



NDRI News

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From the Director's Desk

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India has maintained *numero uno* position in the list of leading milk producing countries of the world for over 15 years. In the year 2016-17, the total milk production reached a new high of 163.3 MT per annum with concomitant increase in per capita milk availability to 351g. The milk production in the country has been maintaining nearly 6 % year on year growth for the last three years, which is more than double the global average growth rate. Milk and milk products remain a major source of quality protein and vital nutrients to the majority of Indian population. Dairying, therefore, offers not only nutritional security to the country's large section of the population but also livelihood opportunities to farm families, processors, and other stakeholders in the dairy value chain.

With increasing volume of milk finding access to the market, quality of milk and milk products reaching the consumers has come to occupy the centre stage. Due to scattered milk production system spread over 75 million dairy farms, clean milk production practices are seldom exercised and quality of milk produced at the farm level is far from satisfactory. Maintenance of continuous cold chain throughout procurement and distribution network remains inadequate thereby making the task of controlling the quality of milk reaching the consumers all the more difficult. The problem is further aggravated because of the significant proportion of adulterated milk finding its way to the national milk pool in both the organized and unorganized sector. New adulterants are being tried by the traders of spurious milk at frequent intervals making the task of ensuring supply of quality milk to the consumers extremely difficult.

NDRI has been at the forefront to constantly develop cost effective and precise tests for the detection of adulterants and contaminants in milk and milk products. A kit developed by the Division of Dairy Chemistry at the institute for detection of various common adulterants in milk has been in high demand among dairymen across the country. The kit contains reagents for detection



of 12 adulterants in milk viz., neutralizers, urea, pond water, starch, sugar, glucose, maltodextrin, salt, formalin, ammonium compounds, hydrogen peroxide, hydrogenated vegetable oil, etc. In not too distant past, a rapid method developed at the Institute for detection of vegetable/refined oil added to milk has been validated and adapted by Bureau of Indian Standards (BIS). Similarly, the qualitative and quantitative methods developed for the detection of presence of added urea in milk has been adapted by the BIS.

In recent times, significant progress has been made in the development of methods to ascertain the chemical quality of milk and milk products, which includes a method for detection of detergent in milk; analytical process for detection of antibiotic residues in milk using spore as biosensor; paper strip based tests/assays for the detection of maltodextrin, hydrogen peroxide, glucose, neutralizers, added urea, sucrose, antibiotic and pesticide residues in milk and milk products; a kit for the detection of vegetable oil/fats in ghee, a PCR based method for detection of foreign fat in ghee etc. The use of strips for detection of adulteration in milk is easy and rapid. These strips are required to be dipped in milk momentarily and colour of strips is to be observed either instantaneously (neutralizer and hydrogen peroxide) or after 3-10 min (urea, glucose, sucrose and maltodextrin). The strips can be used at milk reception centers and also at house-hold level. The strip based tests developed for detection of antibiotic and pesticide residues in milk are unique. These strips are based on the principle of spore germination and enzyme inhibition and can detect antibiotic and pesticide



Dr. R. R. B. Singh, Director NDRI hoisting the National Flag on 15th August, 2017



Group dance being performed by the students of NDRI on Independence Day

residues in milk at MRL limits set by Codex/EU. These tests can ascertain the presence of antibiotic and pesticides in 50 min and 120 min, respectively. For ensuring the microbiological quality of milk, innovative methods have been developed which include two stage enzyme based assay for detection of *Listeria monocytogenes*, *Escherichia coli* and *Enterococci* in milk and rapid detection of coliforms in milk. These tests are rapid, less expensive and results are available within one working day. Further, scientists at NDRI have also developed innovative DNA based assays to differentiate milk of different species (cow, buffalo, sheep, goat and camel milk) and to differentiate A₁/A₂ milk.

The Institute Technology Management Unit (ITMU) has been making concerted efforts for commercialization of the technologies developed at the institute. As a result, know-how for several of these test kits and strips has been transferred to the leading players in the dairy industry. Many of these technologies have been licensed to new entrepreneurs who are in the process of taking it to the masses for broad based use. It is pertinent to mention here that all the above mentioned analytical methods have been extensively validated before licensing and are, therefore, very reliable. Efforts are also on to enhance objectivity in detection by integrating the new generation methods with sensor based applications, which could make use of electrochemical signal, fluorescent signal or colorimetric signal, with known chemistry of detection methods. Essentially this will be

achieved through team work involving experts who are currently working on this aspect and those who have expertise in electronics and information technology.

NDRI has also initiated a programme to educate the farmers about the importance of clean milk production. Farmers are being educated about the quality and safety aspects of milk and also about clean milk production practices right in their village or farms by the scientists of the Institute. The Dairy extension department is supporting clean milk production drive scrupulously through educational aids and educational programmes focusing on the practices to be followed in relation to hygiene of animal, milking personnel, milking process and environment. The clean milk production practices are also being followed at the Institute's Livestock Farm, which has been developed as a model dairy farm. Apart from this, the scientists of the Institute are also contributing in the activities of FSSAI and BIS in various capacities wherein they are helping the regulatory bodies to provide safe and quality milk and milk products to the masses. I am sure, in not too distant future; our initiatives will help the Dairy Industries, Dairy Farmers and the Regulatory Bodies to adopt complete measures for ensuring only safe and quality milk and milk products to the consumers.

