंद्र सीफेट अबोहर द्वारा बाजरा उत्पादक पोषण व मूल्य संवर्धन पर 3 दिवसीय व्यावसायिक प्रशिक्षण कार्यक्रम का आयोजन 9 से 11 अगस्त 2023 को किया गया। यह कार्यक्रम अंतर्राष्ट्रीय श्रीअन्न वर्ष के उपलक्ष में संचालित किया गया, जिसका संचालन राजेश कुमार, सहायक मुख्य तकनीकी अधिकारी, डॉ रूपिंद्र कौर, गृह विज्ञान विशेषज्ञ व डॉ मंजू बाला, प्रभारी वैज्ञानिक सीफेट लुधियाना द्वारा किया गया।

संस्थान के निर्देशक डा. नचिकेत कोतवालीवाले ने प्रतिभागियों को संबोधित करते श्रीअन्न वर्ष के उपलब्ध मशीनरी एवं सुविधाओं के बारे में प्रतिभागियों को अवगत कराते हुए इस तरह के प्रशिक्षण प्राप्त कर स्वरोजगार स्थापित करने के लिए प्रेरित किया। राजेश कुमार द्वारा बाजरा उत्पादन के वर्तमान परिदृश्य पोषण एवं

प्रतिभागियों को सम्बोधित करते संस्थान के निदेशक डा. नचिकेत कोतवालीवाले।

नेतृत्व में करवाया गया। मंजूबाला द्वारा बाजरे से बनाने के बारे में विस्तृत गई तथा डॉक्टर स्वाति बिस्किट तैयार करने प्रतिभागियों को बताई, गोरखपाी द्वारा मिलेट करवाए तथा पैकिंग पी पी एवं डॉ चंद मिलेट संस्करण सुविधाना पर उपल तकनीकी के बारे जानकारी देते हुए इकर्ड का भ्रमण प्रशिक्षण में स्वर महिलाओं एवं गुरवीर सिंह एवं कुल 27 प्रति कार्यक्रम को स

दैनिक सवेरा टाइम्स

न्यूज गैलरी

ग्रामीण स्तर का जागरूकता कार्यक्रम आयोजित

सवेरा न्यूज/धर्मवीर अबोहर: कृषि विज्ञान केंद्र सीफेट अबोहर द्वारा फसल अवशेष प्रबंधन परियोजना के तहत गांव खिपांवाली में ग्रामीण स्तर का जागरूकता कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन डॉ अरविंद कुमार अहलावत हेड कृषि विज्ञान केंद्र निर्देशन में डॉक्टर रूपेंद्र कौर द्वारा नंबरदार श्योपत राम के सहयोग से किया गया। इस कार्यक्रम में रूपेंद्र कौर द्वारा विशेष प्रबंध परियोजनाओं के बारे में विस्तृत जानकारी देते हुए कृषि विज्ञान केंद्र की गतिविधियों पर प्रकाश डाला। पृथ्वीराज ने पराली प्रबंधन के लाभ व विभिन्न तरीकों के बारे में जानकारी दी। कृषि ब्लॉक अधिकारी डॉ विजय सिंह द्वारा पराली प्रबंधन की सस्ती तकनीक के बारे में अवगत कराते हुए मृदा स्वास्थ्य में मित्र कीटों के बचाव के विभिन्न उपायों के बारे में बताया। डॉक्टर अरविंद कुमार द्वारा पराली प्रबंधन के तरीकों के साथ-साथ उच्च गुणवत्ता वाली किस्म के बारे में भी विस्तृत जानकारी दी। कार्यक्रम में कल कल 72 किसानों ने भाग लेकर कार्यक्रम को सफल ब

पौधशाला प्रबंधन पर 3 दिवसीय प्रशिक्षण कार्यक्रम का समापन

प्रतिभागियों को प्रमाणपत्र वितरित करते आयोजक।

सवेरा न्यूज/कथूरिया अबोहर: कृषि विज्ञान केंद्र अबोहर द्वारा पौधशाल
पर 22 से 24 अगस्त को 3 दिवसीय व्यावसायिक प्रशिक्षण कार्य
आयोजन पृथ्वीराज मुख्य सहायक तकनीकी अधिकारी
अबोहर द्वारा क

मृदा व पोषक तत्व प्र

कार्यक्रम में हिस्सा लेते सीफेट अधिकारी व किसान।

सवेरा न्यूज/धर्मवीर, अबोहर : कृषि विज्ञान केंद्र सीफेट अबोहर द्वारा मृदा व
तत्व प्रबंधन पर 11 मई को एक दिवसीय किसान प्रशिक्षण कार्यक्रम का आ
किया गया। कार्यक्रम का संचालन डा. रमेश कुमार प्रभारी कृषि विज्ञान
र्देशन में पृथ्वीराज एसीटीईओं द्वारा किया गया। इस कार्यक्रम में मृदा स
ध्यान में रखते हुए किसानों को मृदा स्वास्थ्य कार्ड बनवाने व उचित मात्रा
पयोग करने व मृदा की उर्वरा शक्ति को बढ़ाने के लिए प्राकृतिक तौर प
पर तैयार करने के नुस्खे भी बताए। किसानों को प्राकृतिक खेती अप

