

ICAR-NATIONAL INSTITUTE OF SECONDARY AGRICULTURE

e-newsletter



Director's Desk

The April–June 2026 issue of the ICAR-NISA quarterly newsletter documents the Institute's uninterrupted efforts in research, technology development, capacity building, and stakeholder engagement. During this period, the Institute made significant progress in protected agroforestry nursery infrastructure, producing approximately two lakhs healthy *Flemingia semialata* seedlings for sustainable lac cultivation and ecological restoration. Notable engineering research included developing and evaluating a continuous refractance window dryer for guar gum hydrogel. Concurrently, investigations into natural resin-based pressure-sensitive adhesives yielded meaningful insights into their viscoelastic and temperature-responsive properties. Additionally, membrane-based separation of lac dye from wash water showed significant potential for resource recovery and value addition. The Institute's translational research activities focused on export-market stability, scientific lac cultivation, and farmer empowerment. Training programmes resulted in substantial income gains for participating lac farmers. Furthermore, technology licensing, entrepreneurial training, and on-farm demonstrations enhanced the linkage between research and practical field application.



This quarter featured extensive outreach activities, including the Khet Bachao Abhiyaan, farmer–scientist interactions, technology dissemination via social media, and a live webcast of the PM-KISAN instalment release programme. Institutional events such as the Institute Research Council meeting, World Intellectual Property Day lecture, COMSOL Multiphysics workshop, and International Yoga Day celebration augmented the professional and social environment at ICAR-NISA. The newsletter further highlights notable publications, technology transfers, and peer recognition, stressing the Institute's commitment to impactful, inclusive, and innovation-driven secondary agriculture. It is my proud privilege to present before you this quarter's newsletter.

(Abhijit Kar)

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RESEARCH HIGHLIGHTS

Development of Protected Agroforestry Nursery Infrastructure for Production of Quality Planting Material

Under the RKVY Agroforestry Scheme, a protected agroforestry nursery infrastructure was established to facilitate large-scale production of quality planting material for important lac host and agroforestry species. The infrastructure comprises a modern polyhouse, mist chamber, and shed net structure equipped with an automated misting and irrigation system to maintain optimum temperature and humidity for seed germination and seedling establishment. These facilities have significantly improved nursery efficiency by providing a controlled environment to raise healthy, uniform seedlings year-round. Standardised nursery media consisting of 40% soil, 30% cocopeat, and 30% vermicompost were used to ensure better seed germination, root development, and vigorous seedling growth. The misting system provided regular irrigation twice daily for one hour each to maintain adequate moisture under protected conditions. Appropriate nursery management practices, including timely weeding, nutrient application, plant protection measures, and routine monitoring, were adopted to produce healthy planting material. As a result, approximately 2.0 lakh quality seedlings, particularly *Flemingia semialata*, were successfully raised under the protected nursery system (Fig 1). The developed seedlings exhibited excellent survival, uniform growth, and robust root development, making them suitable for field planting and distribution to farmers. The facility has strengthened the institute's capacity for continuous production of quality planting material and serves as a demonstration unit for protected nursery technologies. It also supports the promotion of agroforestry-based farming systems, sustainable lac cultivation, and ecological restoration through the timely availability of healthy seedlings.



Fig 1 *Flemingia semialata* seedlings in shed net structure for hardening

Development and Evaluation of Refractance Window (RW) Dryer for Drying of Guar Gum-Based Hydrogel

A pilot-scale refractance window (RW) dryer was developed for continuous drying of guar gum-based hydrogel, integrating stainless steel construction for durability and corrosion resistance. The design consists of a 1 m × 2.5 m water trough as the refractance medium, a Mylar belt for uniform hydrogel contact, and rollers with diameters of 16 cm (driver/driven) and 6 mm (idlers) to ensure smooth belt guidance. A speed reduction gearbox coupled with a transmission unit provides controlled belt movement,

while integrated heaters and controllers regulate trough temperature and belt speed for precise drying conditions (Fig 2).Operational evaluation highlighted its ability to maintain product uniformity under continuous operation, with assessments confirming efficient energy utilisation, effective heat transfer, and reliable drying performance. The system’s mechanical robustness and process control make it suitable for scale-up, offering a technically sound solution for guar gum hydrogel drying with consistent quality outcomes.