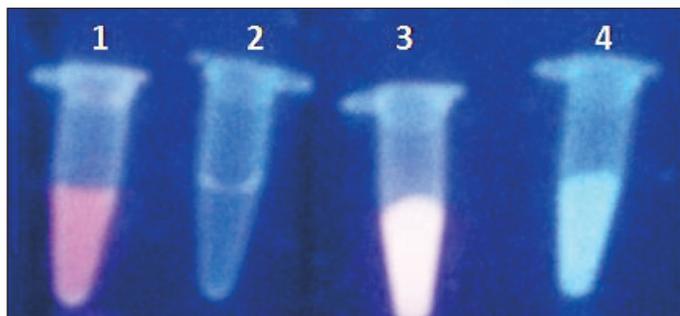


(R. R. B. Singh)

Proof of Concept for Detection of Mercury in Water and Milk Using Gold Nanodots

(Dhiraj Kumar Nanda, Y. S. Rajput and Rajan Sharma)

Gold nanodots capable of emitting fluorescence were synthesized in the laboratory by reducing auric acid (AuHCl₄.H₂O) with bovine serum albumin at alkaline pH. The prepared gold nanodots gave bright red fluorescence (λ emission = 680 nm) on excitation with 377 nm radiation. The property of emission of fluorescence from gold nanodots resided in 1.5 to 2.5 nm size nanodots. The fluorescence from gold nanodots was quenched by mercury when gold nanodots were suspended in water or milk. The quenching effect was very intense. Fluorescence and quenched-fluorescence could be recorded by fluorescence spectrophotometer and mobile camera. Preliminary results indicated dose response relationship between level of mercury and extent of quenching. Under similar conditions, lead as well as silver failed to quench fluorescence from gold nanodots.



Tube 1, Gold nanodots suspended in water; Tube 2, Gold nanodots suspended in water + mercury; Tube 3, Gold nanodots suspended in milk; Tube 4, Gold nanodots suspended in milk + mercury

Development and Evaluation of Nano Iron (III) Oxo-Hydroxide Complex Fortified Biscuits

(Apurva Sharma, Sumit Arora, A. K. Singh and Vivek Sharma)

Iron is an essential micronutrient since it plays a vital role in many metabolic processes including oxygen transport, cellular proliferation and growth. Ferrous forms of iron that are commonly used for supplementation and fortification may lead to undesirable changes in the intestinal lumen e.g. generation of harmful free radicals, oxidative stress and chronic diseases. Ferritin is the broadly conserved biological storage form of iron and its core is made up of Fe (III) oxo-hydroxide having size ~2 to 8 nm which is well absorbed in the intestine. Organic acid-modified Fe (III) oxo-hydroxide nanomaterial mimics the core of ferritin and it may provide a new and safe solution to eradicate anemia. Organic acids (adipic, citric, tartaric and mallic acid) modified Fe (III) oxo-hydroxide complexes were prepared with particle size below 200 nm. The combinations of adipic, citric acid and iron in the ratio of 1:1:2 (A:C:Fe) resulted in lowest particle size (4 nm) among all modified iron complexes and it also matched with the size of ferritin core material. A:C:Fe complex possessed better stability (resistance towards release of bound iron) during different processing conditions such as heat treatments and pH. Phen green assay indicated that the iron from A:C:Fe complex was not affected by the presence of iron absorption inhibitor i.e. phytic acid. Biscuits were fortified with 15 mg of iron/100 g of biscuits in the form of A:C:Fe complex. Shelf life of fat extracted from biscuits fortified with A:C:Fe complex was higher than the fat extracted from biscuits fortified with iron salt. Overall acceptability scores of fortified biscuits were identical with the control biscuits upto 120 days of storage. However, on further storage fortified biscuits had lower sensory scores than the control biscuits. Peroxide value and acidity of fat extracted from A:C:Fe complex fortified biscuits showed non-significant difference

($p < 0.05$) with control biscuits. *In vitro* bioavailability using Caco-2 cell culture method showed that iron uptake from biscuits fortified with A:C:Fe complex was significantly higher than biscuits fortified with iron salt. Therefore, the organic acid-iron complex could be a better iron fortificant with good oxidative stability and bioavailability



A:C:Fe complex and biscuits fortified with A:C:Fe complex

How Intelligent are Buffaloes?

(Rajashree Rath, Pawan Singh, M. L. Kamboj, S. S. Lathwal and T. K. Mohanty)

A study conducted at Livestock Production Management Section of NDRI on buffalo calves demonstrated that buffalo calves are smart and intelligent. The learning and cognitive performance of the Murrah buffalo calves was measured using an operant learning task in a Y-shaped maze. The calves were trained to visually discriminate between two colours viz., white versus black, following which they were rewarded (provided with milk) or punished (provided no milk). Surprisingly, the buffalo calves were able to learn and then relearn the visual discrimination task in a Y-maze test when the stimuli were reversed. This is the first report in the world, regarding accessing the learning and cognitive abilities in buffaloes. This clearly suggests that buffaloes are smart and intelligent enough and also possess cognitive abilities similar to other farm animals.



Calf locating the reward (correct side, white)



Calf located the correct side (reward, milk)

INSTITUTE TECHNOLOGY MANAGEMENT COMMITTEE (ITMC)

Patents Filed

S. No	Title of Patent	Inventors	Application Number
1.	The Preparation of Buffalo Milk Casein Hydrolysates with Enriched Antioxidative Peptides and the Process Thereof. Filing Date –04/07/2017	Rajesh Kumar, Rajeev Kapila, Nichal Mayur Ashok Rao, Sowmya, Gulshan Dass, Bimlesh Mann, Suman Kapila	201711023424
2.	Construction of Mutant Strain of <i>Kluyveromyces Marxianus</i> for Enhanced Galactose Utilization. Filing Date –31/08/2017	Shilpa Vij	201711030808
3.	A Crosslinked Membrane with Flow-Line Capable of Arresting Free-Flowing Gold Nanoparticles and the Process for the same. Filing Date –13/10/2017	Y. S. Rajput, D. K. Nanda and Rajan Sharma	201711036404

Technologies Transferred

1.	Arjuna Herbal Ghee	Punjab & Sindh Dairy Products Pvt. Ltd. Mumbai	2308.2017	1.50 + 18% GST
2.	Bajra Lassi	Aadhar Udyog, New Delhi	27.09.2017	1.50 + 18% GST
3.	Milk Protein Enriched Iron Fortified Bajra Biscuits	Aadhar Udyog, New Delhi	27.09.2017	1.50 + 18% GST



An MoU being exchanged for the transfer of technology of Arjuna Herbal Ghee

ITMU Meeting Organised

- 35th ITMU meeting was organized at NDRI on 14th August, 2017. Director, NDRI Dr. R. R. B. Singh chaired the meeting. Four number of patent applications were cleared for filing to Patent Office. Prices of two technologies developed at NDRI were fixed. These Technologies are ready for commercialization.

