राडेअनुसं समाचार

NDRI News

राष्ट्र के डेरी स्वप्नों को समर्पित
Fulfilling Nation's Dairy Dreams

भाकृअनुप–राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल
ICAR-NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

www.ndri.res.in

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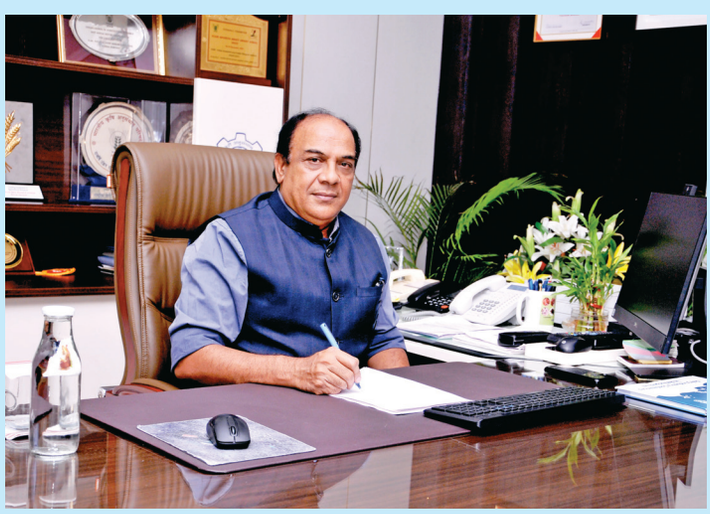
From the Director's Desk



It is with great enthusiasm that I share the latest advancements and ongoing research at the ICAR-National Dairy Research Institute (ICAR-NDRI), which are poised to shape the future of the dairy industry. As one of the leading institutes in dairy science, we remain committed to improving milk production and quality through innovation.

Milk is a staple food in many diets worldwide, valued for its rich nutritional content. Cattle are the primary source of milk, contributing to 81% of global milk production, followed by buffaloes at 15%. Over the past three decades, global milk production has increased by more than 77%, from 524 million tonnes in 1992 to 930 million tonnes in 2022 (FAO, 2024). India is the largest producer, contributing 22% of the global total, followed by the United States, Pakistan, China, and Brazil.

Despite its importance as a nutrient-rich food source, milk consumption poses challenges for some individuals, particularly those with allergies. One of the most common allergens in bovine milk is β-lactoglobulin (BLG), a protein absents in human milk but present in the milk of many mammals. This allergenic property has sparked interest in developing hypoallergenic or allergen-free milk to cater to individuals suffering from milk allergies.

In response, researchers at ICAR-NDRI have made significant progress in utilizing CRISPR/Cas9-based genome editing technology. This innovative approach enables precise modification of specific genes responsible for producing BLG in dairy animals. By editing the BLG gene, we are pioneering the development of dairy animals capable of producing milk that is not only nutritionally rich but also safe for those with milk allergies.

The long-term implications of this breakthrough are profound. By producing BLG-free milk, we can offer a solution for individuals who previously could not consume dairy products while maintaining its nutritional benefits. Our work holds great promise not only for India, the world's largest milk producer, but also for the global dairy industry. This research could pave the way for a new class of dairy products that are safe, accessible, and inclusive, ensuring that milk remains an essential part of the global food system.

As we continue exploring the potential of genome editing in dairy animals, we remain committed to science-driven solutions that shape the future of agriculture and food production. We are proud to lead this transformation and

In this issue...

look forward to a future where dairy is safe, accessible, and inclusive for all.

I am also happy to share that in the year 2024, thirty-one students of ICAR-NDRI cleared the Agricultural Research Service exam, highlighting the institute's excellence. Selections included 07 students form Livestock Production Management, 05 form Agricultural Extension Education and 05 from Animal Nutrition departments among others.

On behalf of the Institute, I congratulate students and faculty for their achievement in advancing agricultural research and education.

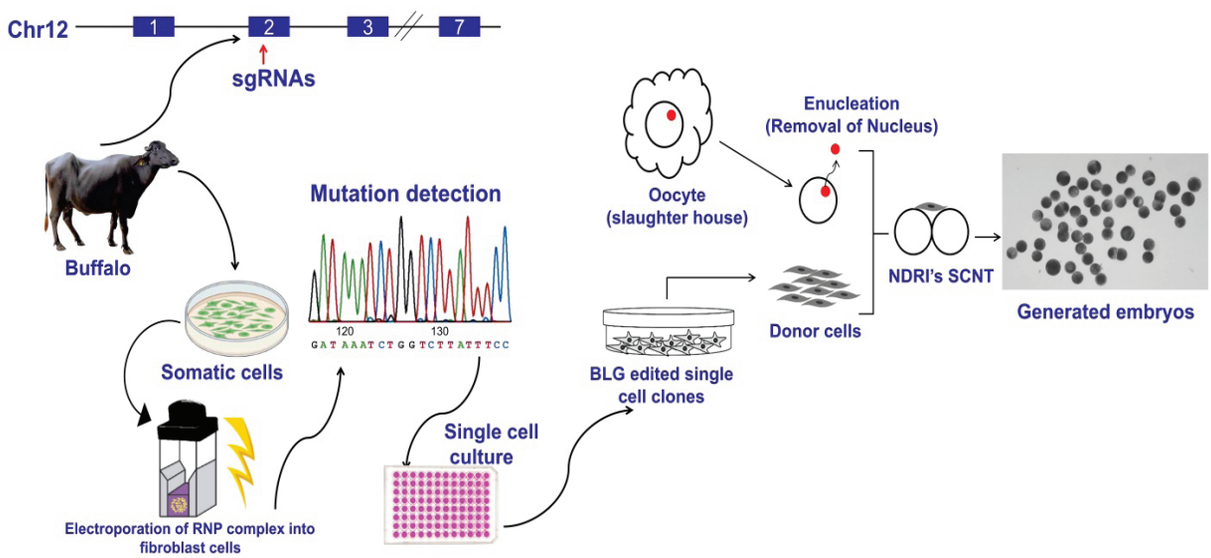
(Dheer Singh)
Director & Vice-Chancellor
ICAR-NDRI, Karnal

RESEARCH

Production of BLG-gene knockout buffalo embryos using CRISPR and SCNT

Naresh L. Selokar, Manoj Kumar Singh, Aseem Tara and Priyanka Singh

The present study was designed to establish β-lactoglobulin knockout cell clones, and the production of β-lactoglobulin-gene edited embryos. A total three sgRNAs were designed, of which two sgRNAs were efficient to edit the β-lactoglobulin (BLG) locus with indigenous lab-made buffer. With the best optimized condition, in the present study, the seven BLG-gene edited single cell clones were established that are 1) C1 has bi-allelic heterozygous mutation, one allele with -107 bp deletion and the other allele with - 9bp deletion with C/T conversion; 2) C2 has bi-allelic homozygous mutation, both alleles have -32 bp deletion; 3) C4 has mono-allelic mutation, in which one allele has -151 bp deletion; 4) C8 has the mono-allelic mutation, in which one allele is with -8 bp deletion; 5) C10 has bi-allelic heterozygous mutation, one allele with -150 bp deletion and the other allele with one bp T insertion; 6) C11 has mono-allelic mutation, in which one allele is with -14 bp deletion; and 7) C13 has bi-allelic heterozygous mutation, one allele with -27 bp deletion and the other allele with - 26 bp deletion. Following the use of some edited single cells clones as nuclear donor for somatic cell nuclear transfer (SCNT) applications, the embryonic developmental rates were different among the cell type; however, the total cell number and apoptotic index were similar among edited and non-edited (wild type) donor cells. Thus, SCNT outcome indicated that genetic modification using CRISPR did not affect the cloned embryonic developmental competence.