Fig 2. Continuous type Refractance Window Dryer

Study on Rheological Behaviour of Natural Resin-Based Pressure Sensitive Adhesive

Pressure-sensitive adhesive formulations were prepared using developed natural resin-based tackifiers. Rheological analysis was performed using a rheometer to study the viscoelastic properties of the adhesives over a frequency range of 0.01 to 10 Hz (Figure 3). Both storage modulus (G') and loss modulus (G'') increased with frequency. At the same time, the phase angle (δ) decreased, indicating a transition from viscous-dominated behaviour at low frequencies to elastic-dominated behaviour at higher frequencies. At low frequencies, the higher δ and dominant G'' suggest that the adhesive behaves more like a viscous fluid. As frequency increases, G' approaches or exceeds G'' , reflecting enhanced elasticity and resistance to deformation (Figure 4). This behaviour shows that the adhesive has a good viscoelastic balance, allowing it to flow under slow deformation while maintaining structural integrity under rapid stress—an essential characteristic for pressure-sensitive adhesives.

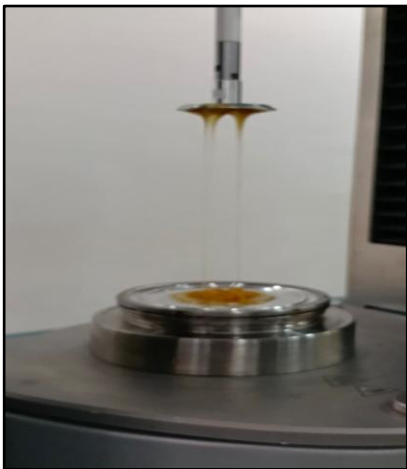


Figure 3. Determination of rheological properties of adhesive

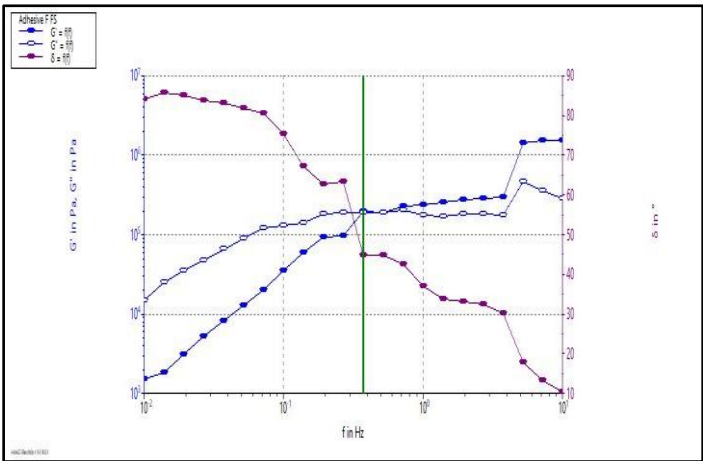


Figure 4. Viscoelastic properties of adhesive over a frequency range

The adhesive formulations were studied for changes in viscosity with time and temperature (Figure 5). The material showed temperature-dependent viscoelastic behaviour. Heating decreased viscosity (softening), which reversed upon cooling (structure recovery). The results show a strong temperature dependence of viscosity and confirm that the material exhibits reversible, path-dependent viscoelastic behaviour, which is critical for applications requiring thermal processing and performance stability.