Foundation Programme for Freshers Introduced

Foundation programme was introduced for the freshers at the start of new academic session 2017-18 to realise the vision of NDRI to produce excellent and accomplished human resource by helping students pursue both their professional and personal goals with greater self-awareness, self-esteem, understanding and focus. The month long foundation course aimed at tapping the innate talents of the students by providing them an enabling and vibrant environment to nurture themselves into outstanding professional and exuberant human beings. The foundation programme started on 2nd August, 2017 and culminated on 14th September, 2017 with the celebration of Freshers' Day. The students were exposed to multifarious extra-curricular group activities such as Theatre & Dramatic, Dances,

Music, Art & Craft, Literacy and Soft Skills to enable them to tap their full potential as per their interests. Besides, the month long foundation program included interactive sessions on Mastering Public Speaking-Stage 1 'Prime', Stage 2 'Prepare', Stage 3 'Present', Stage 4 'The Secret Sauce'; Easy Ways to Communicate in English; Improving Spoken English; Professional Communication; Social Media and English; Climbing the Leadership Curve, Team Building, Gender Equality & Environment Awareness, and Stress Management. Eminent resource persons from the corporate world and educational Institutes mentored the students. These sessions provided them the correct platform and opportunity to work on their self-esteem and showcase their latent talent.



Dr. R. R. B. Singh, Director, NDRI addressing students



A view of soft skill session



Group dance being performed by the students of NDRI



Dr. R. R. B. Singh, Director, NDRI felicitating resource persons

Stubble Burning: Option to Address it

NDRI organized a panel discussion on the topic "Stubble Burning: Option to Address it". Various eminent scientists, policy makers, farmers, representatives of non-government organizations participated. While addressing the gathering, Dr. R. R. B. Singh, Director, NDRI said that stubble burning has emerged as an important issue both at national and international level because it is contributing to the air pollution and also affecting soil health. Dr. S. Narayanan, Member Secretary, Haryana State Pollution Control Board said that Karnal and Kurukshetra have highest incidences of stubble burning and Karnal

has been chosen as Model District to develop mitigation strategies for this issue. Similarly, in Punjab, Patiala District has been chosen as Model District.

Dr. Samar Singh, Professor and Head, Regional Research Station (CCSHAU) and KVK, Uchani, Karnal informed that for each kilogram of harvested rice, about 1.5 kg of crop residues are produced. By burning these crop residues in the soil, soil gets depleted by about 89% nitrogen, 5.5% phosphorus, 19.9% potassium and 20.5% sulphur. Dr. Pradeep Meel, Deputy Director, Agriculture Department informed about number of alternatives available to stubble burning, which

include happy seeder, combine harvester with straw management system, reversible plough, turbo happy seeder, mulcher, bailer, zero tillage etc.



Dr. R. R. B. Singh, Director, NDRI addressing the gathering

Workshop-cum-interactive session on Beyond a Life in Classrooms–8 Must Know Truths for Success

Workshop-cum-interactive session on “Beyond a Life in Classrooms–8 Must Know Truths for Success” was organised at NDRI under the aegis of Students’ Empowerment Unit on 17th July, 2017. The resource person for the workshop was Mr. Debashish Sarkar, Managing Partner, Proliferator Advisory and Consulting.



Mr. Debashish Sarkar motivating students of NDRI

A Special Lecture under the Rally for Rivers Campaign

A special lecture was organised under the “Rally for Rivers” Campaign for NDRI Faculty and Students on 23rd September, 2017. The objective of this lecture was to bring about much needed awareness amongst the faculty and students for conservation and preservation of water and to suggest measures to save our future generations from devastating impact of water scarcity. The depletion of rivers is a serious concern for our environment. The informative talk on “Rally for Rivers” by Dr. D. K. Sadana, Secretary, Indigenous Livestock Society-India and



Dr. R. R. B. Singh, Director NDRI with the participants

Mr. Mohit Sardana, Rashtriya Udyog Ratan Awardee emphasized on the concerns of depleting rivers. Dr. R. R. B. Singh, Director, NDRI in his presidential address also emphasised that this is a cause of serious concern and all significant steps must be taken towards planting trees & creating awareness for conservation of scarce water resources. As a part of this awareness campaign, students of ICAR-NDRI went on a cycle rally to support the cause and spread awareness among people of Karnal on 25th September, 2017.

Diamond Jubilee Celebrations: Workshop on Dairy Education

NDRI (Deemed University) celebrated its Diamond Jubilee by organizing a workshop on the theme ‘Towards Leadership through Dairy Education’ on 17th July, 2017. Mr. Harkesh Kumar Mittal, Advisor & Head, National Science & Technology Entrepreneurship Development Board, Department of Science & Technology, Govt of India and alumnus of the Institute [B.Sc (Dairy Technology), 1977-81] was the Keynote speaker of the day and spoke on ‘Towards Leadership through Innovation and Entrepreneurship – Perspective of an Alumnus’. The Panel Discussion on ‘Dairy Education: Way Forward’ with nine participants drawn from academia and the industry was moderated by Mr. Debashish Sarkar, Managing Partner, Proliferator Advisory & Consulting, Mumbai.