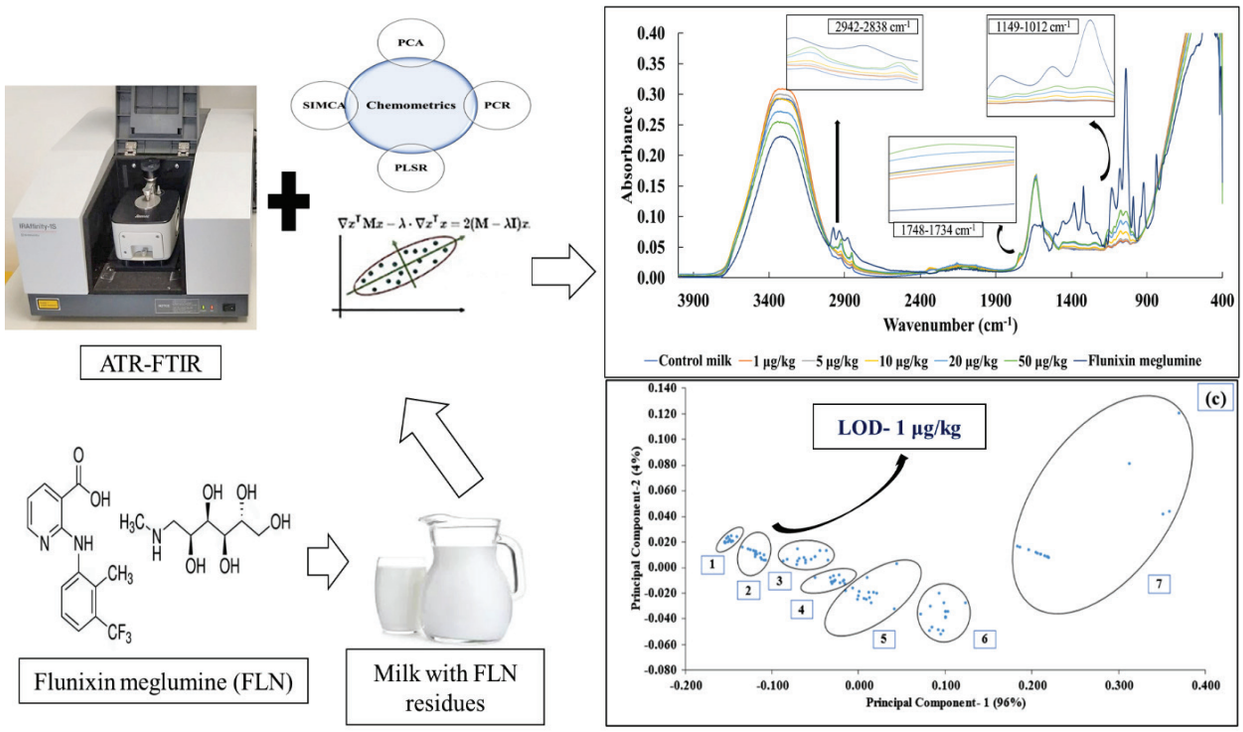


CRISPR technology for production of β-lactoglobulin (BLG)-gene edited buffalo embryos (Tara et al., 2024)

Detection of flunixin residues in milk using ATR-FTIR spectroscopy coupled with chemometrics

Rakendhu Saji, Kamal Gandhi and Rajan Sharma

Flunixin (FLN)), a common non-steroidal anti-inflammatory drug (NSAID) administered to cattle, raises human health concerns when present in milk. Maximum residue limit (MRL) of 10µg/kg has been set by Food Safety and Standards Authority of India (FSSAI) in milk. Currently, the detection of actual amount of FLN in milk is only possible through LC-MS/ MS and HPLC methods. To precisely and rapidly detect and quantify FLN residues in milk- at, below, and above the MRL established by FSSAI, this study was carried out using ATR-FTIR spectroscopy and chemometrics. ATR-FTIR measurements were conducted over the 4000-400 cm^{-1} wavenumber range, and the wavenumber regions (2942-2838, 1748-1734 and 1149-1012 cm^{-1}) were selected based on the maximum variability in the intensity of peaks and chemometrics techniques were applied. Developed method successfully differentiated among the FLN spiked milk samples at 0.5 MRL and 2 MRL levels. ATR-FT-MIR coupled with chemometrics could detect FLN residues in milk even at 1 µg/kg concentration.



ATR- FTIR and chemometrics to detect flunixin residues in milk

Development of automatic thermal storage module for fermented dairy product

Chitranayak and J. K. Dabas

This study developed an automatic thermal storage module for fermented dairy products, such as yogurt and dahi, which require precise temperature control during incubation. The module utilizes a phase change material (PCM) to store thermal energy, maintaining temperatures between 40°C and 45°C without electricity. Three PCMs-paraffin wax, palm oil, and beeswax-were tested in different geometrical containers, with cylindrical geometry proving to be the most effective. The melting temperature and melting time were measured as 59.3°C and 36 minutes, 68.1°C and 48 minutes, and 43°C and 20 minutes for paraffin wax, beeswax, and palm oil, respectively, under specific experimental conditions. Paraffin wax was found to be the most suitable for developing a thermal storage cell due to its melting temperature (59°C), which is 10°C to 15°C higher than the required fermentation temperature. Additionally, image analysis showed that paraffin wax exhibited a lower reduction rate (in both area and perimeter of the solid part) during melting, making it the preferred PCM for this application.

Institutional Technology Management Unit

Detail of Patents Filed during October-December, 2024: - 5 Nos.

Sl. No.	Title of Patent	Inventors	Application Number & Date of Filing
1.	Epitope peptide predicted INL A and INL B antibody based lateral flow assay strips for detection	Raghu H.V., Mariya Divanshi A. S., Jitesh Tarak and Sachinandan De	202411080111 filed on October 22, 2024
2.	Two stage assays for rapid detection of Salmonella in foods and water	Raghu H.V., Ajit A, Pushpa Devi, Rashmi H.M. and A.K. Puniya	202411080112 filed on October 22, 2024
3.	Whey-Apricot wine and its production process thereof	P. Narender Raju, Harsh Jindal, Sangita Ganguly and A. Saxena	202411084435 filed on November 5, 2024
4.	An apparatus for real time monitoring of rumen fermentation	Raman Malik and Harneet Kour	202411090649 filed on November 21, 2024
5.	A teat spray formulation for combating subclinical mastitis and process for preparation thereof	Sachin Kumar, Nitin Tyagi, Ashis Kumar Samanta, Ashish Kumar Singh, Pradip Vishnu Behare, Nutan Chauhan and Ojal Singh	202411093245 filed on November 28, 2024

Detail of Copyright Filed during October-December, 2024: - 3 Nos.