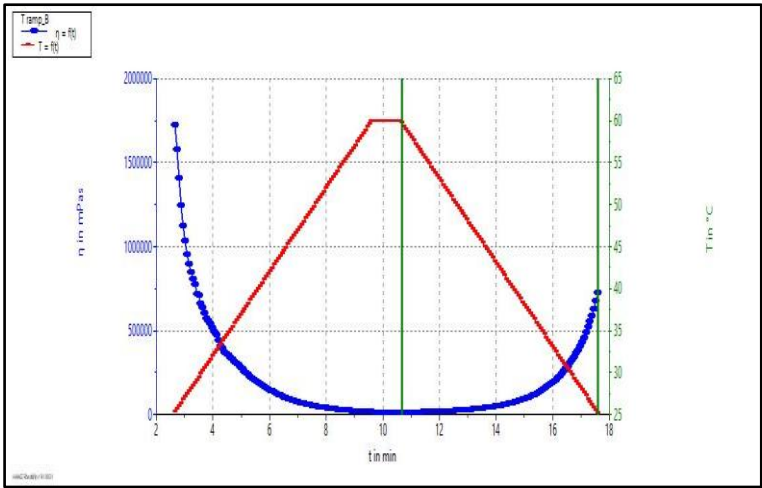


Figure 5. Change in Viscosity (η) with time and temperature

Membrane Separation of Lac Dye from Wash Water

Lac wash water contains approximately 2% lac dye, a substance used across the food, pharmaceutical, and textile industries. A 60 L sample of wash water—obtained from two washes of 5 kg scraped lac—was processed through a 100 L capacity membrane-filtration unit equipped with microfiltration (MF), ultrafiltration (UF), and nanofiltration (NF) membranes (Fig 6a). The retentates and permeates from each stage were collected and analysed for lac dye content (Fig 6b). Initial analysis showed 40 g of lac dye in the feed. After MF, the dye concentration in the MF retentate declined to 28 g; UF permeate contained 12.4 g; and the NF retentate contained 11 g. These results indicated the existing protocol did not maximise dye recovery, prompting process modifications. When the protocol was adjusted and applied to washings from 3 kg scraped lac, 60% of the dye could be recovered. Protein content in the wash water was 11.2% in the feed, declined to 4.8% in the MF permeate, further reduced to 4.1% in the UF retentate, and no protein fraction was detected in the NF retentate along with pure dye, indicating the recovered lac dye is devoid of insoluble protein fraction. These findings will inform the design and operation of membrane-filtration systems for efficient lac dye recovery.



Fig 6 (a) Membrane Separation of Lac Dye from Wash water, (b) different fractions from Feed, Permeate and Retention from MF, UF and NF

Translational Research to Promote Secondary Agriculture

The Markov chain-based transitional probability analysis assessed the stability and loyalty of India's export markets by capturing the likelihood of retaining trade shares over time. This helps identify dependable markets such as the USA, Bangladesh, and Germany, enabling policymakers and exporters to formulate targeted export strategies, reduce market risk, and strengthen long-term trade relationships. The Markov chain-based transitional probability matrix for Indian shellac and lac-based product exports during 2014–15 to 2023–24 showed that the USA (85%), Bangladesh (75%), and Germany (52%) were the most stable export markets, reflecting high retention probabilities. Similarly, the transitional probability matrix for Indian guar gum exports over the same period revealed that the USA (63%) and Germany (14%) were relatively more stable markets, indicating consistent trade relationships.

As part of the ongoing research and extension activities, an assessment survey was conducted among farmers to identify their information requirements, preferred communication channels, and existing knowledge gaps. Simultaneously, an impact assessment of training programmes was undertaken to evaluate the adoption of scientific technologies in lac cultivation and to document key constraints faced by farmers. Data were collected from 200 farmers, comprising 150 trained and 50 control farmers, and the impact assessment of the training programme was carried out using the Propensity Score Matching (PSM) technique, which provides evidence that structured lac cultivation training generates economically meaningful and statistically significant income gains for participating farmers. Using PSM to control for pre-existing differences between trained and untrained farmers, the estimated average treatment effect on the treated is Rs. 92,716 for income from lac cultivation and Rs. 1,23,752 for total household income; both are significant at conventional thresholds. Beyond the Training effect, two other covariates, i.e. lac cultivation experience and family size, exerted statistically significant and substantively interpretable effects on income growth.

Baseline Survey on the Potential of Scientific Lac Cultivation in Jashipur Block, Odisha

ICAR-NISA conducted a baseline survey, in collaboration with the Centre for Regional Education, Forest & Tourism Development Agency (CREFTDA), Jashipur, to assess the potential for scientific lac cultivation in Chakidia, Ramasahi, Jamuti, and adjoining villages of Jashipur Block, Mayurbhanj District, Odisha, on 23rd June 2026. The survey focused on the availability and distribution of lac host plants and the area's suitability for scientific lac production. Field observations revealed an abundance of Kusum (*Schleichera oleosa*) trees, while Ber (*Ziziphus mauritiana*) plants were found in limited numbers. The predominance of Kusum trees indicates strong potential for promoting Kusmi lac cultivation under the coupe system. A large population of Kariya Kusum trees was identified, which can serve as broodlac banks for ensuring the availability of quality broodlac. The dense forest cover and favourable microclimatic conditions also support successful rearing of the Kusmi lac insect during the summer crop, indicating strong prospects for sustainable lac cultivation in the region. The team also visited the local market and interacted with traders to understand the lac supply chain and prevailing market prices in the region.