A view of inaugural session of Diamond Jubilee celebrations

Laurels to NDRI

NDRI Team won the National Dairy and Food Quiz Contest organized by SMC College of Dairy Science, Anand Agricultural University, Anand during 7th – 8th Sept. 2017. The team consisted of Mr. Shubham Chaturvedi (M. Tech. DT) and Ms Parul (M. Tech. DC) and was led by Mr. Sanket Borad (Scientist, DT).



NDRI students receiving the award

Swachchh Bharat Abhiyaan Pakhwada Celebrated

NDRI celebrated Swachchhta Pakhwada under the “Swachchhta Hi Sewa” Campaign of the “Swachchh Bharat Abhiyaan” programme of the Institute. All the scientists, technical officers, administrative, financial, supporting staff and students of the Institute participated in this cleanliness drive (Pakhwada) and cleaned up NDRI

premises, Sector-12 (Sunday Market area), Uchani lake etc. during 22nd September to 2nd October, 2017. After cleaning the allotted area, participants collected the garbage and disposed at dumping ground. In addition to this, an awareness campaign was also organized in adopted villages of NDRI regarding the importance of the cleanliness drive. The regional campuses of NDRI located at Bengaluru and Kalyani also organised the cleanliness drive.



(A): NDRI employees cleaning Sunday Market Area in Sector-12 Karnal (B): Dr. R. R. B. Singh, Director NDRI with the employees after cleaning the area

Sankalp-Se-Siddhi New India Programme

KVK of NDRI organised a programme on “Sankalp-Se-Siddhi New India” for doubling the income of farmers by 2022 on 6th September, 2017. Sh. Ashwani Chopra, Member of Parliament, Karnal was the Chief Guest of the function. A total of 300 farmers, farmwomen and Directors of the sister ICAR Institutes located at Karnal were present in this programme for sharing their experiences for increasing the income of farmers. Dr. B. S. Prakash, ADG (A & P) ICAR, New Delhi urged scientists to develop cost effective technologies for the benefits of farming community. Dr. R. R. B. Singh, Director, NDRI, Karnal said that micro-irrigation, organic farming, value addition and integrated farming have to be implemented for enhancing the income of farmers. All the participants took the pledge to work sincerely for the benefit of farmers.



Sh. Ashwani Chopra, Member of Parliament, Karnal inaugurating the Sankalp Se Siddhi New India programme

- **Dr. Sunita Grover**, Head, Dairy Microbiology was conferred NAAS Fellowship on 5th June, 2017 on the Foundation day ceremony of Academy.



Dr. Sunita Grover being felicitated with NAAS fellowship

- **Mr. Bhavesh Baria**, Ph.D. Scholar, **Dr. Neelam Upadhayay**, Scientist, **Dr. A. K. Singh**, Principal Scientist, Dairy Technology Division and **Dr. R. K. Malhotra**, Principal Scientist, Dairy Economics Statistics & Management Division received “**First Prize**” during Research Poster Competition held at Hindi Chetana Mass on 20th September, 2017 at NDRI Karnal.

PERSONALIA

Joining/Appointments

- Dr. Satish Kumar, Sr. Scientist (Animal Biotechnology) joined at ICAR-NDRI after relieving from ICAR-CSWRI, Avikanagar w.e.f. 1.7.2017.
- Dr. Sanjeev Kumar, Scientist (Agronomy) joined at ICAR-NDRI after relieving from ICAR-IIFSR, Modipuram w.e.f. 1.7.2017.
- Sh. Brahm Parkash, AAO joined at ICAR-NDRI after premature repatriation from National Test House (ER), Kolkata w.e.f. 17.7.2017.
- Dr. Arun Kumar Misra, Principal Scientist (LPM) joined at ICAR-NDRI after relieving from ICAR-CAZRI, Jodhpur w.e.f. 20.7.2017.
- Dr. T. K. Dutta, Principal Scientist entrusted the additional responsibilities of Acting Head, ERS of NDRI, Kalyani for further period of six months w.e.f. 1.8.2017.
- Sh. A. K. Mishra Administrative Officer joined at ICAR-NDRI after relieving from ICAR-CSSRI, Karnal w.e.f. 7.8.2017.

Promotions

- Dr. A. Kumaresan, Senior Scientist, Southern Campus, Bengaluru promoted as Principal Scientist w.e.f. 09.07.2015.
- Dr. S. Jeyakumar, Senior Scientist, Southern Campus, Bengaluru promoted as Principal Scientist w.e.f. 16.08.2015.
- Dr. P. Heartwin Amala Dhass, Senior Scientist, Southern Campus, Bengaluru promoted as Principal Scientist w.e.f. 02.09.2015.

Retirements/Relieved

- Dr. S. S. Kundu, Principal Scientist, Animal Nutrition Division retired from Council's services w.e.f. 30.9.2017.
- Dr. P. S. Oberoi, Principal Scientist, Animal Nutrition Division retired from Council's services w.e.f. 30.9.2017.
- Smt. K. Geetha Kumari, Senior Technical Officer, retired voluntarily from Council's services w.e.f. 01.08.2017.
- Smt. T. R. Thivija Kumari, Assistant Chief Technical Officer, retired voluntarily from Council's services w.e.f. 01.09.2017.
- Sh. Agnivesh, AO NDRI, Karnal transferred and relieved from ICAR-NDRI to join his duties at ICAR-CIRG, Makhdoom w.e.f. 19.8.2017.

VISIT ABROAD

Dr. M. L. Kamboj and Dr. Pawan Singh, Principal Scientist Livestock Production and Management Section were deputed to attend "51st Congress of International Society for Applied Ethology (ISAE)" from 7th - 10th August, 2017 at Aarhus, Denmark.