Sl. No	Copyright Title	Author and Co Author	Dairy No. and Date of Filing
1.	Catalogue of National Collection of Dairy Cultures	Pradip Vishnu Behare, Yogita Sharma and Shilpa Vij	34218/2024-CO/L filed on October 30, 2024
2.	Performance Evaluation of Dairy Bovines	Vikas Vohra, Supriya Chhotaray, Rajesh Gahlyan, Anupama Mukherjee, Archana Verma and Dheer Singh	38809/2024-CO/L filed on December 10, 2024
3.	Karan Fries Cattle: 'The Pride of NDRI' Development Report, Planning and Research	Sabyasachi Mukherjee, Anupama Mukherjee, Vikas Vohra, Shivam Bhardwaj and Archana Verma	40145/2024-CO/L filed on December 20, 2024

EVENTS

- A workshop entitled, *"Natural behaviors in relation to production and welfare of native farm animals"* on animal behavior and welfare was held at ICAR-NDRI, Karnal, on October 25, 2024 in collaboration with International Society for Applied Ethology (ISAE). It brought together researchers, academicians, veterinarians, and farmers to discuss strategies for improving dairy cattle and buffalo welfare. Chief Guest Dr Dheer Singh, Director ICAR-NDRI inaugurated the event, emphasizing genetics research and welfare standards. Dr Rajan Sharma (Joint Director-Research), Dr Ajit Singh Yadav ADG (EQA&R), ICAR, New Delhi, and Dr Sanjay Kumar Sharma, Director, Uttarakhand Council for Biotechnology also addressed the gathering. The workshop featured 12 expert presentations, including international speakers, and a panel discussion. Key recommendations included farmer training and better housing incentives to enhance both animal welfare and dairy productivity.

Dr Dheer Singh, Director and Vice Chancellor NDRI, Karnal addressing the gathering (Left) and participants attended the workshop (right) on October 25, 2024

- A One-Day Exposure Training on 'Present Status and Mechanization Gap in Dairy Farming in India' was held at ICAR-NDRI, Karnal on October 8, 2024, for PIs, Co-PIs, and Scientists from nine AICRP on Mechanization of Animal Husbandry (MAH) centers. Twenty participants attended the event and the topics discussed include precision dairy farm equipment, mechanization and automation, and housing design for mechanized operations. The training also included an exposure visit to the Farm Section and Livestock Research Centre, providing insights into advanced dairy farming practices.

Dr Dheer Singh, Director and Vice Chancellor, ICAR-NDRI addressing the participant of the training program October 8, 2024

- Anusandhan National Research Foundation (ANRF) (erstwhile SERB), sponsored one-day workshop on "Applications of Big Data in Animal Science: Advances and Insights" was organized at ICAR- NDRI, Karnal on October 25, 2024. A total of 25 participants attended the workshop. Dr Sanjay Kumar Singh, Professor & HoD, Indian Institute of Technology (BHU), Varanasi delivered lecture on Precision livestock farming and Dr Sandeep Kumar Sood, Head & Associate Professor (Computer Application), National Institute of Technology, Kurukshetra, Haryana delivered talk on "Big Data Analytics and Artificial Intelligence in the Current Scenario".

Dr Sanjay Kumar Singh, Professor & HoD, IIT, BHU, Varanasi delivering lecture during workshop on October 25, 2024

- In an inspiring kick-off to the academic year 2024, ICAR-NDRI organized a special "Dheeksharambh" Induction-cum-Foundation Course' for newly admitted B.Tech., M.Tech., and M.Sc. students from November 6-22, 2024. A total of 82 students joined the undergraduate programs, including 50 in Dairy Technology, 17 in Food Technology, and 15 in Biotechnology. Additionally, 78 students enrolled in master's programs. The event introduced students to academic and research opportunities, institutional policies, and well-being initiatives. Presided over by Dr Dheer Singh, Director and Vice Chancellor, ICAR-NDRI, the overall event aimed to help students acclimatize

with the various sections/division of the institute, building strong bonds, and embrace the institution's culture. The students who have joined at Southern Regional Campus (SRS) of ICAR-NDRI Bengaluru participated in the event virtually. The institute invited Dr Nivedita Shreyans, a renowned educationist, Director of Youth Programs at Heartfulness Institute, Hyderabad, and Associate Professor at Pillai Institute of Management Studies and Research (PIMSR), to speak on the vital theme of "Wellbeing and Happiness." Dr Nivedita delivered an engaging session, highlighting the importance of dedicating quality time to oneself for rejuvenation, boosting creativity, and unlocking hidden potential.

Dr Dheer Singh, Director and Vice Chancellor, ICAR- NDRI and other officials along with newly admitted students on November 6, 2024

- Shri Gabriel D. Wangsu, Hon'ble Minister of Agriculture, Horticulture, Animal Husbandry, Veterinary, Fisheries, Food and Civil Supplies, Legal Metrology, and Consumer Affairs, Government of Arunachal Pradesh, along with other officials, visited ICAR-NDRI on November 24, 2024. The Hon'ble Minister visited various sections of ICAR-NDRI and interacted with the faculty.

Shri Gabriel D. Wangsu, Hon'ble Minister of Arunachal Pradesh, visited ICAR-NDRI on November 24, 2024, accompanied by Dr. Dheer Singh, Director & Vice-Chancellor, and other faculty members

- ICAR-NDRI, Karnal, celebrated National Milk Day on November 26, 2024, honoring Dr. Verghese Kurien's 103rd birth anniversary. Padma Shri Kanwal Singh Chauhan was the guest of honor, and Dr. G. S. Rajorhia served as the chief guest. Dr. Dheer Singh emphasized industry-research collaboration. The event featured the launch of millet milk protein-based cookies by "Smillets." An Amul-India bike rally from Jammu also arrived, highlighting the vital role of dairy farmers in India's economy and public health.

Dr Dheer Singh, Director and Vice Chancellor, ICAR-NDRI and other dignitaries during the celebration of National Milk Day on November 26, 2024

- District Development Officers from Himachal Pradesh and Haryana visited ICAR-NDRI on November 28 and December 2, 2024. The Himachal Pradesh team, led by Dr. Vivek Pathania, included 16 officers, while the Haryana team, led by Ms. Nivedita Tiwary, comprised 18 officers. The visit aimed to introduce innovative dairy technologies for dissemination to farmers and stakeholders, along with a tour of ICAR-NDRI facilities.

Dr Dheer Singh, Director of the Institute addressing District Development Officers of NABARD on November 28, 2024

- Shri Shivraj Singh Chouhan, Hon'ble Union Minister for Agriculture & Farmers Welfare and Rural Development, visited ICAR-NDRI, Karnal, on December 11, 2024. He witnessed cloned and gene-edited dairy animals, inaugurated an exhibition, and interacted with scientists, farmers, and entrepreneurs. He emphasized increasing dairy's contribution to GDP through quality germplasm. The Minister also laid the foundation for a boys' hostel and appreciated innovative technologies adopted by stakeholders.