दैनिक सवेरा टाइम्स

किसानों को बड़ा प्लेटफार्म मुहैया क
सीफेट : डा. नचिकेत कोतवाली वाले

सीफेट परिसर में छठी वैज्ञानिक सलाहकार समिति में शामिल अधिक

सवेरा न्यूज/कथूरिया, अबोहर : कृषि विज्ञान केंद्र-सीफेट अबोह
वैज्ञानिक सलाहकार समिति बैठक का आयोजन किया गया। इ
अध्यक्षता डॉक्टर नचिकेत कोतवाली वाले निदेशक सीफेट लुधियाना
बैठक के अंतर्गत डॉ अरविंद कुमार अहलावत हेड कृषि विज्ञान केंद्र
की गतिविधियों का प्रगति विवरण एवं आगामी वर्ष की कार्य योजना क
ई। इस अवसर पर सीफेट के डायरेक्टर डा. नचिकेत कोतवाली व
बोधन में कहा कि किसानों के हित में सीफेट लंबे अर्से से रिसर्च व अन्य
जुटा हुआ है। नए वर्ष में सीफेट-केवीके का उद्देश्य अबोहर क्षेत्र के
ष्ट्रीय व अंतरराष्ट्रीय पटल पर लेकर जाने का है और इस क्रम में पिछ
रान दो किसानों के उत्पादों को नई दिल्ली में आयोजित होने वाले दल
यर में प्लेटफार्म उपलब्ध करवाया गया था ताकि अबोहर के उत्पादो
ा भर के लोग परिचित हों। इसका मुख्य उदेश्य किसानों को सिर्फ तक
ना ही नहीं है अलबत्ता बड़ा प्लेटफार्म मुहैया करवाना है। उन्हें बीज
स्यों के अलावा पैकेजिंग, मशीनें और अन्य प्रकार का मार्गदर्शन क
क में लगभग 25 सदस्यों ने भाग लेकर कार्यक्रम को सफल बनाया।

किसान प्रशिक्षण कार्यक्रम व पोषक तत्व प्रबंधन पर हुआ

कार्यक्रम में हिस्सा लेते सीफेट अधिकारी व किसान।

सवेरा न्यूज/धर्मवीर, अबोहर : कृषि विज्ञान केंद्र सीफेट अबोहर द्वारा मृदा व पोष
तत्व प्रबंधन पर 11 मई को एक दिवसीय किसान प्रशिक्षण कार्यक्रम का आयो
किया गया। कार्यक्रम का संचालन डा. रमेश कुमार प्रभारी कृषि विज्ञान केंद्
देशन में पृथ्वीराज एसीटीईओं द्वारा किया गया। इस कार्यक्रम में मृदा स्व
ध्यान में रखते हुए किसानों को मृदा स्वास्थ्य कार्ड बनवाने व उचित मात्रा में
पयोग करने व मृदा की उर्वरा शक्ति को बढ़ाने के लिए प्राकृतिक तौर पर

केवीके का केराखेड़ा में जागरूकता कार्यक्रम आयोजित

सवेरा न्यूज/धर्मवीर अबोहर : 18वें गाजर घास जागरूकता सप्ताह के अंतर्गत कृषि विज्ञान केंद्र व सीफेट द्वारा केराखेड़ा स्थित माया देवी मैमोरियल स्कूल में जागरूकता कार्यक्रम का आयोजन किया गया। इस कार्यक्रम में एसीटीओ राजेश कुमार द्वारा छात्र-छात्राओं को गाजर घास से स्वास्थ्य, कृषि व पर्यावरण को होने वाले

संबोधित करते एसीटीओ राजेश कुमार।

CITY AIR NEWS

Ludhiana

Training program on "V
Addition of Cereals and
for Nutritional Security

ICAR–Central Institute of Post–Harv
Engineering and Technology, Ludhia
with ICAR-ATARI Ludhiana in collabo
KVK Ludhiana (Samrala) organized a
raining program on "Value Addition
nd Millets for Nutritional Security" from 13th to
5st March, 2023 under the Scheduled Caste
ub Plan scheme of Government of India.

मधुमक्खी पालन पर 3 दिवसीय प्रशिक्षण कार्यक्रम

प्रतिभागियों को सम्मानित करते हुए अधिकारी।

सवेरा न्यूज/धर्मवीर अबोहर: कृषि विज्ञान केंद्र सीफेट द्वारा 13 से 15 मार्च को मधुमक्खी पालन पर तीन दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस कार्यक्रम का संचालन सहायक मुख्य तकनीकी अधिकारी पृथ्वीराज द्वारा कृषि विज्ञान केंद्र के प्रभारी डा. रमेश कुमार के निर्देशन में किया गया। इस कार्यक्रम के अंतर्गत मधुमक्खी पालन की वैज्ञानिक तकनीकों व मधुमक्खी पालन वाली समस्याओं के बारे में विस्तारपूर्वक जानकारी विभिन्न विषय दी गई, साथ ही साथ प्रतिभागियों को प्रायोगिक जानकारी भी दी गई साथ मधुमक्खी के सहायक धंधों को अपनाने के लिए भी प्रतिभागि किया गया और शहद की गुणवत्ता और मूल्य संवर्धन की भी जानकार कार्यक्रम में कुल 23 प्रतिभागियों ने भाग लेकर कार्यक्रम को सफल