Fig 7 Baseline Survey on Scientific Lac Cultivation in Jashipur Block, Odisha by ICAR-NISA team

Technology Licensed

Sl. No.	Technology	Licensee	Date of signing MoU	Valid up to
1	NRG based Gluten Free Binder for use with Millets and Pseudo Cereals.	LE FRAIS FOODS INDIA PVT. LTD.,	17.04.2026	03 Years

Technology/Know-how Transfer on Processes and Products to Entrepreneurs Under Entrepreneurs’ Programme

Sl. No.	Date	Technology Transfer	Trainees	Firm/Organization
1	15-18, June 2026	Primary Processing of Lac	1. Mr. Anubhav Raj 2. Mr. Sumant Kumar	New Area Jogiya Bagicha, Gaya, Bihar & RMS Colony, Kankarbagh, Patna, Bihar.
2	22-26, June 2026	Dewaxed Bleached Lac	1. Mr. Anubhav Clancy Singh	Prestige St Johns Wood, Bangalore
3	22-26, June 2026	Dewaxed Decolourised Lac	1. Mr. Nitish Barla	Prestige Willow Tree, Vidyaranyapura, Bengaluru

Sl. No.	Date	Technology Transfer	Trainees	Firm/Organization
4	29 June to 02, July 2026	Primary Processing of Lac	1. Mr. Ishan Sherali Jiwani	Yavatmal, Maharsashtra
5	29 June to 03, July 2026	Dewaxed Decolourised Lac	1. Mr. Manish Agrawal	BL Shellac, Sakti, Chhattisgarh

On-Farm Training

ICAR–National Institute of Secondary Agriculture (NISA), Namkum, Ranchi, organised a one-day on-farm training programme on scientific lac cultivation on 24 June 2026 at KVK Mayurbhanj-II, Jashipur, Odisha. Farmers from Chakidia, Ramasahi, Jamuti, Danua, Gharmabeda, Budamara, Tangurusahi, Gentisahi, Naibhanga, and nearby villages of Jashipur, Odisha actively participated in the programme. Dr Udaykumar M S and Mr P. Patmajhi participated in this on-farm training. The training focused on key scientific practices to improve lac production, including scientific lac cultivation techniques, brood lac inoculation, scientific pruning of host plants, timely spraying, and proper harvesting of brood lac. CREFTDA Jashipur, Odisha, sponsored the programme. The training provided farmers with valuable technical knowledge and practical skills to promote sustainable and profitable lac cultivation in the region.



Technology Dissemination Using Social Media Platform

As part of translational research and outreach efforts to promote secondary agriculture, four short videos, i.e. Synergistic Benefits of Beekeeping in Lac-Based Farming Systems, Beekeeping and Its Training, Strawberry Bites: Goodness of Strawberries, and All Year Round and Agronomic Interventions to Increase Lac Yield on Semialata, were disseminated through the Institute’s social media platforms. In addition, the Institute recorded success stories of progressive lac farmers to showcase the impact of scientific lac cultivation on income enhancement and livelihood improvement. Success story videos were shared on social media, serving as an effective knowledge-dissemination tool to encourage wider adoption of scientific lac cultivation practices among farmers.

Capacity Building, Educational and Entrepreneurs Programmes

Sl. No.	Name of programme	No. of programme/ batch	No. of beneficiaries
1.	Farmers’ Training programme on “Scientific methods of Lac cultivation, primary processing and utilization”	02	165

Sl. No.	Name of programme	No. of programme/ batch	No. of beneficiaries
2.	On-Training programme on “Scientific methods of Lac cultivation, primary processing and utilization”	01	50
3.	Participation in Mela/Events	01	-
4.	One day training cum Exposure visit Programme	04	140

Patent Filed

Sl. No	Title	Application No.	Inventors	Status	Date of filing
1	Method of preparation of encapsulated ethylene using PEG based amphiphilic polymer and formulation there of	2026310463 49	Abhijit Kar, Supriya Priyadarsan, NA Shakil & AS Patel	Filing of new application with complete specification	10.04.20 26

Participation in Programme, Mela, Events, Exhibition Etc. From ICAR-NISA, Ranchi

Sl.No .	Programme, Mela, Events and Visit	Organised by	Venue	Period
1	Participation through Exhibition Stall on Natural Resins, Gums and Secondary Agriculture during Agriculture Trade Fair-2026	Ministry of Agriculture, Animal Husbandry and Co-operation, Government of Jharkhand.	Murabadi Maindan, Ranchi, Jharkhand.	16-18, June 2026.

Participation of Scientists in Seminar/Symposia/Workshop/Conference/Training/Summer School/Winter School/CAFT Program

Scientists	Event	Organised by	Venue	Period
Rajvardhan K Patil, Scientist	Professional Attachment Training on “Hyperspectral Imaging for Contaminants Detection In Foods”	IIT, Kharagpur	Dept of Agri and Food Engineering, IIT kharagpur	12 January to 10 April 2026
Simran Arora, Scientist	Professional Attachment Training on “Bioprocessing of Orange Peel: Transforming Fruit Waste into Valuable Compounds”	CSIR–Institute of Microbial Technology	CSIR-IMTECH), Chandigarh	12 January to 10 April 2026