Shri Shivraj Singh Chouhan, Hon'ble Union Minister for Agriculture and Farmers Welfare & Rural Development laying foundation stone for boy's hostel on December 11, 2024

EXTENSION

Dairy Extension Division

- Twenty-one agro-advisory messages related to weather forecasting, crop and animal husbandry practices, etc., were sent to 4,708 farmers through WhatsApp groups and an SMS portal. Advisory services were also provided to farmers for timely agricultural practices aimed at reducing losses and minimizing input costs.
- ICAR-NDRI, Karnal, organized eighty-three visits, with a total of 4,599 students participating in these visiting teams.
- Demonstrations were conducted on mustard (variety Radhika) in the fields of 35 farmers, on wheat (variety DBW-371) in the fields of 35 farmers, and on vegetable seeds in the fields of 3 farmers. Additionally, 54 elite bucks were provided for breeding purposes to 54 SC farmers in the Hanumangarh and Bikaner districts of Rajasthan.
- Two Kisan Gosthis were organized in the Hanumangarh and Bikaner districts of Rajasthan in collaboration with the State Animal Husbandry Department and the KVKs of the respective districts. A total of 170 farmers participated in these Gosthis.
- A total of four field visits were made to villages in Karnal, where farmers' queries were addressed.
- Three training sessions on cattle management and milk production were conducted for farmers in three villages: Furlak, Budhanpur, and Nagla Rodan.
- An interaction meeting with the Hon'ble Union Minister of Agriculture & Farmers' Welfare and Rural Development was organized on December 11, 2024, at the NDRI campus, with one hundred twenty farmers and farm women in attendance.
- An animal health camp was organized on December 18, 2024, in Kamalpur Rodan village, Karnal, benefiting fifty-nine farmers.

Krishi Vigyan Kendra

- Block-level awareness camp and Kisan Gosthi program were organized in connection with Kisan Divas-2024 on December 23, 2024, at Nissing block, in which 100 farmers participated. Experts from KVK as well as ICAR-NDRI delivered lectures on various topics like animal health and demonstrated some of the recent technologies related to animal breeding to the farmers.

Experts from KVK along with participant farmers from Nissing block on December 23, 2024.

- A poster-making competition was conducted at Brahmanand Public School, Nissing, on December 23, 2024, on the theme *Crop Residue Management and Its Disadvantages*. A total of eighty students from classes V to IX participated. The winners of the competition were awarded, and all other participants received consolation certificates.

Students participating poster-making competition on December 23, 2024

- Swachh Bharat Abhiyan awareness programs were held at KVK from December 16-31, 2024, during which the premises of KVK, Demonstration Units, and Kisan Bhavan were cleaned. Students of ICAR-NDRI and KVK staff participated in this event.

Cleaning of premises of KVK under Swachh Bharat Abhiyan program on December 16, 2024

HONOURS/ AWARDS/ RECOGNITIONS

- Mr Bindeshwari Pratap Singh, Chief Technical Officer (Library) received the award for the Fellow of the Association of Agricultural Librarians and Documentalists of India (AALDI) for the years 2023 and 2024 during '*International Conference of Agricultural Librarians & User Community (ICALUC-2024) on Technological Transformation in Agricultural Library and Information Systems and Services in the Artificial Intelligence (AI) Era*' Organized by Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar and Association of Agricultural Librarians and Documentalists of India (AALDI) held at Bidar on November 23, 2024.

Mr Bindeshwari Pratap Singh, Chief Technical Officer (Library) receiving the award from the dignitaries on November 23, 2024

- Chitranayak, P. S. Minz, A.K. Singh, J. K. Dabas, Arijit Ray, Nisha Bose received the second prize for poster presentation on '*Solar-Powered Automation for Curd Fermentation: A Hybrid Approach*' in 11th National Seminar on '*Indian Dairy & Food Industry in Viksit Bharat: Developments and Innovation*' on September 27-28, 2024 at ICAR-NDRI, Karnal.
- Hima John, P. Barnwal, Khushbu Kumari, Banashree N. received the third prize for poster presentation on '*Magnetic induction: a sustainable milk heating solution*' in 11th National Seminar on '*Indian Dairy & Food Industry in Viksit Bharat: Developments and Innovation*' on September 27-28, 2024 at ICAR-NDRI, Karnal.
- Arijit Ray, Chitranayak, Rishi Shringi, Khushbu Kumari, P. S. Minz, J. K. Dabas received Best poster presentation award for their poster on 'Unnat engineering taknik va swachalan prasansakan dwara dahi banana ka set up' in NDRI Raj Bhasha Hindi Poster presentation- at ICAR-NDRI, Karnal
- Chitranayak received third prize for INDIA- General Knowledge test NDRI Raj Bhasha at ICAR-NDRI, Karnal
- Arijit Ray, Chitranayak, Kiran Goyat, P. S. Minz, J. K. Dabas, Hima John & Khusbhu Kumari received Best poster presentation award for their poster on '*Solar powered hybrid automatic yogurt processing system*' in '*International Conference on Emerging Technologies in Food Processing, (ETFP-2024)*' Department of Food Engineering and Technology, Ghani Khan Choudhury Institute of Engineering and Technology, Narayanpur, Malda, WB-732141.

PERSONALIA

Permission granted to the following Scientific/ Administrative Staff for attending Workshop/ Seminar/ Symposia/ Conference/ Training during the period October to December, 2024:

Name & Designation	Period	Title of the Training/ Seminar/ Workshop	Venue
Dr P. Barnwal, Principal Scientist Dr Khushbu Kumari, Scientist (SS) Dr Priyanka, Scientist Dr Hima John, Scientist	October 8, 2024	Training program on 'Present Status and Mechanization Gap in Dairy Farming in the Country' under AICRP on Mechanization of Animal Husbandry (MAH).	ICAR-NDRI, Karnal

Dr Sumit Arora, Principal Scientist	October 16-18, 2024	Training Workshop on 'Enhancing Academic Excellence of Agricultural Higher Education Institutions through NIRF Ranking and NAAC Accreditation'.	NAARM, Hyderabad
Dr Sachin Kumar, Scientist	October 16-18, 2024	39th Indian Poultry Science Association Conference (IPSACON-2024) and National Symposium under the aegis of IPSA, Bareilly.	Department of Poultry Science, MAFSU-Nagpur Veterinary College, Nagpur
Dr P.N. Raju, Senior Scientist	October 23-25, 2024	Annual Convention of Society for Veterinary Science and Biotechnology, College of Veterinary Science.	Sri Venkateswara Veterinary University Proddatur (AP)
Dr Yogesh Khetra, Senior Scientist	October 25-26, 2024	International Conference-2024 on Emerging Paradigm Shifts in Food & Dairy Processing.	Banaras Hindu University
Dr Sachinandan De, Principal Scientist	November 4, 2024	World One Health Day National Symposium on 'Connecting Human, Animal and Environment, Health: When we Protect One, We help to Protect all'.	Banaras Hindu University, Mirzapur, UP
Dr Sanchita Garai, Senior Scientist	November 6-8, 2024	International Conference on 'Climate-Smart Nutri-Sensitive Integrated Farming System for Gender-equitable Sustainable Agriculture: Prospects and challenges (ICNSFS-2024)'.	ICAR-CIWA, Bhubaneswar, Odisha
Dr Sadeesh E.M., Senior Scientist	November 10-12, 2024	Workshop and International Conference on 'Progress in Mitochondrial Research and Therapy'.	Dharmasthala Manjunatheshwara University, Dharwad, Karnataka
Dr Udita Chaudhary, Senior Scientist	November 11-13, 2024	Presented the paper in 84th Agricultural Economics Conference.	Karaikal, Pondicherry
Dr D. Malakar, Principal Scientist	November 15-17, 2024.	International Conference on Reproductive Sciences and Molecular Medicine.	University of Delhi
Dr Vikas Vohra, Principal Scientist Dr Santanu Banik, Principal Scientist Dr G. R. Gowane, Principal Scientist	November 21-22, 2024	XXXII National Conference of Indian Society of Animal Genetics & Breeding (ISAGB) Annual Conference-2024.	Bihar Veterinary College, BASU, Patna
Dr Jai Kr. Kaushik, Principal Scientist Dr Nishant Kumar, Senior Scientist Dr Rubina K. Baithalu, Senior Scientist Dr Rani Alex, Senior Scientist Dr Sudarshan Kumar, Senior Scientist Dr Indu Devi, Scientist	November 27-29, 2024	XXXII Annual Conference of Society of Animal Physiologist of India (SAPI) & International symposium on Advances in Physiological Research in Omics Era for sustainable Animal Production & Livelihood Security under the changing climatic scenario.	ICAR-CIRC, Meerut (UP)
Dr Nitin Tyagi, Principal Scientist	November 29, 2024	The Stakeholders Consultation Workshop on Innovative Approaches to Crop Residue Management.	FAO and ICAR-CSSRI, Karnal
Dr Magan Singh, Principal Scientist	November 29-30, 2024	National Conference on 'Hill Agro-Ecosystem: Challenges and Opportunities for Achieving Sustainable Development Goals'.	ICAR-Research Complex for NEH Region, Nagaland Centre, Jharnapani.