DINSTINGUISHED VISITORS

10.7.2017 Dr. Santosh Kumar Singh, Agricultural Specialist in Embassy of the USA, New Delhi.

15.7.2017 Sh. Tsering Gyurme, Ex-Minister, Animal Husbandry Veterinary and Dairy Development Government of Arunachal Pradesh.

21.7.2017 House Committee of Kerala Legislative Assembly.

27.07.2017 Hon'ble Hifikepunye Pohamba, Former President of the Republic of Namibia, Mr. Pius Dunaiki, High Commissioner, High Commission of Namibia and Prof. Lazarus Hangula, Vice-Chancellor, Namibia alongwith other dignitaries.



Delegation from Namibia led by former President of the Republic of Namibia at NDRI

15.9.2017 42 NRIs (participating in 41st Know India Programme in Haryana scheduled from 14th to 17th Sept., 2017 organized by DSO, Karnal).

तिमाही हिन्दी बैठक का आयोजन

संस्थान के निदेशक एवं कुलपति महोदय की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की तिमाही बैठक संस्थान में दिनांक 8.9.2017 को संपन्न हुई। समिति ने गृह मंत्रालय, राजभाषा विभाग द्वारा जारी चालू वित्तीय वर्ष 2017-18 के लिए केन्द्र सरकार के सभी कार्यालयों के लिए लक्ष्य तय किए गए न्यूनतम वार्षिक लक्ष्यों के कार्यान्वयन के बारे में विस्तार से चर्चा करके कई महत्वपूर्ण निर्णय लिए।

हिन्दी चेतना मास का आयोजन

संस्थान में दि. 14.9.2017 से 16.10.2017 तक चेतना मास का आयोजन किया गया। चेतना मास के अंतर्गत दि. 14.9.2017 को हिन्दी देशभक्ति गीतगायन प्रतियोगिता, 20.9.17 को हिन्दी शोध-पत्र पोस्टर प्रदर्शन प्रतियोगिता, दि. 22.9.2017 को "राजभाषा प्रबंधन" पर हिन्दी कार्यशाला, 25.9.2017 को हिन्दी निबंध प्रतियोगिता, 6.10.2017 को हिन्दी आशुभाषण प्रतियोगिता के आयोजन के उपरांत 16.10.2017 को राजभाषा पुरस्कार वितरण समारोह का आयोजन किया गया, जिसमें 139 विजेताओं को सम्मानित किया गया।



हिन्दी दिवस समारोह का आयोजन



हिन्दी शोध-पत्र पोस्टर प्रदर्शन प्रतियोगिता का आयोजन

राजभाषा एकक

राजभाषा संबंधी अन्य गतिविधियाँ

- » दि. 12.7.2017 से 18.7.2017 तक नगर राजभाषा कार्यान्वयन समिति, करनाल के तत्वावधान में स्कूल शिक्षा विभाग, हरियाणा की पहल पर उत्कर्ष सोसायटी के सौजन्य से आयोजित "नाट्यलेखन एवं प्रस्तुति विषय पर हिन्दी कार्यशाला का आयोजन किया गया, जिसमें नराकास करनाल के सदस्य कार्यालयों के अधिकारियों एवं 55 हरियाणा सरकार के शिक्षकों ने भाग लिया।
- » दि. 18.7.2017 को नराकास करनाल की ओर से हिन्दी श्रुतलेखन

प्रतियोगिता का आयोजन करके इसके 8 विजेताओं को सम्मानित किया गया।

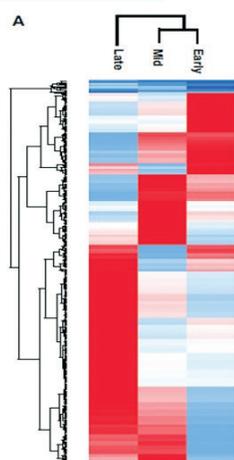
- » दि. 28.7.2017 को नराकास करनाल के तत्वावधान में नेहरू युवा केन्द्र, करनाल द्वारा संस्थान में आयोजित युवा नेतृत्व व सामुदायिक विकास प्रशिक्षण शिविर में 40 प्रतिभागियों को राजभाषा प्रबंधन विषय पर मार्गदर्शन प्रदान किया गया।
- » दि. 22.8.2017 को नराकास करनाल की ओर से हिन्दी लघु-कथा लेखन प्रतियोगिता का आयोजन किया गया एवं 10 विजेताओं को सम्मानित किया गया।

RESEARCH

Whey Proteome Variation at Different Stages of Lactation in Malnad Gidda (*Bos Indicus*) - Dwarf Cattle of Western Ghats, India

(Praseeda M., Uday Kannegundla, Gourav Dey, Lathika Gopalakrishnan, Manjunath Dammalli, Manish Kumar, Arun Patil, M. Basavaraju, Akhila Rao, T. S. Keshava Prasad and K. P. Ramesha)

High-resolution mass spectrometry-based quantitative proteomics of bovine whey proteins at early, mid and late lactation stages of Malnad Gidda (*Bos indicus*) cows indicated marked whey proteome variation. A total of 564 proteins were identified, out of which, 403 proteins were found to differentially abundant at different lactation stages. Hierarchical clustering of total proteins identified across lactation stages were carried out. Gene ontology analyses were carried out to categorize proteins altered across lactation stages based on biological process and molecular function. Identified 30 proteins that were found to be involved in complement and coagulation cascade pathway, in which, 90% were highly abundant in mid or/and late lactation. Our study represents the first and largest inventory of bovine milk proteins identified to date for an Indigenous breed of cattle.