Scientists	Event	Organised by	Venue	Period
Jithender Bhukya, Scientist	Professional Attachment Training on “Extraction and characterization of microcrystalline cellulose (MCC) from corn silk using microwave-assisted alkali treatment followed by acid hydrolysis	Indian Institute of Technology Bombay, Powai	Centre for Technology Alternatives for Rural Areas (C-TARA), (IIT Bombay).	12 January to 10 April 2026
Archana Mahapatra, Scientist	5-day training on “Strengthening Agriculture Research with Gender Perspective for Sustainable Agri-	ICAR-CIWA	Bhubaneswar	18-22 May 2026
Debabandya Mohapatra, Principal Scientist	Food Systems' for Nodal Officers - Gender Research in Agriculture at ICAR-CIWA, Bhubaneswar, during			22-26 June 2026
Debabandya Mohapatra, Principal Scientist	Workshop on crop health management and annual meeting of NAAS and presented “Digital transformation of Indian Agriculture: role of AI, IoT and VR in Engineering Applications”	NAAS	NASC, New Delhi	4-5th June 2026

Events Organized

ICAR- NISA successfully host Institute Research Council Meeting

The Institute Research Council (IRC) meeting was held on April 23-24, 2026, at ICAR- NISA, Ranchi. Dr Abhijit Kar, Director, ICAR-NISA, chaired the meeting, which was attended by esteemed external experts Dr Amitabha Bandyopadhyay, Former National Coordinator for the National Fund for Basic and Strategic Research in Agriculture, ICAR, New Delhi, and Dr S. Mandal, Associate Professor, Government Engineering College, Kalyani, West Bengal. Dr S.C. Sharma, In-charge, PME Cell & Member Secretary, IRC, welcomed the IRC participants and apprised the house of the modalities and structure of the presentations.

Key highlights of the meeting:

- Program leaders presented progress on work conducted under various approved research and extension programs during the last financial year 2025-2026 (April 2025 to March 2026).
- 38 projects, including 17 new project proposals (RPP-I), 8 ongoing projects (RPP-II), and 13 completed projects (RPP-III), were presented by Principal Investigators and reviewed, covering areas such as agro-processing, value addition and product development from agro-biomass, lac host plants, and extension and agri-business. Principal Investigators also discussed the challenges in achieving project goals.
- * External experts provided valuable input to improve research quality and impact
- The meeting concluded with actionable recommendations to enhance research outcomes and a vote of thanks to the Chair.



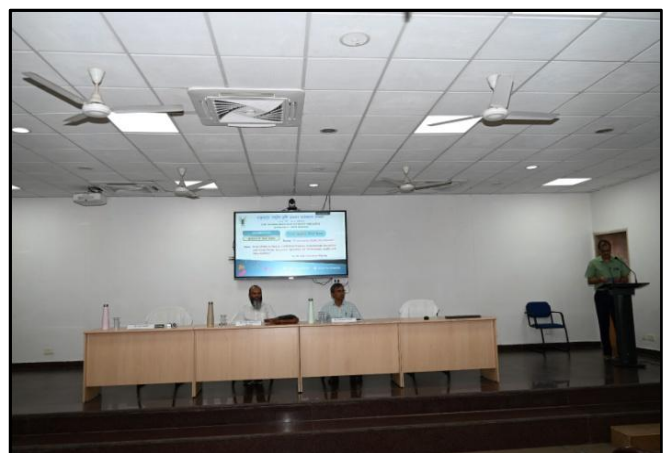
Dr. Abhijit Kar, Director, ICAR-NISA, addressing the IRC Meeting.



Scientist presenting a new project proposal during IRC Meeting.

Celebration of World IP Day Event 2026 at ICAR-NISA, Ranchi

ICAR-National Institute of Secondary Agriculture (NISA), Ranchi, celebrated World Intellectual Property Day 2026. World IP Day is celebrated every year on 26 April to increase general understanding of Intellectual Property (IP). World IP Day is a unique opportunity to join others worldwide in considering how a balanced IP system helps the global arts scene flourish and enables the technological innovation that drives human progress. This year's World IP Day theme was “IP and Sports: Ready, Set, Innovate”. So, in view of celebration of World IP Day 2026, a guest lecture by Prof Dr. M R Sreenivasa Murthy, Professor & PG Head, National University of Study and Research in Law (NUSRL), Kanke Ranchi, Jharkhand was organized on 28.04.2026 at Palas Hall of ICAR-NISA, Ranchi under chairmanship of Dr. Niranjana Prasad, Head ABA Division on the Topic: “From Millets to Medals: Intellectual Property, Nutraceuticals Innovation and Sports-Centric Secondary Agriculture for Performance, Health and Value Addition”. The guest lecture followed this year's theme. Nearly 50 Scientists, technical and administrative staff of the Institute, including SRFs and young professionals (YPs), attended and benefited from this program, gaining valuable insights into intellectual property rights and enriching their knowledge.