Dr Pradip Behare, Scientist	December 1-3, 2024	Presented a poster in the 94th Annual Session and Symposium on 'Accelerated R&D towards a Developed India'.	National Academy of Sciences, India (NASI), IISER Bhopal
Dr Sanjeev Kumar, Scientist	December 10-12, 2024	The Global Research Initiatives for Sustainable Agriculture and Allied Sciences (GRISAAS-2024) conference.	SKNAU, Jaipur
Dr Subhasis Mandal, Principal Scientist Dr Sanjit Maiti, Senior Scientist	December 11-13, 2024	Presented Research Paper during 32nd Annual Conference of Agricultural Economics and Research Association (AERA), India.	Indira Gandhi Krishi Viswavidyalaya (IGKV), Raipur, Chhattisgarh
Dr Vikas Vohra, Principal Scientist Dr Pawan Singh, Principal Scientist Dr Nitin Tyagi, Principal Scientist	December 16-18, 2024	The National Symposium on 'Innovative approaches for Boosting Buffalo productivity', Department of Animal Genetics and Breeding.	College of Veterinary Science & AH, Kamdhenu University, Anand
Dr Subhasis Mandal, Principal Scientist	December 20, 2024	Workshop on data validation of livestock production in India.	Hotel Jaypee Siddharth, Rajendra Place, New Delhi.
Dr Rajni Kumar Paul, Scientist	December 20-21, 2024	8th Annual Convention of Society of Veterinary Biochemists and Biotechnologists of India and National Symposium on 'Unlocking and Potential of Veterinary Biochemistry and Biotechnology for Food and Nutrition Security' (SVBBICON-2024).	College of Veterinary Science and Animal Husbandry, Mathura.

राजभाषा एकक

संस्थान राजभाषा कार्यान्वयन समिति की बैठक

भाकृअनुप–राष्ट्रीय डेरी अनुसंधान संस्थान, करनाल की राजभाषा कार्यान्वयन समिति की दिनांक 18 दिसंबर 2024 को संपन्न हुई 105वीं समीक्षा बैठक का कार्यवृत्त

डा. धीर सिंह, निदेशक, भाकृअनुप–राडेअनुसं, करनाल की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की 1 अक्तूबर, 2024 से 31 दिसंबर, 2024 तक की तिमाही समीक्षा बैठक दिनांक 18 दिसंबर, 2024 को अपराह्न 3:00 बजे के साथ संस्थान के पिनाकी सभागार में आयोजित की गयी। बैठक में संस्थान के 28 पदाधिकारी शामिल हुए। बैठक के आरंभ में सदस्य–सचिव, श्री धीरज शर्मा ने सभागार में समिति के अध्यक्ष तथा अन्य सदस्यों का स्वागत किया तथा सभा में कार्यसूची बिन्दुओं पर विस्तार से चर्चा की गई और निर्णय लिए गए।

हिन्दी कार्यशाला का आयोजन

संस्थान के श्री धीरज शर्मा, संयुक्त निदेशक (राजभाषा) ने भा.कृ.अनु.प.–केन्द्रीय पक्षी अनुसंधान संस्थान, इज्जतनगर, बरेली तथा संस्थान के अधिकारियों एवं कर्मचारियों के लिए संयुक्त रूप से दिनांक 17 दिसंबर, 2024 को अपराहन 3:30 बजे से हिन्दी कार्यशाला (राजभाषा कार्यान्वयनः नियम एवं अधिनियम विषय पर) व्याख्यान दिया। जिसमें संस्थान के वैज्ञानिक, अधिकारी एवं कर्मचारी एवं नराकास, करनाल के सदस्य कार्यालय के 81 अधिकारी एवं कर्मचारी शामिल हुए।

नगरस्तरीय राजभाषा गतिविधियां

नगर राजभाषा कार्यान्वयन समिति, करनाल के अध्यक्षीय कार्यालय भा.कृ.अनु.प.– राडेअनुसं, करनाल में दिनांक 18 नवंम्बर, 2024 को 80वीं नगरस्तरीय छमाही समीक्षा बैठक का डा. धीर सिंह, निदेशक की अध्यक्षता में संस्थान के डा. एन. एन. दस्तूर सभागार में आयोजन किया गया। इस बैठक में समिति के करनाल नगर के केन्द्रीय कार्यालयों के प्रशासनिक प्रमुखों एवं प्राधिकृत अधिकारियों ने भाग लिया और सभी कार्यालाओं की छमाही समीक्षा रिपोर्ट पर चर्चा की। इन छमाही समीक्षा बैठक में करनाल आहर के 40 से अधिक कार्यालाओं के कार्यालय प्रमुख एवं उनके प्रतिनिधियों ने बैठक में शिरकत की।

हिंदी दिवस पखवाड़ा समापन एवं वितरण समारोह–2024

भा.कृ.अनु.प.–राडेअनुसं, करनाल में हिंदी दिवस पखवाड़ा समापन एवं वितरण समारोह–2024 दिनांक 4 नवंम्बर, 2024 को डा. एन. एन. दस्तूर सभागार में अपराह्न 4:00 बजे किया गया। हिन्दी पखवाड़ा के दौरान दिनांक 20 सितम्बर, 2024 हिंदी निबंध प्रतियोगिता का आयोजन किया गया। इसके पश्चात् दिनांक 23 सितम्बर, 2024 को हिंदी ओोध पत्र व पोस्टर प्रदर्शन प्रतियोगिता, दिनांक 25 सितम्बर, 2024 को हिंदी श्रुतलेखन प्रतियोगिता, दिनांक 27 सितम्बर, 2024 को हिंदी टंकण प्रतियोगिता, दिनांक 30 सितम्बर, 2024 भारत ज्ञान प्रतियोगिता तथा दिनांक 1 अक्तूबर, 2024 टिप्पण – आलेखन प्रतियोगिता कर प्रतियोगिताओं के विजेताओं को प्रमाणपत्र से सम्मानित किया गया। इसमें संस्थान के वैज्ञानिकों, अधिकारियों, कर्मचारियों एवं ओोधकर्ता विद्यार्थियों ने बढ़–चढ़कर हिस्सा लिया।