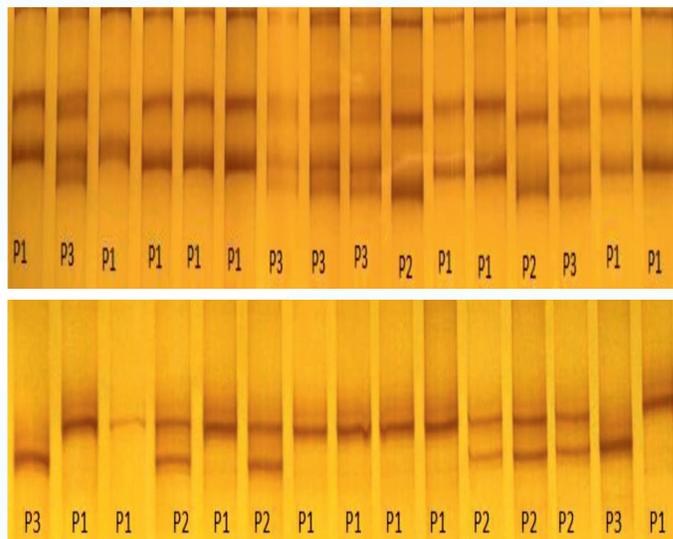


Hierarchical clustering of total proteins identified across lactation stages

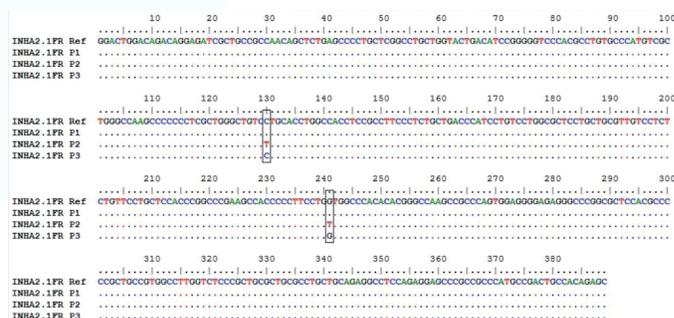
Role of Inhibin Alpha Gene Polymorphism with Semen Quality Traits in Murrah Bulls

(Satish Chandra and D. N. Das)

Inhibin is an important glycoprotein hormone belonging to the transforming growth factor- β super family which suppresses follicle-stimulating hormone (FSH) synthesis and secretion. In the present investigation, polymerase chain reaction-single-strand



PCR-SSCP patterns of INHBA gene in Murrah bulls



Clustal W multiple sequence alignment of INHA Exon2 FRI

conformation polymorphism (PCR-SSCP) was carried out to detect SNPs of Inhibin alpha gene and to analyze the association between the observed polymorphisms with semen quality traits in 103 Murrah bulls. These animals are from Frozen Semen Bull Stations of Nandya, Kurnool, Andhra Pradesh and Karimnagar, Telangana. Genotypes were classified based on the polymorphic patterns of targeted genes. In INHA gene, exon 1 was found to be monomorphic, while, first fragment of INHA exon 2 (INHA Exon 2 FR 1) and second fragment of exon 2 (INHA Exon 2 FR 2) were polymorphic. The first fragment of INHA exon 2 (INHA Exon 2 FR1) revealed a transition at C267119T position and a transversion at G267033T position in coding region in comparison to *Bubalus bubalis* reference sequence. The second fragment of INHA exon 2 (INHA Exon 2 FR 2) exhibited one transition at T266510C position as in comparison to the *Bubalus bubalis* reference sequence. The SSCP variants of first fragment of INHA exon 2 had significant effect on semen volume per ejaculate ($P < 0.05$) and sperm concentration ($P < 0.01$). The SSCP variants of second fragment of INHA exon 2 had significant effect on sperm concentration ($P < 0.01$) and functional membrane integrity ($P < 0.05$). The observed association between SSCP variants in INHA gene with semen volume per ejaculate, sperm concentration and functional membrane integrity suggests the possibility of using these genetic variants in INHA gene as prognostic marker for selection of animals for high semen quality traits.

EXTENSION ACTIVITIES

- A total number of 734 visitors in 22 batches comprising students from various educational institutes, farmers and entrepreneurs of Southern region visited the Campus. The visitors were taken round to various sections and briefed about the ongoing activities.
- Advisory services/technical advice were rendered to 39 clientele during personal visits, phone calls and mail enquiries. The information needs of the advisory comprised technical advice for commercial dairy project, cattle feed formulation, green fodder production and about hydroponics.
- Extension literature on green fodder production, clean milk production, indigenous dairy animals and indigenous dairy products of the region prepared exclusively for the clientele groups of the Southern region were distributed to the farmers and other stakeholders.
- An orientation programme was organised at the Campus for 509 dairy farmers of Karnataka Milk Federation, in 14 batches from Kolar, Tumkur, Bengaluru Rural and Urban Districts. The trainees were briefed about the ongoing activities of the campus, scientific dairy farming and clean milk production and were taken round the campus to fodder demonstration unit and livestock research unit of the campus as a part of exposure programme.
- Southern Campus, Bengaluru participated in Dairy Tech India 2017, International Exhibition on Dairy Products & Technology held during 28th to 30th August 2017 at BIEC Bengaluru. NDRI stall depicted innovative & educative information on dairy production & processing technologies, Indigenous breeds & Indigenous dairy products of the region with focus on clean milk production.
- Under the Farmer First, collaborative research project by ICAR-IIHR and SRS: ICAR-NDRI, Dairy Cattle Health Camp and Awareness Campaigns on Balanced Feeding in Dairy Animals were organised for the benefit of farm families of the project villages in Kanakapura Hobli of Ramanagara Taluk.