Khet Bachhao Abhiyaan 2026: Village-Level Campaign for Sustainable Soil Health Management

Khet Bachhao Abhiyaan was observed by ICAR-NISA from 1-30 Jun, 2026, in Ranchi and Khunti districts of Jharkhand to propagate ideas on maintaining soil fertility using cost-effective, easily available resources within farmers' reach. Training and demonstrations were organised in 23 villages through 23 programmes. A total of 710 people participated. An interface meeting was held with input dealers and one FPO member. In addition to in-situ training/demonstrations, the essence of the training was shared on different social media. As a result, the benefits reached 14481 farmers across the districts.



Scientist-Farmer interaction in Khet Bachhao Abhiyaan

Workshop on COMSOL Multiphysics

A one-day workshop on "COMSOL Multiphysics" in association with COMSOL India was organised at ICAR–NISA on 17 June 2026 for scientists, students, and technical officers. Mr Himanshu Agrawal (COMSOL India) demonstrated COMSOL's tools and applications, illustrating their use in solving a range of engineering problems, including Simulation of electromagnetic fields and their interactions with materials; analysis of the behaviour of structures under various loads and conditions; modelling and prediction of fluid behaviour in different environments; analysis of heat transfer processes in various systems; modelling and prediction of chemical reactions in different processes; simulation of sound propagation and noise in various environments; analysis of microfluidic systems and their behaviour and optimisation. The workshop drew 16 participants. Dr Debabandya Mohapatra, Head, AEPD, organised the event.



Live Streaming Webcast of the 23rd PM-KISAN Instalment Release Program

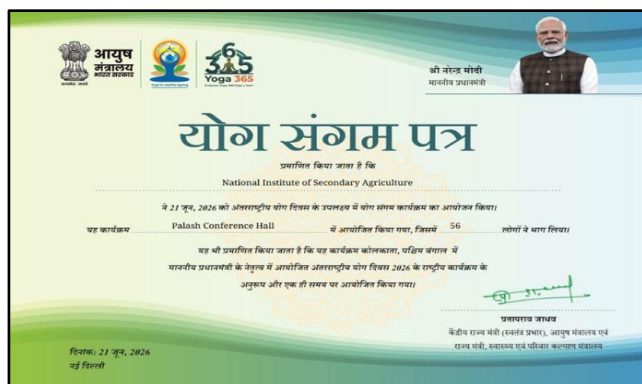
ICAR–NISA, Ranchi organised a live streaming webcast of the 23rd PM-KISAN instalment release programme on June 20, 2026. About 416 farmers from various villages in Namkum and Ranchi blocks, along with agri-entrepreneurs, representatives of Non-Governmental Organisations (NGOs), and Farmer Producer Organisations (FPOs), participated in the programme alongside institute staff. The programme served as an important platform to disseminate information on government agricultural welfare initiatives and enhance stakeholder engagement. Participants actively viewed the live telecast of the PM-KISAN benefit transfer event and interacted with scientists. A farmer–scientist interaction session addressed field-level challenges, discussed improved agricultural practices, and promoted the adoption of innovative technologies for sustainable agricultural development.



ICAR- NISA, Ranchi Celebrated 12th International Yoga Day

A one-day Yoga training & practice program was organised at the ICAR-National Institute of Secondary Agriculture, Namkum, Ranchi, on the 12th International Yoga Day, 21 June 2026. During the program, Mrs Antara, a Yoga instructor at the Art of Living (AOL) Foundation, along with AOL volunteers Ms Shreya and Mr Hitesh, guided the staff and explained different Asanas, Pranayamas, and Mudras, along with their benefits for maintaining good health and happiness in daily life. The session also included a meditation session, during which all participants felt relaxed and refreshed. After the yoga session, the yoga instructor held an interaction session and answered participants' queries. All ICAR-NISA staff, including scientists and technical, administrative, and contractual staff, actively participated in the event.

During the program, Dr Abhijit Kar, Director, ICAR-NISA, highlighted the importance of yoga in our lives and for maintaining the work-health balance. Dr Nandkishore Thombare, Convener of the program, highlighted the benefits of yoga for physical, mental, and emotional health. The yoga instructors were felicitated during the program.