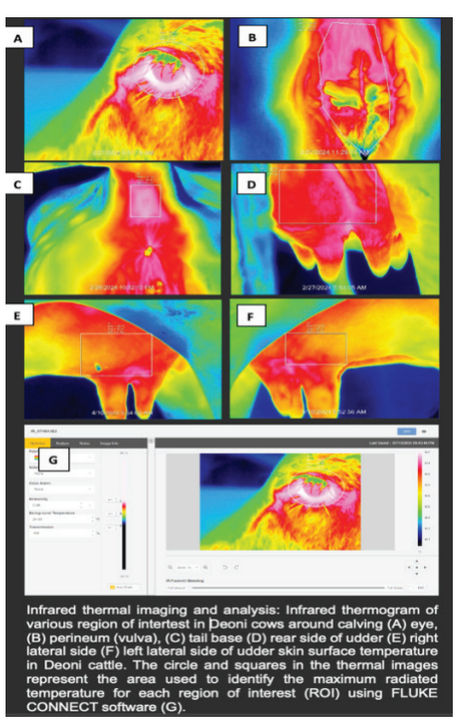
SOUTHERN CAMPUS, BENGALURU

Research

Thermal signatures as a potential non-invasive indicator of onset of calving process in cattle

Sakshi Payasi, S. Jeyakumar, A. Kumaresan, Vedamurthy, GV and Arindam Dhali

Calving is a key phenomenon and a performance indicator for the sustainable and profitable maintenance of the dairy herd. The ability to predict the onset of calving facilitates timely and efficient calving management to reduce the risks and enhance calf survival and herd profitability. Therefore, to enhance the prediction of the calving process and also to improve postpartum health management of both the dam and neonate in cattle, Infrared Thermography (IRT) would be a potential non-invasive technique for monitoring temperature associated changes with calving process in cattle. study aimed i) to determine the infrared thermographic profile of select regions of interest associated with calving in Deoni and HF crossbred cattle and ii) to investigate the potential of identified thermal indicators for prediction of calving. It is concluded that the infrared temperature profile of eye, perineal region, tail base and udder skin surface associated with the calving process has been established. Ventral tail-base, vulval skin and most importantly udder skin surface temperature could be used as potential



Infrared thermal images of various regions of interest associated with calving process in cattle

non-invasive indicator of calving prediction within 6 to 12 h prior to actual calving in HF crossbred and Deoni (*Bos indicus)* cows.

Events

- A new Lassi variant made from skimmed milk dahi was launched on October 3, 2024, at Southern Regional Station (SRS) of ICAR-NDRI, Bengaluru by Dr Dheer Singh, Director and Vice Chancellor, ICAR-NDRI and Dr Y. S. Rajput. Developed to utilize skim milk, it caters to consumers seeking low-fat, low-calorie dairy options, containing only 0.2% fat.

Release of product Slim Lassi (Skimmed milk) by Dr Dheer Singh, Director & Vice Chancellor, ICAR-NDRI along with other dignitaries at the Southern Regional Station of ICAR-NDRI, Bengaluru on October 3, 2024

- The SRS of ICAR-NDRI, Bengaluru, organized a training program on Flow Cytometry in Semen Analysis from November 18-20, 2024. Twenty participants, including researchers and semen station personnel, received lectures and hands-on training in flow cytometric assessment of sperm viability, intracellular calcium, reactive oxygen species, apoptosis, and acrosomal integrity.

Participants of training Program on 'Applications of Flow Cytometer in Semen Analysis', during November 18-20, 2024, SRS, ICAR-NDRI, Bengaluru

- A National Milk Day seminar was held at SRS, ICAR-NDRI, Bengaluru, on November 26, 2024, with 100 participants, honoring Dr Verghese Kurien, in collaboration with Indian Dairy Association (South Zone).

A view of National Milk Day seminar at Southern Regional Station of ICAR-NDRI, Bengaluru on November 26, 2024

- A Dairy Glassware Calibration training was held from December 9-13, 2024, at SRS, ICAR-NDRI, Bangaluru, with 13 participants from Karnataka Milk Federation and private dairies.
- A training program on Ice Cream and Frozen Desserts was held at SRS, ICAR-NDRI, Bengaluru, from December 2-6, 2024, with 12 participants from Karnataka, Tamil Nadu, and Andhra Pradesh. It included theory sessions, practical demonstrations, business modules, industry standards, packaging, and FSSAI regulations related to ice cream production.

Participants and Organizers of training program on Preparation of Ice Cream and Frozen Desserts at SRS, ICAR-NDRI, Bengaluru during December 2-6, 2024

- On December 16, 2024, staff, faculty, and students of SRS, ICAR-NDRI took a pledge for Swachhta Pakhwada-cum-Kisan Diwas (December 16-31, 2024). A cleanliness drive was conducted at the section level on December 19 within the campus and office premises.
- The Dairy Microbiology Laboratory (Dairy Processing Section) at SRS-NDRI, Bengaluru, conducted a five-day hands-on training on 'Microbiological Quality and Safety of Milk and Milk Products' from December 16-20, 2024. Nine participants gained expertise in advanced microbiological techniques, regulatory frameworks, and antimicrobial resistance (AMR), enhancing dairy quality control and safety practices.

Participants and Organizers of training on Microbiological Quality and Safety Aspects of Milk and Milk Products during December 16-20, 2024

Dairy Extension

- Under the SCSP program, a farmers' training program on '*Scientific Dairying and Value Addition to Milk*' was organized at SRS. The on-campus training was attended by 335 dairy farmers from the SC community in Karnataka and Tamil Nadu.
- A one-day training program on '*Scientific Dairy Farming and Value Addition to Milk*' was organized at SRS-ICAR-NDRI, Bangalore, for 130 women dairy farmers from Tamil Nadu on October 17, 2024, under the SCSP fund.
- SRS-ICAR-NDRI participated in and exhibited a stall at '*Fodder Mela-2024*,' organized by KVAFSU at Veterinary College, Hebbal, Bengaluru, on October 25, 2024.

  SRS-NDRI participated in and exhibited a stall at '*Krishi Mela-2024*,' organized by GKVK, UAS, Bengaluru, from November 14-17, 2024.