EVENTS

Foundation Day Celebration

- Southern Campus of NDRI celebrated 95th Foundation Day of ICAR-National Dairy Research Institute by organising a National Seminar on "Strategies for Enhancing Productivity of Indigenous Cattle" jointly with Alumni Association of Southern Campus, Bengaluru on 1st July 2017. The Seminar was inaugurated by Shree Shree Adrushya Kadsiddheshwar Swamiji, Shree Kshetra Siddhagiri Mahasamsthan, Kaneri Mutt, Kolhapur. Swamiji in his speech stressed the growing importance of cattle rearing in rural economy. Dr. T. N. Prakash Kammardi, Chairman, Karnataka Agricultural Prices Commission, Govt. of Karnataka emphasized the relevance of assessing the overall socio-economic contributions of indigenous cattle. Dr. Prakash released the Documentary Video of Southern Campus of NDRI. Dr. Bimlesh Mann, Joint Director (Research), NDRI, Karnal in her presidential address shared the contribution made by the Institute in the improvement of indigenous breeds and emphasized on the issues and their solutions related to rearing of indigenous milch animals. Dr. Raghavendra Bhatta, Director, ICAR-NIANP, Bengaluru shared his views on relevance of rearing indigenous cows and attributes of their milk.



A view of inaugural session of foundation day celebration

The National Seminar enveloped two Technical Sessions coupled with a Panel Discussion in which eminent dairy professionals, entrepreneurs and developmental experts participated and shared their experiences and views with the participants with respect to the strategies for promotion of indigenous cattle focusing on productivity front. The Plenary Session was chaired by Dr. Bimlesh Mann, Joint Director (Res.), NDRI, Karnal.

- Freshers' Day Celebrated: An orientation programme for Freshers was conducted from 2nd - 31st August, 2017 at



Freshers day being celebrated at Southern Campus of NDRI, Bengaluru

Southern Campus of NDRI, Bengaluru. Apart from regular classes, various activities were organized for freshers like exposure to cultural activities, oration, debates, soft skill development, yoga, leadership attributes etc. The orientation programme ended by a gala Freshers' Day on 31st Aug 2017 to formally welcome all the newly admitted students of DDT, M. Tech. DT, DE and Ph.D. DE under a festive atmosphere. Speaking on the Freshers Day, Dr. K. P. Ramesha, Head, Southern Campus urged students to study hard and apply for more and more external fellowships. Freshers exhibited their talents in singing, theatre and mime.

Swachhta Hi Seva of Swachh Bharat Mission

Shri. Ananth Kumar, Hon'ble Union Minister of Parliamentary Affairs and Chemicals & Fertilizers, Government of India motivated campaign on 'Swachhta Hi Seva' of Swachh Bharat Mission on 22nd September 2017 by inaugurating "Sasyagraha Vana" and planting tree saplings. Hon'ble minister recalled the visit of Father of our

nation Mahatma Gandhi ji to SRS of ICAR-NDRI in June' 1927 for 2 weeks and highlighted swachhatha dream of Mahatma Gandhi ji in the independent Bharat.



Shri. Ananth Kumar Hon'ble Union Minister addressing gathering at Southern Campus of NDRI

Editor's Choice Article

The research article "**Sperm variability, reactive oxygen species and DNA fragmentation index combined can discriminate between above-and-below average fertility bulls**" by A. Kumaresan, Anders Johannisson, Essraa M. Al-Essawe, Jane M. Morrell published in *Journal of Dairy Science*, Vol. 100 (7): 5824-5836 (July, 2017 Issue) had been selected as Editor's choice feature article by the Editor-in-Chief as especially notable regarding their contribution to dairy science specifically in the area Dairy Production. Editor's choice is a feature of each Journal issue and articles selected are made available for free access.

RESEARCH

Effect of Some High Altitude Indian Tree Leaves on Ruminal Methanogenesis *In Vitro*

(S. Choudhary, A. Santra, S.K. Das, A. Mandal and T.K. Dutta)

Ruminal methane production contributes significantly to the green house effect in the atmosphere. There has been a growing interest in the use of plant secondary metabolites as methane mitigators due to their natural origin in place of chemical additives. North-eastern part of India possesses wide variety of tree leaves which are not yet tested to observe their effect on ruminal methanogenesis. Nine tree leaves e.g., Blemkar (*Buddlejaasiatica*), Phrengpa (*Quercuswalliasehiana*), Maar (*Costanpsisindica*), Maarma (*Spiraeacanesens*), Domkar (*Symplocusracemosa*), Matekpa (*Quercusfenestrate*), Zimbu (*Lingustrmmysinities*), Baggar (*Berberisaristata*) and Ngek sing (*Symplocoscraetaegoides*) were collected from Arunachal Pradesh for studying their effect on ruminal methanogenesis *in vitro*. 200 ± 5 mg of each tree leaves were incubated anaerobically in triplicate with 30 ml buffered rumen inoculum (10 ml cattle rumen fluid + 20 ml buffer) in 100 ml calibrated glass syringes for 24 h at 39°C, with recording of the gas production after 24 h of incubation.

Highest (P<0.01) gas production was observed due to incubation of Domkar tree leaves (33.8 ml/24 h) followed by Baggar and Maarma tree leaves. Lowest gas production was observed due to incubation of Maar followed by Matekpa tree leaves. However, gas production, in terms of digested dry matter, was highest (P<0.01) for Maarma tree leaves (326.1 ml/g DDM/24 h) followed by Domkar (320.8 ml/g

DDM/24 h) and Maar (304.6 ml/g DDM/24 h) tree leaves. *In vitro* methane emission from these tested tree leaves in 24 h incubation varied from 1.8 to 6.8 ml. Methane production per unit of digested dry matter on 24 h incubation was lowest (P<0.01) due to incubation of Ngek sing, Baggar and Blemkar tree leaves (about 45.9 to 46.7 ml/g DDM/24 h). Per cent of methane produced in total gas was lowest for the incubation of Maarma followed by Zimbu and Baggar tree leaves. It was concluded that Ngek sing (*Symplocoscraetaegoides*) tree leaves might be used as feed additives to manipulate rumen fermentation for reducing ruminal methanogenesis.