चड़दीकला
epaper.charhdikala.com
16 Mar 2023 - Page 6

ਪੋਸ਼ਣ ਸੁਰੱਖਿਆ ਹੇਠ ਅਨਾਜ ਅਤੇ ਸ੍ਰੀ ਅੰਨ ਦਾ ਮੁੱਲ ਵਧਾਉਣ 'ਤੇ ਸਿਖਲਾਈ ਪ੍ਰੋਗਰਾਮ

ਸਮਰਾਲਾ, 15 ਮਾਰਚ (ਵਰਿੰਦਰ ਸਿੰਘ ਹੀਰਾ): ਆਈਸੀਏਆਰ-ਸੀਫੈਟ, ਲੁਧਿਆਣਾ ਵੱਲੋਂ ਆਈਸੀਏਆਰ-ਅਟਾਰੀ ਜ਼ੋਨ-1 ਲੁਧਿਆਣਾ ਅਤੇ ਕੇ.ਵੀ.ਕੇ. ਸਮਰਾਲਾ ਦੇ ਸਹਿਯੋਗ ਨਾਲ ਅਨੁਸੂਚਿਤ ਜਾਤੀ ਸਬ-ਪਲਾਨ ਅਧੀਨ 'ਪੋਸ਼ਣ ਸੁਰੱਖਿਆ ਹੇਠ ਅਨਾਜ ਅਤੇ ਸ੍ਰੀ ਅੰਨ ਦਾ ਮੁੱਲ ਵਧਾਉਣ' ਉੱਤੇ 3 ਦਿਨਾਂ ਦਾ ਸਿਖਲਾਈ ਪ੍ਰੋਗਰਾਮ 13-15 ਮਾਰਚ 2023 ਤੋਂ ਕੇਵੀਕੇ ਸਮਰਾਲਾ ਵਿਖੇ ਲਗਾਇਆ ਗਿਆ।

ਪ੍ਰੋਗਰਾਮ ਦਾ ਉਦਘਾਟਨ ਡਾ. ਮੰਜੂ ਬਾਲਾ, ਪ੍ਰਧਾਨ ਵਿਗਿਆਨੀ ਆਈਸੀਏਆਰ-ਸੀਫੈਟ ਲੁਧਿਆਣਾ ਨੇ ਕੀਤਾ। ਡਾ. ਪ੍ਰੀਤੀ ਮਮਗਾਈ, ਪ੍ਰਧਾਨ ਵਿਗਿਆਨੀ, ਆਈ.ਸੀ.ਏ.ਆਰ.-ਅਟਾਰੀ, ਲੁਧਿਆਣਾ, ਡਾ. ਸੂਰਿਆ ਅਤੇ ਡਾ. ਸਵਾਤੀ ਸੋਠੀ ਵਿਗਿਆਨੀ ਆਈਸੀਏਆਰ-ਸੀਫੈਟ, ਲੁਧਿਆਣਾ, ਡਾ. ਪੁਰਨਾ ਕਪਿਲਾ ਕੇਵੀਕੇ ਸਮਰਾਲਾ ਦੇ ਵਿਗਿਆਨਕ ਸਟਾਫ ਅਤੇ 50 ਦੇ ਕਰੀਬ ਕਿਸਾਨ ਵੀਰਾਂ ਅਤੇ ਕਿਸਾਨ ਬੀਬੀਆਂ ਨੇ ਭਾਗ ਲਿਆ। ਡਾ. ਪ੍ਰੀਤੀ ਨੇ ਸਿੱਖਿਆਰਥੀਆਂ ਨੂੰ ਮੋਟੇ ਅਨਾਜਾਂ ਤੋਂ ਤਿਆਰ ਕੀਤੇ ਜਾ ਸਕਣ ਵਾਲੇ ਵੱਖ-ਵੱਖ ਸਿਹਤਮੰਦ ਉਤਪਾਦਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿੱਤੀ। ਡਾ. ਸੂਰਿਆ ਨੇ ਮੋਟੇ ਅਨਾਜਾਂ ਲਈ ਪ੍ਰੋਸੈਸਿੰਗ ਅਤੇ ਬੰਡਾਰਣ ਵਿਧੀਆਂ ਦੀ ਜਰੂਰਤ ਤੇ ਚਾਨਣਾ ਪਾਇਆ। ਸਮਾਪਤੀ ਪ੍ਰੋਗਰਾਮ ਦੀ ਪ੍ਰਧਾਨਗੀ ਡਾ. ਜੀ.ਪੀ.ਐਸ. ਸੋਢੀ, ਵਧੀਕ ਨਿਰਦੇਸ਼ਕ ਪਸਾਰ ਸਿੱਖਿਆ, ਪੀ.ਏ.ਯੂ., ਲੁਧਿਆਣਾ ਅਤੇ ਡਾ. ਸਤਬੀਰ ਸਿੰਘ, ਡਿਪਟੀ ਡਾਇਰੈਕਟਰ (ਸਿਖਲਾਈ) ਕੇ.ਵੀ.ਕੇ. ਲੁਧਿਆਣਾ (ਸਮਰਾਲਾ) ਨੇ ਕੀਤੀ। ਡਾ. ਸੋਢੀ ਨੇ ਕਿਸਾਨਾਂ ਨੂੰ ਬਾਜਰੇ ਦੇ ਅੰਤਰਰਾਸ਼ਟਰੀ ਸਾਲ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿੰਤੀ ਬਾਜਰੇ ਦੀ ਬਾਸ਼ਤ, ਪ੍ਰੋਸੈਸਿੰਗ ਅਤ ਸਟੋਰੇਜ ਦੀਆਂ ਲੋੜਾਂ ਬਾਰੇ ਚਾਨ ਪਾਇਆ। ਡਾ. ਸਤਬੀਰ ਨੇ ਬਾਜਰੇ ਅਹੰਤਤਾ ਬਾਰੇ ਚਾਨਣਾ ਪਾਇਆ ਭਾਗ ਲੈਣ ਵਾਲਿਆਂ ਨੂੰ ਆਪਣੀ ਖੁ ਵਿੱਚ ਬਾਜਰੇ ਨੂੰ ਸ਼ਾਮਲ ਕਰਨ ਅਪੀਲ ਕੀਤੀ। ਇਸ ਵਿਸ਼ੇ 'ਤੇ ਸਿਖਲਾਈ ਮੈਨੂਅਲ ਵੀ ਜਾਰੀ ਕ ਗਿਆ ਅਤੇ ਵੰਡਿਆ ਗਿਆ। ਪ੍ਰੋਗਰਾਮ ਦਾ ਕਰਦਿਆਂ ਸਾਰੀ ਟੀਮ, ਕਿਸਾਨਾਂ ਕਿਸਾਨ ਬੀਬੀਆਂ ਦਾ ਧੰਨਵਾਦ ਕੀ