Honours/ Awards/ Recognition:

- Dr Monika Sharma was conferred with the Young Scientist Award by the Pragati International Scientific Research Foundation (PISRF) for her contributions to the field of Food Science and Technology during the International Conference on '*Climate-Smart Nutri-Sensitive Integrated Farming System for Gender-Equitable Sustainable Agriculture: Prospects and Challenges*' (ICNSFS), held from November 6-8, 2024.
- Dr Sakshi Payasi, M.V.Sc., Scholar of ARGO received Young Scientist Award for her research work on '*Thermal Signatures of Udder Skin Surface: a potential non-invasive tool to predict parturition in cows*' in the XI Annual Convention of Society for Veterinary Sciences and Biotechnology (SVSBT) and National Conference on '*Biotechnological Innovations to Augment Health and Productivity of Livestock and Poultry for Sustainable Livelihood*' held at College of Vet Sciences, SVVU, Proddatur, AP, October 23-25, 2024.
- Dr Kisan Kumar Fatania, M.V.Sc., Scholar of ARGO received Young Scientist Award for his research work on '*Buffalo bull fertility predictions using functional sperm populations*' in the XI Annual Convention of Society for Veterinary Sciences and Biotechnology (SVSBT) and National Conference on '*Biotechnological Innovations to Augment Health and Productivity of Livestock and Poultry for Sustainable Livelihood*' held at College of Veterinary Sciences, SVVU, Proddatur, AP, October 23-25, 2024.

EASTERN CAMPUS, KALYANI

Research

Towards *in silico* 3-D Structure Modeling & Prioritization of Candidate Genes Regulating the Bovine and Caprine Apelinergic System

Jayashree Gogoi, Piyali Kuri, M. Karunakaran, M. Mondal

Though the Apelinergic system plays a crucial role in many important biological processes, very little is known about the same in bovines and caprine species. Therefore, the aims of the present study were to a) model the 3-D structure of the Apelinergic system and b) identify and prioritize the candidate genes regulating the system in bovine and caprine through bioinformatics tools. A 3-D model was constructed using SWISS-Model, a homology modeling server. The predicted model was validated by SAVES including PROCHECK and ERRAT server. The structures were refined by Refold server of intfold homology modeling tool. PyMol was used to visualize the tertiary structure of the protein. Three gene prioritizing tools Genie, toppgenet, David, and Genemania to further visualize the network of genes were used. The overall quality factor for the remodeled 3D.

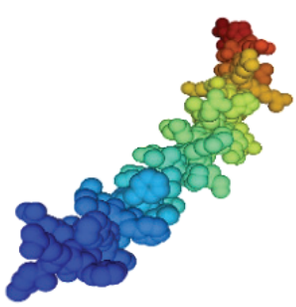


Figure 1.

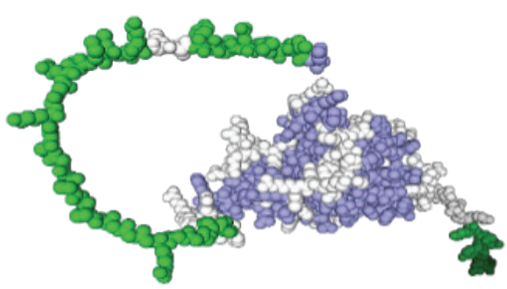


Figure 2.

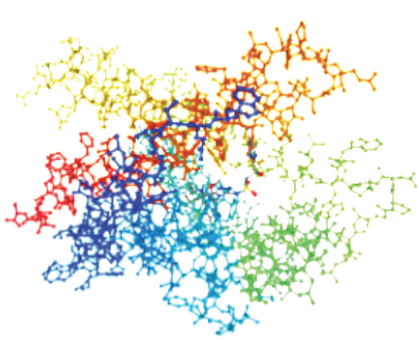


Figure 3.

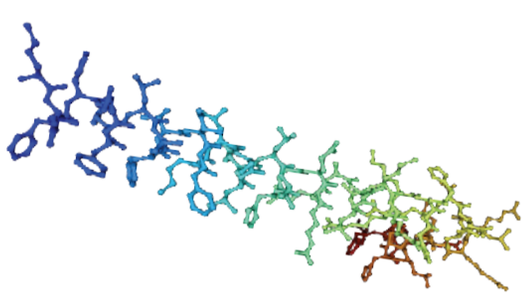


Figure 4.

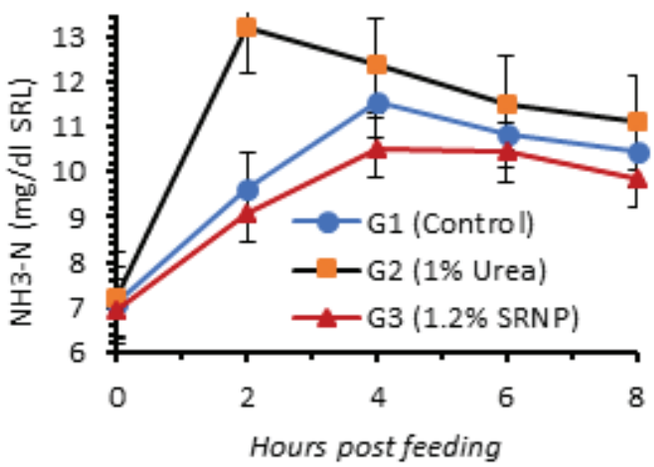
The 3D images of Fig. 1: AOA452FUK9 (Apela, Capra Hircus), Fig. 2: AOA452FYU9 Apelin receptor for Caprine species, Fig. 3: 7W01.1E (Bovine, Apelin Receptor) and Fig. 4: AOA3QIMCX2 (Apela, Bos tauras) generated by SWISS MODEL tool

Effect of feeding slow-release nitrogen compound on rumen fermentation pattern and enzyme profile in growing calves

P. Patir, A. Santra, D.K. Mandal, M. Mandal, S. K. Das and S. Banik

Slow-release nitrogen compound had been developed for efficient utilization of dietary nitrogen. mPro®a new slow-release nitrogen compound was evaluated inthree groups of crossbred calves e.g., fed no urea or mPro (G1), mustard

oil cake (protein content basis) in the concentrate mixture was partially replaced by 1% urea (G2) and 1.2% bymPro® (G2). Daily dry matter intake was similar and it was 2.8, 2.7 and 3.0 kg per 100 kg body weight in G1, G2 and G3 groups, respectively. Rumen pH, TVFA, Total-N and TCA-ppt-N was similar among the experimental groups. However, urea-supplemented group (G2) had a higher ($P<0.01$) ruminal NH3-N concentration than in mPro®fed group (G3). NH3-N concentration in the rumen liquor peaked at 2 h post-feeding in the urea fed calves (G2 group) whereas mPro®fed groups (G3), it was at 4 h post feeding. Ruminal carboxy methyl cellulase, xylanase, β-glucosidase, and amylase enzyme activity were similar in all the experimental groups. It can be concluded that slow-release nitrogen compound (mPro) may be a viable non protein nitrogenous compound source that can be utilized to replace feed grade urea completely in concentrate mixture as well as vegetable protein sources partially in calves.



Rumen NH3-N profile in post feeding

Extension

Livestock Development Program at Dhubri, Assam under NEH Project

The ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, Nadia, West Bengal, organized a program on 'Livelihood Improvement of NEH Farmers through Livestock Interventions' on October 1, 2024, at Dhubri, Assam. The event, led by Dr Tapas Kumar Dutta, Dr Subrata Kumar Das, Dr Anupam Chatterjee, and Dr Saroj Rai, included a scientist-farmer interaction, training, input distribution, and feedback survey in collaboration with KVK, Dhubri. 200 farmers participated, receiving livestock, feed, and veterinary supplies, promoting scientific rearing practices for better socio-economic outcomes.