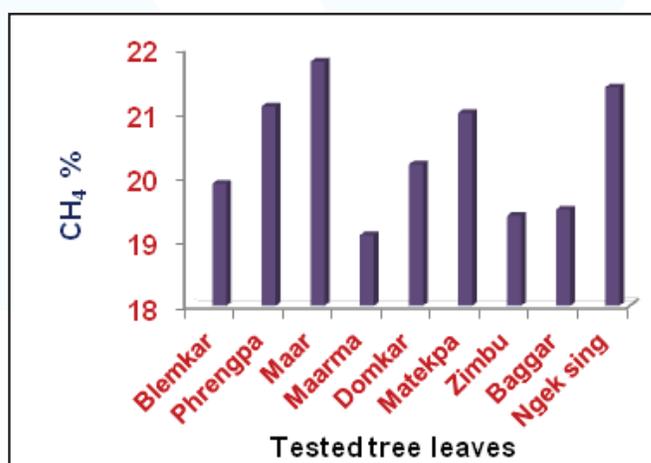


Fig:Percentage Methane production by Arunachal Pradesh tree leaves *in vitro*

EXTENSION ACTIVITIES

- One training programme on “Scientific Dairy Farming Practices” for Tribal unemployed youth was organized during 5th -7th September, 2017. In the training programme, 14 tribal youth from Jhargram district of West Bengal participated. Tribal youths were exposed to various facets of recent development in dairy farming and suitable literature was also distributed among the participants.
- Two veterinary camps were organized during this period. One camp was organized on 22nd September, 2017 at Laghata village and another camp was organized in Ghoshaldanga village of Birbhum district. In these camps, 100 kg mineral mixture was distributed among the farmers. 267 tribal farmers were benefitted from these camps. A total of 1060 livestock & 678 poultry birds were treated in these camps.



Veterinary camps being organised at adopted villages under TSP Programme

- Training on “Scientific Dairy Farming” for 16 farmers from Tripura was organized from 11th -14th September, 2017. Farmers got exposure about scientific dairy farming and they were also acquainted with day-to-day activities of Campus. Exposure visit of trainee farmers was also arranged in R. R. S. of CIFA, Kalyani and Faculty of Dairy Technology, West Bengal University of Animal and Fishery Sciences, Mohanpur.



Trainees being exposed about scientific dairy farming

- One training programme on “Artificial Insemination and Veterinary First Aid” was organized during 18th July to 18th August, 2017 in which a total of 13 participants participated from Bihar and West Bengal. In the training programme, several aspects of artificial insemination of dairy animals were

practically discussed and certificates were distributed among the successful participants.



Hands on practical training being given to trainees

- A total of 3 vaccination and deworming camps were organized in the adopted villages; namely Muratipur and South Chandamari, in which 278 animals belonging to 103 dairy farmers were vaccinated against FMD, HS and BQ.



A view of vaccination and deworming camps

Sankalp-Se-Siddhi Programme

New India Manthan-Sankalp-Se-Siddhi programme was celebrated on 24th August, 2017 at Eastern Campus of NDRI, Kalyani under the aegis of KVK-II of Nadia District. Dr. T. K. Dutta, Head, Eastern Campus of NDRI, Kalyani welcomed all delegates. Honorable Member of Parliament of Ranaghat, West Bengal, Dr. Tapas Mandal was the chief guest of the function. In his address, he stressed upon the need of urgent convergence of efforts of different stakeholders in the agriculture sector to increase the income of farmers and motivating youth to take agriculture as profession. On this occasion, senior experts deliberated upon several technologies, which can enhance the farm productivity and income on sustainable basis. A pledge on ‘Sankalp-Se-Siddhi’ was also taken on this occasion. A total number of 100 farmers of Nadia district participated in this programme.



A view of inaugural session of Sankalp-Se-Siddhi programme

Mera Gaon Mera Gourav Programme

Six visits including three scientist farmers' interaction sessions were organized under 'Mera Gaon Mera Gourav' programme in three villages namely Majhdia, Saguna and Charsarati. Villagers were updated about recent development in the field of dairy farming and extension literatures, mineral mixture as well as veterinary medicines were distributed among farmers. SMS pertaining to vaccination against FMD, HS and BQ and information about Anthrax disease were disseminated through SMS portal developed by Eastern Campus of NDRI, Kalyani.



A team of extension scientists of ERS, Kalyani visiting animal houses maintained in rural area

Training Programmes

New KVK (Nadia dist) of Eastern Campus of NDRI, Kalyani organised some trainings (on-campus and off-campus) for farmers and farmwomen. Some need based training topics viz: Nutrition and fodder production for small and large animals, Clean milk production, Azolla and Vermicompost production, Veterinary first aid and Animal

health care management, Scientific dairy farming and Mastitis management etc were covered. About more than 300 farmers and farmwomen participated in these training programmes regularly conducted at Eastern Campus of NDRI as well as surrounding villages. Some other relevant field activities viz: Exhibitions, Scientists-farmers interaction, animal treatment camps, Front-line-demonstrations, On-farm-testing etc. were initiated. Some services viz: subclinical mastitis diagnostic services, pregnancy diagnosis were also initiated at KVK villages.



A lecture being delivered to trainees

The training participants were from different Villages viz: Umapur, Dhanicha, Muratipur, Sugna, Nandidanga, Dangupara, Majhdia, Gotra, South Chandamari, Banamali para, Birsidunagar (Chalkdah block), Dignagar, Jhangirpur, Krishnachandapur, Ramchandrapur (Krishnagar block), Krishnapur, Humanipota, Parasnathpur (Ranaghat block).



Farmers being made aware about scientific dairy farming

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Tel.: 0184-2252800 | Fax: 0184-2250042 | E-mail : dir@ndri.res.in | Gram : DAIRYRESEARCH