ਸਮਾਗਮ 'ਚ ਹਿੱਸਾ ਲੈਣ ਵਾਲੇ ਕਿਸਾਨਾਂ ਨਾਲ ਡਾਇਰੈਕਟਰ ਡਾ. ਨਰੀਕੇਤ ਕੋਤਵਾਲੀਵਾਲੇ।

ਸੀਫੈਟ ਨੇ ਕਰਵਾਇਆ ਜਾਗਰੂਕਤਾ ਪ੍ਰੋਗਰ

ਪਲਵਿੰਦਰ ਸਿੰਘ ਚੁੰਡੀਕੇ, ਲੁਧਿਆਣਾ

ਆਈਸੀਏਆਰ-ਸੀਫੈਟ ਲੁਧਿਆਣਾ ਵੱਲੋਂ ਐਸਸੀਐਸਪੀ ਸਕੀਮ ਤਹਿਤ ਅਨੁਸੂਚਿਤ ਜਾਤੀਆਂ ਲਈ ਵਿਸ਼ੇਸ਼ ਤੌਰ 'ਤੇ ਇਕ ਰੋਜ਼ਾ ਜਾਗਰੂਕਤਾ ਪ੍ਰੋਗਰਾਮ ਕਰਵਾਇਆ ਗਿਆ। ਇਸ ਟੀਮ 'ਚ ਡਾ. ਰਣਜੀਤ ਸਿੰਘ ਪ੍ਰਮੁੱਖ ਵਿਗਿਆਨੀ, ਡਾ. ਰਾਹੁਲ ਕੇ. ਅਨੁਰਾਗ ਸੀਨੀਅਰ ਵਿਗਿਆਨੀ ਤੇ ਨੈਫ਼ਲ ਅਹਸਰ ਐਸਐਐਸਐਫ਼, ਡਾ. ਚੰਦਨ ਸੈਲੇਰੀ ਵਿਗਿਆਨੀ (ਐਸਐਸ) ਤੇ ਨੈਫ਼ਲ ਅਹਸਰ ਅਤੇ ਡਾ. ਵਿਕਾਸ ਕੁਮਾਰ ਵਿਗਿਆਨੀ ਸ਼ਾਮਲ ਹਨ। ਡਾ. ਚੰਦਨ ਸੈਲੇਰੀ ਨੇ ਬਾਜਰੇ ਦੀ ਬਾਸ਼ਤ ਅਤੇ ਇਸ ਦੀ ਪ੍ਰੋਸੈਸਿੰਗ ਬਾਰੇ ਗੱਲ ਕੀਤੀ। ਉਨ੍ਹਾਂ ਕਿਹਾ ਕਿ ਅਜਿਹੀਆਂ ਡ੍ਰਸਲਾਂ ਨੂੰ ਉਗਾਉਣਾ ਕਣਕ ਅਤੇ ਚੌਲਾਂ ਦੇ ਮੁਕਾਬਲੇ ਬਹੁਤ ਆਸਾਨ ਹੈ।

ਉਨ੍ਹਾਂ ਬਾਜਰੇ ਦੀ ਡ੍ਰਸਲ ਨੂੰ ਵੱਖ-ਵੱਖ ਮੁੱਲ-ਵਰਧਿਤ ਉਤਪਾਦਾਂ, ਜਿਵੇਂ ਕਿ ਪੋਹੇ, ਅਨਾਜ, ਮਲਟੀਗ੍ਰੇਨ ਆਟਾ, ਉਚ ਫਾਈਬਰ ਨਾਲ ਭਰਪੂਰ ਬੇਕਡ ਉਤਪਾਦਾਂ 'ਚ ਪ੍ਰੋਸੈਸ ਕਰਨ ਦੀਆਂ ਸੰਭਾਵਨਾਵਾਂ ਬਾਰੇ ਚਾਨਣਾ ਪਾਇਆ, ਜੋ ਇਹਨਾਂ ਅਨਾਜਾਂ ਦੀ ਵਰਤੋਂ ਕਰ ਕੇ ਬਣਾਏ ਜਾ ਸਕਦੇ ਹਨ। ਇਸ ਦੇ ਨਾਲ ਹੀ ਉਨ੍ਹਾਂ ਬਾਜਰੇ ਦੇ ਸੰਦਨ, ਪੋਸ਼ਣਿਕਤਾ ਅਤੇ ਸਿਹਤ ਲਾਭਾਂ 'ਤੇ ਚੰਨ ਦਿੱਤਾ। ਡਾ. ਰਣਜੀਤ ਸਿੰਘ ਨੇ ਸੰਸਥਾ ਵਿੱਚ ਉਪਲਬਧ ਐਗਰੀ ਬਿਜ਼ਨੈਸ ਇਨਕਿਊਬੇਸ਼ਨ ਸੈਂਟਰ ਦੀ ਮਦਦ ਲੈ ਕੇ ਪੇਂਡੂ ਨੌਜਵਾਨ ਪ੍ਰਮੋਸਿੰਗ ਸ਼ੁਰੂ ਕਰਨ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦਿੱਤੀ। ਪ੍ਰੋਸੈਸਿੰਗ ਸੈਂਟਰ ਦੀਆਂ ਮਸ਼ੀਨਾਂ ਪਾਇਲਟ ਪ੍ਰੋਸੈਸਿੰਗ ਯੂਨਿਟ ਲੁਧਿਆਣਾ ਫੀਡਰੀਓਜ਼ ਦਾਖਾ ਕੀਤੀਆਂ ਗਈਆਂ। ਸਮਾਪਤੀ ਪ੍ਰਧਾਨਗੀ ਡਾਇਰੈਕਟਰ ਡਾ. ਕੇਤਵਾਲੀ ਨੇ ਕੀਤੀ। ਉਨ੍ਹਾਂ ਜਲਵਾਯੂ ਪਰਿਵਰਤਨ ਦੇ ਦੌਰ ਦੀ ਬਾਸ਼ਤ ਅਤੇ ਇਸ ਦੀ ਪ੍ਰੋਸੈਸਿੰਗ ਮੁੱਲ ਨਾਲ ਭਰਪੂਰ ਪੋਸ਼ਟਿਕ ਉਤਪਾਦ ਕਰਨ ਨਾਲ ਰੁਪਏ ਦੇ ਮਜ਼ਬੂਤ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