Scientist-farmer interaction organized at KVK, Dhubri on October 1, 2024

Poultry Development: Livelihood improvement program for tribal farmers

ICAR-NDRI, ERS, Kalyani, West Bengal, organized a one-day program on Livelihood Improvement of Tribal Farmers through Livestock Interventions on October 14, 2024, under the NDRI-TSP Project. The event included a Scientists-Farmers' Interaction, benefiting 106 tribal farmers through the distribution of chicks, poultry feed, pig feed, and aluminum pots, promoting nutritional and economic security.

Glimpse of the Livelihood Improvement Program for Tribal Farmers at ERS, ICAR-NDRI, Kalyani on October 14, 2024

Empowering Farmers through Scientific Goat Husbandry Training

On October 21, 2024, the ERS of ICAR-NDRI hosted a training programme on 'Scientific Goat Husbandry' for 22 farmers from Bolpur, West Bengal, focusing on the scheduled caste community. The training program

combined lectures and hands-on activities, including a farm tour, to enhance participants' knowledge and skills in scientific goat-rearing practices for improved livelihoods.

Training program Scientific Goat Husbandry at Bolpur, West Bengal on October 21, 2024

Input distribution camp organized under Tribal Sub-Plan (TSP) for Front Line Demonstration in Nadia District

On November 5, 2024, an input distribution camp was organized under the Tribal Sub-Plan to support tribal farmers through Front Line Demonstration activities. Agricultural inputs were distributed to 161 farmers cultivating mustard, maize, and oats across six villages in Nadia district, promoting crop diversification, productivity, and sustainable livelihoods in tribal communities.

An input distribution camp organized in Nadia district on November 5, 2024

Workshop on Scientific Animal Husbandry and Input Distribution Camp at North 24 Parganas district of West Bengal

On November 5, 2024, a workshop on 'Scientific Animal Husbandry' was organized, coupled with an input distribution camp under the Scheduled Caste Sub-Plan (SCSP), benefiting 25 scheduled caste (SC) farmers from North 24 Parganas district. The workshop aimed to impart essential knowledge and techniques related to scientific animal husbandry practices. As part of the initiative, goat feed and male goats were also distributed to the participants, further supporting their farming activities. This event not only provided technical knowledge but also practical resources, contributing to the enhancement of livestock management and the livelihoods of SC farmers in the region.

Glimpse of the workshop on 'Scientific Animal Husbandry' organized at North 24 Parganas district of West Bengal on November 5, 2024

Empowering SC Farmers through Poultry-Based Livelihood Support

On November 6, 2024, the ERS of ICAR-NDRI, Kalyani, organized a Scientists-Farmers Interaction cum Input Distribution Program under the SCSP project to strengthen poultry-based livelihoods. Eighty SC farmers received chicks and drinkers, along with training on poultry management and innovative farming techniques, promoting sustainable income generation and community empowerment.

An input distribution camp organized at ERS ICAR-NDRI Kalyani on November 6, 2024

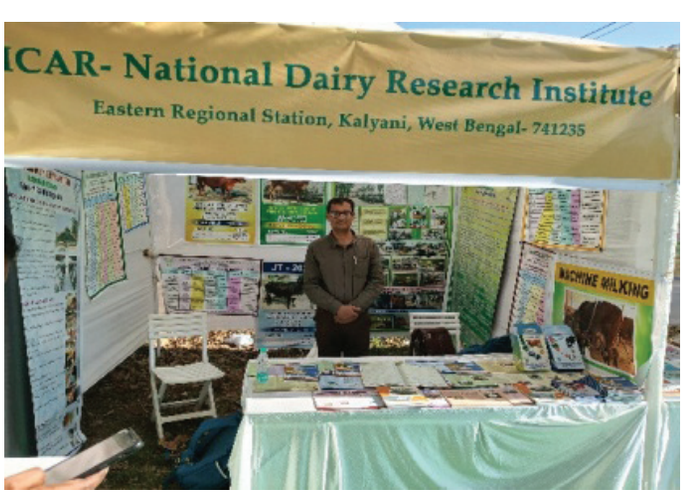
Promoting Sustainable Dairy Farming: Outreach Program for Livestock Farmers in Assam

On December 17, 2024, the ERS of ICAR-NDRI, Kalyani, conducted an outreach program at KVK Kamrup, Assam, benefiting 60 farmers with essential inputs for improved animal husbandry. The event emphasized indigenous Lakhimi cattle conservation, branding livestock products, and sustainable dairy farming, fostering collaboration between KVK Kamrup and ERS-ICAR-NDRI for better livelihoods.

Glimpse of Outreach program conducted at Kamrup KVK on December 17, 2024

Showcasing Innovations in Dairy Science: ERS-ICAR-NDRI's Participation in National Events

The ERS of ICAR-NDRI, Kalyani, showcased innovative technologies at two major events. At the National Conference in Nagaland on November 29-30 2024, it highlighted technologies for the northeast. ERS also participated in the APC Roy Science Fair at West Bengal University of Animal & Fishery Sciences (WBUAFS), Kolkata on December 26-29 2024, presenting sustainable dairy farming research, fostering discussions, and raising awareness among stakeholders.



Participation at National Conference in Nagaland on November 29-30 2024 (left) and in the APC Roy Science Fair at WBUAFS, Kolkata on December 26-29 2024 (right)

Livestock Development Program at Bagma, Gomti district, Tripura under NEH Project

ICAR-National Dairy Research Institute, Eastern Regional Station, Kalyani, organized a program on 'Livelihood Improvement of NEH Farmers through Livestock Interventions' in collaboration with Bagma Agri Producer Company Limited on December 19, 2024,

Input Distribution at Bagma, Tripura on December 19, 2024

in Bagma, Tripura. The program included scientist-farmer interactions, training, input distribution (goats, chicks, ducks, feed, medicines), and feedback surveys, benefiting 160 farmers.

Trainings Program organized

Under the ITC-funded project on the Pashusakhi model and entrepreneurship, a five-day training program on 'Kid Nursery & Scientific Goat Farming Practices' was held from November 25-29, 2024, for 22 women from Bihar. It covered goat breeds, farm economics, nutrition, health management, AI, entrepreneurship, and government schemes. Shri Binoy Menon, Regional Manager, ITC Kolkata, interacted with participants on the final day.

Distribution of certificates among the training participants on November 29, 2024

KVK (additional), Nadia

- Two skill development training programs were conducted for 251 trainees (65 male and 186 female farmers) in Nadia district. Additionally, 12 one-day training-cum-demonstration and awareness programs were held, benefiting 1,021 farmers from the district.
- Six new onion varieties from ICAR-Directorate of Onion and Garlic Research, Pune, are being evaluated with ten farmers in Nadia. Additionally, studies on root-knot nematode management in pointed gourd and planting time effects on chrysanthemum flowering are being conducted with 10 and 15 growers, respectively, under Nadia's agro-climatic conditions.

Field visit by the KVK staff

- From October to December 2024, seeds, planting materials, fertilizers, sprayers, pesticides, and goats were distributed under OFT/FLD/CFLD to 281 female and 381 male farmers in the Nadia district, supporting agricultural productivity and sustainability.

Distribution of input among farmers under OFT/FLD/CFLD program in Nadia district

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