Publication and Publicity

Research paper

- Ajith D, Kumar S, Chowdhury AR, Mishra R, Sravani C, Ram MK, Bishi SK, Lohot VD & Tribhuvan KU (2026). Prebiotic efficacy of natural gums and their partial hydrolysates: Linking fermentation dynamics with glycosyl hydrolase expression. Food Hydrocolloids for Health, 9, 100278
- Ansari MDJ, Garai S, Kanaka KK, Sravani C, Kashyap T, Sahu TK, Chowdhury AR, Bhadana VP, Rakshit S, Sinha RK & Bishi SK (2026). A classification-based machine learning strategy for nonlinear optimization of the antiparkinson drug L-DOPA and relevant catecholamine intermediates from Faba bean (*Vicia faba* L.) leaves. Chemical Papers. doi:10.1007/s11696-026-05185-7
- Biswas S, Patanjali N, Suby SB, Sahoo RN, Kushwaha DK, Salim R, Timanna H, Chandrika KSVP, Mukhopadhyay A, Banerjee T, Kundu A, Dutta A, Hegde R, Sangle P, Babar KS, Kumar A & Singh A (2026). Drone-delivered novel oil dispersion formulation of Chlorantraniliprole and emamectin benzoate for precision control of fall armyworm in maize. Pest Management Science, 82(4), 3100-3115.

Research Paper

- Kale S & Nath P (2026). Mechanical thresholds and texture integrity in stone fruits: A Hertzian contact approach. *Journal of Texture Studies*, 57, e70085
- Pawar DA & Giri SK (2026). Development and performance evaluation of tender jackfruit peeling machine. *Journal of Food Science and Technology*, doi:10.1007/s13197-026-06782-w
- Prasad N, Sharma SC, Udaykumar MS (2026). Study on Growth and Instability of Gum Arabic Export and Import in India. *Bhartiya Krishi Anusandhan Patrika*, 41(1), 85-91.
- Sahu P, Gangil S, Guru PK, Lakshmi Durga M, Shukla P, Kumar M, Diwan P, Kamendra, Rath I, Sahu RK, Meena BS, Khatri S, Sonwani S & Kumar J (2026). Pyrolysis-induced lignin transformation and its thermo-kinetic implications for biochar development. *Results in Engineering*, 30, 110216.
- Sakare P, Thombare N, Mahapatra A, Giri SK, Kumar S & Kar A (2026). Matrix-Dependent Performance of pH-Based Freshness Indicators: Mechanistic Insights and Validation in Fish and Mushrooms. *Food Control*, 112238.
- Samota MK, Kale S, Nath A & Varinda (2026). Development of a phase change material-based assembled-type fruit ripening chamber and evaluation of mango ripening, shelf life, and physicochemical properties. *Applied Fruit Science*, 68, 255.
- Selvan SS, Mohapatra D, Kate A, Tripathi MK & Kar A (2026). Evolution of fermentation assisted modification in the microstructural, and functional properties of macromolecules and bioactive compounds of pearl millet grains during storage. *Journal of the Science of Food and Agriculture*, 106, 6812–6824
- Tiwari S, Gujjar JP, Kate A, Tripathi MK, Modhera B & Mohapatra D (2026). Volatile biomarker signature of onion infected with *Aspergillus niger* and *Aspergillus flavus* under postharvest storage. *Journal of Food Measurement and Characterization*, 20, 8484–8495.
- Fahmidha F, Gaharwariya S, Kale S, Nath P, Giri SK, Mohapatra D & Kar A (2026). Physico-compositional attributes and predictive mass modelling of sapota (*Manilkara zapota* L.) Fruits. *Journal of Agricultural Engineering*, 63(2), 346-356
- Gaharwaria S, Kale S, Faizal F, Nath P, Giri SK, Mohapatra D & Kar A (2026). Refractance window drying: Mechanisms, quality, and smart control. *Comprehensive Reviews in Food Science and Food Safety*, 25, e70518
- Gaharwaria S, Kale S & Nath P (2026). Energy and exergy analysis of food drying systems: Thermodynamic performance, sustainability integration, and future research directions. *Journal of Food Engineering*, 421, 113224

Popular Article

- Mahapatra A, Sakare P & Giri SK (2026). 3D Food Printing: Engineering the Future of Edible Innovation, *Science Reporter*, 50-53.
- Mahapatra A, Sakare P, Thombare N & Kumar S (2026). Nature in a bottle: How essential oils are shaping a greener future. *Down To Earth*. <https://www.downtoearth.org.in/wildlife-biodiversity/nature-in-a-bottle-how-essential-oils-are-shaping-a-greener-future>