दैनिक सवेरा टाइम्स

अनुसूचित जाति उप योजनाः जागरूक प्रशिक्षण कार्यक्रम का आयोजन

प्रतिभागियों को प्लास्टिक कैरेट बांटते हुए सीफेट प्रभारी डा. रमेश कुमार।

सवेरा न्यूज/धर्मवीर अबोहर: सीफेट अबोहर द्वारा अनुसूचित जाति यो अंतर्गत जागरूकता एवं प्रशिक्षण कार्यक्रम का तीन दिवसीय आयो दिनांक 1 से 3 मार्च को फाजिल्का के राजपूत धर्मशाला में आयोजित कि गया। इस कार्यक्रम का संचालन डा. रमेश कुमार प्रभारी सीफेट, अबो द्वारा किया गया। इस कार्यक्रम में अनुसूचित जाति को लाभान्वित क के लिए उद्यमिता विकास पर प्रशिक्षण कार्यक्रम के अंतर्गत फल उ सब्जियों के विभिन्न तरह के मूल्य संवर्धित उत्पाद जैसे फलों का उ शरबत सॉस इत्यादि बनाने की प्रायोगिक जानकारी दी गई त प्रतिभागियों को अनुसूचित जाति उप योजना के बारे में विस्तार पूर्व बताया गया तथा कृषि विज्ञान केंद्र की गृह विज्ञान विशेषज्ञा डा.वटर रूप कौर द्वारा महिलाओं के आर्थिक स्वावलंबन के लिए कृषि विज्ञान केंद्र अंतर्गत दिए जाने वाले व्यवसायिक प्रशिक्षण के बारे में जागरूक किय गया तथा किस तरह स्वयं सहायता समूह बनाकर मूल्य संवर्धित उत्पा बनाने पर अपना स्वयं का रोजगार स्थापित कर महिलाएं आर्थिक रूप से आगे बढ़ सकती है के बारे में विस्तार पूर्वक जानकारी दी इस कार्यक्रम के अंतर्गत फाजिल्का एवं जलालाबाद ब्लाक के 15 गांवों के 300 प्रतिभागियों ने भाग लेकर कार्यक्रम विभिन्न तरह के पंप प्राथमिकता के

ICAR-CIPHET Ludhiana organized Awareness Programme

दैनिक सवेरा टाइम्स

खेत दिवस का किया आयोजन

गांव भागसर में लगाई गई प्रदर्शनी में शिरकत करते हुए किसान।

सवेरा न्यूज/कथूरिया, अबोहर : कृषि विज्ञान केंद्र सीफेट की ओर से मंगलवार को गांव भागसर में दलहनी फसलों के अग्रिम पंक्ति प्रदर्शन के अंतर्गत खेत दिवस का आयोजन किया गया। इस कार्यक्रम का संचालन सहायक मुख्य तकनीकी अधिकारी पृथ्वीराज द्वारा डॉ रमेश कुमार प्रभारी कृषि विज्ञान केंद्र के निर्देशन में किया गया। इस कार्यक्रम में पृथ्वीराज द्वारा तिलहनी फसलों के उत्पादन की उन्नत तकनीकों एवं किस्मों के बारे में किसानों को कृषि विज्ञान केंद्र के द्वारा लगाए गए प्रदर्शनों के माध्यम से किसानों की फसल से तुलनात्मक तौर पर समझाया और किसानों को उन्नत व नई किस्में अपनाने के लिए प्रेरित किया ताकि वह ज्यादा से ज्यादा पैदावार ले सके। इस कार्यक्रम में 32 प्रगतिशील किसानों ने भाग लेकर कार्यक्रम को सफल बनाया।

MALWA SAVERA Edition

INNOCENT HEARTS SCHOOL

ICAR-CIPHET inaugurates its "Storage-Pests Management Laboratory"


ਪੋਸ਼ਣ ਸੁਰੱਖਿਆ ਹੇਠ ਅਨਾਜ ਅਤੇ ਸ੍ਰੀ ਅੰਨ ਦਾ ਮੁੱਲ ਵਰਧਨ ਤੇ ਸਿਖਲਾਈ ਪ੍ਰੋਗਰਾਮ
PUNJAB INFOLINE
hop on Role of Physiotherapist in Women's health issues in
ntral Institute of Post Harvest Engineering & Technology
कृषि प्रदर्शनी किसान मेले का समापन
लगभग 90 हजार किसान व आमजन ने ली जानकारी
पंचवर्षीय समीक्षा समिति बैठक का आयोजन
बैठक की अध्यक्षता करते डॉक्टर एनसी पटेल।
सवेरा न्यूज/कथूरिया अबोहर : कृषि विज्ञान केंद्र/सीफेट अबोहर पर पं
समीक्षा समिति बैठक का आयोजन शनिवार को किया गया। इस बैठ
अध्यक्षता डॉक्टर एनसी पटेल भूतपूर्व उपकुलपति आनंद कृषि विश्वविद्या
तथा डॉक्टर आरके जैन भूतपूर्व प्रधान वैज्ञानिक एसडीआईटी आनंद, डॉ
उपाध्याय प्रोफेसर निफ्टीम, शंकरशाह भूतपूर्व सीजीओ नाबार्ड, डॉ प्रि
भूतपूर्व निदेशक सीआईएयू भोपाल, डॉ संदीप मान प्रधान वैज्ञानिक
लुधियाना एवं डॉ रणजीत सिंह प्रधान वैज्ञानिक सीफेट लुधियाना समिति
के रूप में उपस्थित रहे। इस बैठक का आयोजन प्रभारी कृषि विज्ञान केंद्र
कुमार द्वारा किया गया। इस बैठक के अंतर्गत 2017 से 2022 कृषि वि
में की गई गतिविधियों की समीक्षा की गई तथा आगे की गतिविधियों के लि
तरह के सुझाव भी दिए गए, इस बैठक में कृषि विज्ञान केंद्र एवं अबोहर
प्रगतिशील कृषक एवं कृषक महिलाओं एवं एफपीओ के सदस्य सहि
सदस्यों ने भाग लेकर इस बैठक को सफल बनाया।
DURG NEWS
दुर्ग कामधेनु विवि में सुपरफूड मिलेट्स पर
मिलेट्स में कैल्शियम और आयरन भरपूर, मधुमेह के मरीजों के लिए उपयोगी : डॉ. एम. नागरकर
नई खोज • आईसीएआर-सीफेट ने तैयार की तकनीक, प्रोडक्ट से मिलेगी 16-18% प्रोटीन की म
डी-ऑयल्ड राइस ब्रान से तैयार होंगे प्रोटीन प्रोडक्ट, बेकि
फूड आइटम्स और सप्लीमेंट में भी किया जा सकेगा इस्तेमा
Training program on "Protein-Enriched: Cereal and Millet Based Value-Added Products" conducted by ICAR-CIPHET Ludhiana

ਸਵੱਛਤਾ ਮੁਹਿੰਮ ਦੌਰਾਨ ਲੋਕਾਂ ਨੂੰ ਸਫ਼ਾਈ ਦੀ ਮਹੱਤਤਾ ਤੋਂ ਕਰਵਾਇਆ ਜਾਣੂ

ਪੱਤਰ ਪ੍ਰੇਰਕ, ਲੁਧਿਆਣਾ : 16 ਤੋਂ 31 ਦਸੰਬਰ 2022 ਤਕ ਆਈਸੀਏਆਰ-ਸੀਫੇਟ ਵੱਲੋਂ ਸਵੱਛਤਾ ਮੁਹਿੰਮ ਕਰਵਾਈ ਗਈ। ਸੰਸਥਾ ਦੇ ਸਮੂਹ ਕਰਮਚਾਰੀਆਂ ਵੱਲੋਂ ਸਵੱਛਤਾ ਦਾ ਪ੍ਰਣ ਲਿਆ ਗਿਆ। ਸਾਰੇ ਕਰਮਚਾਰੀਆਂ ਨੂੰ ਵੱਖ-ਵੱਖ ਗਤੀਵਿਧੀਆਂ ਵਿੱਚ ਤਾਲਮੇਲ ਕਰਨ ਅਤੇ ਸਵੱਛਤਾ ਦੀ ਮਹੱਤਤਾ ਬਾਰੇ ਸਮਾਜ ਨੂੰ ਜਾਗਰੂਕ ਕਰਨ ਲਈ ਵੱਖ-ਵੱਖ ਟੀਮਾਂ 'ਚ ਵੰਡਿਆ ਗਿਆ ਸੀ। ਡਾ. ਨਰੀਕੇਤ ਕੋਤਵਾਲੀਵਾਲੇ ਡਾਇਰੈਕਟਰ ਆਈਸੀਏਆਰ-ਸੀਫੇਟ ਲੁਧਿਆਣਾ ਨੇ ਰੋਜ਼ਾਨਾ ਜੀਵਨ 'ਚ ਸਵੱਛਤਾ ਦੀ ਸਾਰਥਕਤਾ ਅਤੇ ਇਸ 'ਚ ਹਰੇਕ ਦੀ ਸ਼ਮੂਲੀਅਤ ਦੀ ਲੋੜ ਬਾਰੇ ਚਾਨਣਾ ਪਾਇਆ। ਇਸ ਮੌਕੇ ਸਰਦੀਆਂ ਦੀਆਂ ਫ਼ਸਲਾਂ ਦੇ ਵਾਢੀ ਤੋਂ ਬਾਅਦ ਪ੍ਰਬੰਧਨ ਬਾਰੇ ਇਕ ਵੈਬੀਨਾਰ ਵੀ ਕਰਵਾਇਆ ਗਿਆ। ਡਾ. ਰੁਪਿੰਦਰ ਕੌਰ ਐੱਸਐੱਮਐੱਸ ਕੇਵੀਕੇ ਅਬੋਹਰ ਨੇ ਸਰਦੀਆਂ ਦੀਆਂ ਫ਼ਸਲਾਂ ਦੇ ਵਾਢੀ ਤੋਂ ਬਅਦ ਦੇ ਪ੍ਰਬੰਧਨ ਬਾਰੇ ਸੰਖੇਪ ਪੇਸ਼ਕਾਰੀ ਦਿੱਤੀ, ਜਿੱਥੇ ਉਸ ਨੇ ਵੱਖ-ਵੱਖ ਅਡਿਆਸਾਂ ਅਤੇ ਤਕਨੀਕਾਂ ਬਾਰੇ ਚਾਨਣਾ ਪਾਇਆ। ਆਈਸੀਏਆਰ-ਸੀਫੇਟ ਕਰਮਚਾਰੀਆਂ ਦੀ ਟੀਮ ਨੇ ਵੱਖ-ਵੱਖ ਪਿੰਡਾਂ ਦਾ ਦੌਰਾ ਕੀਤਾ ਅਤੇ ਸਫ਼ਾਈ