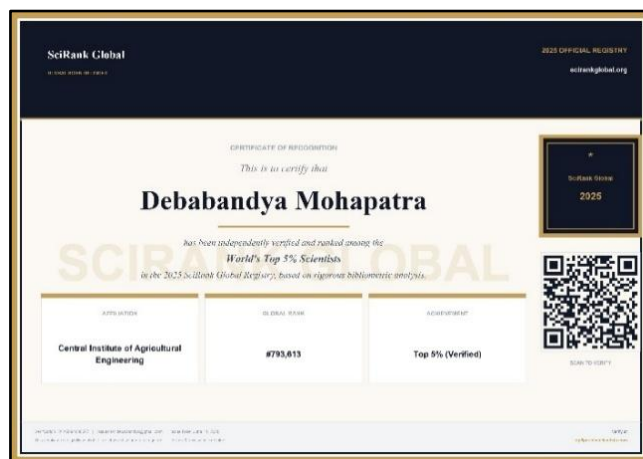
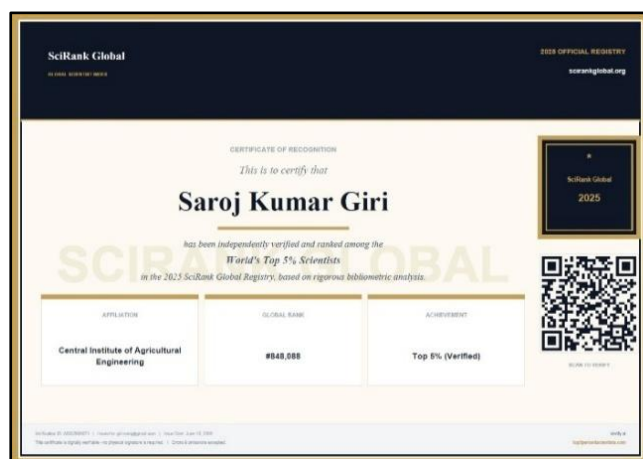
Popular Article

- Patil RK, Mohapatra D & Sahu P. 2026. Machine Vision-Based Food Quality and Safety. Agri Magazine (ISSN: 3048-8656), 03(05), 580-582
- Lakshmi Durga M, Sahu P, Mohapatra D & Patil RK. 2026. Revolutionizing Agriculture: The Era of Automated Greenhouse Control Systems. ROPAN Agriculture Magazine (ISSN: 3107-6858), May 2026. 24-26.
- Patil RK, Sahu P, Mohapatra D & Bakade RR. 2026. Spent Mushroom Substrate: Present and Future Perspectives for Green Applications. Agriculture and Food: e-Newsletter (ISSN: 2581:8317) 8(6), 225-227.
- Sahu P, Patil RK, Mohapatra D, Lakshmi Durga M & Bhukya J (2026). Smart sensors and AI for real-time food safety monitoring. Trends in Agriculture Science, 5(6), 832–836. doi.org/10.5281/TrendsInAgriculture.21078327.
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Book Chapter

- Bisht M, Suyal DC & Arora S (2026). Industry Collaboration for Widespread Water Conservation Practices. In: Anand V, Tewari PK, Jindal MK (eds) Water-Saving Technologies for Hotels and Restaurants. Advances in Sustainability Science and Technology. (pp.177-189). Springer, Singapore.
- Kademani SB, Nagduar V & Udaykumar MS (2026). Financial management and accessing funds (schemes & grants) (pp. 97–108). In SB Kademani, K Sharma, GN Aderao, S Naskar, V Nagduar, VP Bhadana & S Rakshit (Eds.), Dairy farming: Exploring farm to fortune. ICAR–Indian Institute of Agricultural Biotechnology, Ranchi, Jharkhand, India. ISBN: 978-93-5782-386-9.
- Kumar M, Kumar S, Bhoi B, Chakraborty B, Singh R, Kumar U & Kumar S (2026). Insights into clinical trials and real-world applications of phytochemicals. In Epigenetic Therapy by Phytochemicals in Lung Cancer edited by Umesh Kumar, Deepak Parashar, Sandeep Kumar Singh, Sachin Kumar (pp. 363-383). Academic Press. ISBN:978-0-443-45146-1

Awards/honours/peer recognition



Dr Saroj Kumar Giri and Dr Debabandya Mohapatra were recognised as top 5% scientists by SciRank Global



Dr Debabandya Mohapatra received NAAS fellowship for the year 2026

List of MOU signed by ICAR-NISA, Ranchi

Sl. No.	Title/Purpose	MoU signed between	Date of signing MoU	Valid up to
1	Fabrication of Debarking equipment for Cinchona tree branches	Dass Group Mechanical Engineering consultant	06.05.2026	-

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