● 16 ਤੋਂ 31 ਦਸੰਬਰ 2022 ਤਕ ਆਈਸੀਏਆਰ ਸੀਫੇਟ ਵੱਲੋਂ ਵਿੱਢੀ ਗਈ ਮੁਹਿੰਮ ਦੌਰਾਨ ਅਧਿਕਾਰੀਆਂ ਨੇ ਮੁਲਾਜ਼ਮਾਂ ਨੂੰ ਲਿਆ ਉਰਜ਼ਾਹ ਨਾਲ ਹਿੱਸਾ

ਸਵੱਛਤਾ ਮੁਹਿੰਮ ਦੌਰਾਨ ਲੋਕਾਂ ਨੂੰ ਸਫ਼ਾਈ ਰੱਖਣ ਸਬੰਧੀ ਜਾਗਰੂਕ ਕਰਦੇ ਹੋਏ ਸੰਸਥਾ ਦੇ ਮੁਲਾਜ਼ਮ।

ਪ੍ਰੋਗਰਾਮ ਕਰਵਾਏ। ਇਸ 'ਚ ਕੂੜੇ ਨੂੰ ਸਾਫ਼ ਕਰਨਾ ਅਤੇ ਇਕੱਠਾ ਕਰਨਾ ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਬਾਇਓ ਡੀਗ੍ਰੇਡੇਬਲ ਅਤੇ ਨੋਨ-ਬਾਇਓਡੀਗ੍ਰੇਡੇਬਲ ਵਿੱਚ ਵੰਡਣਾ ਸ਼ਾਮਲ ਸੀ, ਜਿਸ ਤੋਂ ਬਅਦ ਸਹੀ ਢੰਗ ਨਾਲ ਨਿਪਟਾਰਾ ਕਰਨਾ, ਸੀਵਰੇਜ ਅਤੇ ਪਾਣੀ ਦੀਆਂ ਲਾਈਨਾਂ ਦੀ ਸਫ਼ਾਈ, ਰੀਸਿੰਦ-ਖੁੰਹਦ ਦੇ ਪਾਣੀ ਦੀ ਰੀਸਾਈਕਲਿੰਗ ਅਤੇ ਰਿਹਾਇਸ਼ੀ ਖੇਤਰਾਂ 'ਚ ਖੇਤੀਬਾੜੀ/ਬਾਗਬਾਨੀ/ਬਾਗਾਂ ਵਿੱਚ ਵਰਤੋਂ ਲਈ ਪਾਣੀ ਦੀ ਸੰਭਾਲ ਬਾਰੇ ਜਾਗਰੂਕਤਾ ਪੈਦਾ ਕਰਨਾ ਵੀ ਸ਼ਾਮਲ ਸੀ।

दालों के मूल्य संवर्धन पर तीन दिवसीय प्रशिक्षण कार्यक्रम संपन्न

प्रतिभागियों को संबोधित करते हुए प्रभारी डा. रमेश कुमार।

सवेरा न्यूज/
दालों के मूल
29 मार्च को
कृषि विज्ञान
गया। इस प्र
बनाने पापड़
की प्रायोगिव
विभिन्न तक

दैनिक सवेरा टाइम्स

स्वास्थ्य जांच शिविर में शिरकत करते बल्लुआना की महिलाएं।

कृषि विज्ञान केंद्र द्वारा स्वास्थ्य जांच शिविर का आयोजन

सवेरा न्यूज/धर्मवीर

अबोहर, 3 अगस्त : कृषि विज्ञान
अबोहर द्वारा बल्लुआना गांव में
वार को स्वास्थ्य जांच शिविर का
योजन किया गया। शिविर का
लन गृह विज्ञान विशेषज्ञ डा.
द कौर द्वारा, आंगनबाड़ी
वाइजर रवीना व आंगनबाड़ी
कर्त्ताओं तथा स्वास्थ्य विभाग के
इस शिविर के दौरान 57 बच्चों
स्वास्थ्य जांच जैसे लंबाई बढ़ाने
एवं खून जांच की गयी। इस शिविर

परीक्षण कार्यक्रम के तहत चयनित 20 बच्चों का पूर्व स्वास्थ्य परीक्षण कर 3 महीने तक इन बच्चों को पौष्टिक दलिया खिलाया जाना है तथा 3 माह पश्चात फिर स्वास्थ्य जांच कर नतीजे निकाले जाएंगे कि पौष्टिक दलिया किस तरह बच्चों के वृद्धि विकास में सहायक है। इसके साथ साथ बच्चों को पौष्टिक दलिए का वितरण भी किया गया। इस कार्यक्रम में 57 बच्चों एवं उनकी माताओं सहित बल्लुआना गांव के पांच आंगनबाड़ी केन्द्रों की सभी कार्यकर्त्ताओं व सहायिकाओं हित कुल 70 प्रतिभागियों ने भाग

दैनिक जागरण

लुधियाना, बुधवार
अगस्त, 2023
हानगर *
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RS 12+4=16

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सिखों से दूरी मिटाने राहुल चार बार पहुंचे श्री हरिमंदिर साहिब 1

सैन्य गतिरोध खत्म होने पर एलएसी से पीछे नहीं हटेंगे : वायुसेना प्रमुख 7

अब जूट के पत्तों से बना पेय पीएं, बीमारियों को दूर भगाएं

अदा सैलत • लुधियाना

अधिकतर लोगों ने जूट से रेशे से बने थैले, लिफाफे, टाट, रस्सियां, दरी, कालीन या घर की सजावट का सामान आमतौर पर देखा होगा। क्या कभी सुना है कि जूट के पत्तों से पेय भी तैयार होता है और यह पेय हमें कई बीमारियों से बचाता है। भारतीय कृषि अनुसंधान परिषद यानी इंडियन एग्रीकल्चर रिसर्च इंस्टीट्यूट (आइसीएआर) के कोलकाता स्थित राष्ट्रीय प्राकृतिक रेशा अभिकेंद्रीकी

नेशनल इंस्टीट्यूट आफ नेचुरल फाइबर इंजीनियरिंग एंड टेक्नोलाजी के विज्ञानियों ने तैयार किया जूट लीफ ड्रिंक, सेहत के लिए लाभकारी

जूट के पत्तों से बने पेय के लाभ

प्रति सौ ग्राम जूट के पत्तों में 5.1 प्रतिशत प्रोटीन, 35-40 एमजीजी डिटामिन, बीटा कैरोटीन, करीब 1.2 ग्राम, कार्बोहाइड्रेट 54.8 ग्राम, विटामिन बी एक 0.5 मिलीग्राम, विटामिन बी टू 0.9 मिलीग्राम, विटामिन बी छह 0.4 मिलीग्राम, विटामिन ए 35.6 एमजी, विटामिन डी 16.8 एमजीजी, विटामिन ई 1.1 मिलीग्राम, विटामिन के 5.0 एमजीजी होता है। इसके अलावा जूट के पत्तों में भरपूर मात्रा में

किसान कमा सकते हैं 20 से 25 हजार रुपये प्रति हेक्टेयर अतिरिक्त

लुधियाना में आयोजित कृषि प्रसंस्करण उद्योग इंटरफेस एवं किसान मेले में मंगलवार को अपना स्टाल लगाया। पहले विज्ञानियों ने जूट के पत्तों से बनाए पेय से संबंधित जानकारी को प्रदर्शित किया। इस पेय के बारे में जानने के लिए मेले में आए किसानों व युवाओं में काफी जिज्ञासा दिखी। संस्थान के वरिष्ठ विज्ञानी कंपन राय ने कहा कि जूट भारत के कई पूर्वी राज्यों में खेती की जाने वाली एक लेकदिन व्यवसायिक फसल है। देश में करीब 40 लाख किसान परिवार जूट की खेती में सक्रिय रूप से शामिल हैं। जूट के रेशों से कई तरह का सामान बनता है। जूट की लकड़ी को घरों में ईंधन के रूप में उपयोग किया जाता है। जूट के पत्ते अधिकतर खेत में ही चबाद हो जाते हैं। संस्थान ने राष्ट्रीय जूट बोर्ड, कपड़ा मंत्रालय के वित्तीय सहयोग से यह आयुर्वेदिक पेय तैयार किया है।

फसल अवशेष प्रबंधन पर जिला स्तरीय जागरूकता शिविर का आयोजन

संबोधित करते ब्लाक अधिकारी डा. विजय सिंह।

सवेरा न्यूज/कथूरिया अबोहर : कृषि विज्ञान केंद्र सीफेट अबोहर द्वारा फसल अवशेष प्रबंधन पर गांव खुई खेड़ा में जिलास्तरीय जागरूकता शिविर का आयोजन किया गया। इस कार्यक्रम का संचालन डा. अरविंद कुमार अहलावत हेड कृषि विज्ञान केंद्र के निर्देशन में डॉक्टर रूपेंद्र कौर द्वारा कृ
आरसीआर सैल व सरपंच आत्माराम के सहयोग से किया गया। इस
में रूपेंद्र कौर द्वारा विशेष प्रबंध परियोजनाओं के बारे में विस्तृत जा
हुए कृषि विज्ञान केंद्र की गतिविधियों पर प्रकाश डाला। पृथ्वीराज ने पर
के लाभ व विभिन्न तरीकों के बारे में जानकारी दी। कृषि ब्लॉक अधिका
सिंह द्वारा पराली प्रबंधन की सस्ती तकनीक के बारे में अवगत कराते
को खेत में मिलाने की तकनीक के बारे में विस्तारपूर्वक जानकारी देते ह
द्वारा मिलने वाली विभिन्न तरह की सब्सिडी व स्कीमों के बारे में भी बता
अरविंद कुमार द्वारा पराली प्रबंधन के तरीकों के साथ-साथ उच्च गुण

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