एनडीआरआई न्यूज़

NDRI News

राष्ट्र क डरी स्वप्नों को समर्पित
Fulfilling Nation's Dairy Dreams

भाकअनुप-राष्ट्रीय डरी अनुसंधान संस्थान, करनाल
ICAR-NATIONAL DAIRY RESEARCH INSTITUTE, KARNAL

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From the Director's Desk

The milk production in India has been growing consistently at the rate of more than 6% during the last few years. During 2017-18, the country has produced 176.3 million tons (MT) of milk contributing to more than 20% of the total milk production in the world. The National Action Plan aims at increasing the milk production to 275 MT tons by 2020-21 and up to 300 MT by 2023-24. Analysis of milk production based on "animal population-based increase" and "animal productivity-based increase" indicates that a significant portion of enhancement in milk production was contributed by the productivity-based increase. The individual cow milk productivity was 423.53 kg/year in 1961, which increased continuously to reach 1191.54 kg/year in 2011. Similarly, the average milk productivity of individual buffaloes also showed a significant increase during the period (from 889.59 kg/year in 1961 to 1700.78 kg/year in 2011). Livestock breeding techniques coupled with artificial insemination (AI) technology has been largely responsible for the increase in milk yield over the period of time.

Artificial Insemination (AI) with cryopreserved semen has played an explicit role in genetic improvement and production enhancement in livestock. Owing to the concerted efforts by the R&D establishments in the country, the number of breeding bulls (both cattle and buffaloes) used for semen production at semen stations has increased from 2368 in 2003-04 to 4158 in 2016-17. Correspondingly, the frozen semen dose (FSD) production also increased from 33.79 million doses in 2003-04 to 115.4 million in 2016-17. Paradoxically, the coverage of AI in India has remained as only a meager 30% of the breedable cattle and buffalo population. To achieve the targeted milk production, a total number of 97.45 million bovines are being aimed for artificial breeding by 2020-21, which requires 201.65 million frozen semen doses as compared to the present production of 115.4 million. The number of bulls required for production of the above-mentioned doses of semen for artificial insemination will be about 9000 (Rastriya Gokul Mission National Action Plan 2016-2020-2024) as compared to the number of 4158 during 2016-17 (NDDB).

To realize the full potential of AI, it is essential that the semen used for artificial breeding should be from

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high genetic merit and high-fertile bulls. The Breeding Soundness Evaluation (BSE) method being currently employed for selection of breeding bulls does not accurately reflect the future fertility of the males. Studies indicate that the efficiency of the current BSE is only 27% and almost 50% of the bulls, especially the crossbreds, which qualify the BSE turn out to be below average in terms of fertility. Also, almost 40% of the ejaculates produced by the crossbred bulls are of inferior quality, thus, not fit to be used for cryopreservation and AI. Thus, development of tools for selection of high-fertile bulls and potent ejaculates are being pursued by several laboratories across the world including India to produce the required quantity of frozen semen straws.

Reducing the sperm numbers per FSD can be a viable option with immediate effect. Currently, in our country, as a standard practice, the frozen semen straws contain approximately 20 million spermatozoa per dose, which yields an average conception rate of 30-35%. Many dairy dominant countries have adopted packing 10-12 million spermatozoa per FSD and obtained around 50% conception rates. Moreover, using sexed semen that contains only 2 million spermatozoa, several reports, including those from India, indicate possibilities of obtaining 30-40% conception rates. This indicates that if the quality of the spermatozoa is ensured, and the method of cryopreservation including extenders can be improvised, the number of spermatozoa per semen dose can easily be reduced. A modest target of reducing the sperms per FSD by 20% can make available an additional 58 million frozen semen doses from the existing bulls itself. This, however, demands a revisit of the traditional semen analysis methods and differentiating between 'good' and 'bad' sperm in terms of its genomic and proteomic content alongwith their essential motility features and fertilizing ability. Modern high throughput semen analysis techniques like flow cytometry could be adopted in the semen analysis labs. With the developments in science, now it is possible to assess every fine characteristic of spermatozoa and it is high time to shift to "Technology based semen quality control tests" from "Traditional semen analysis".

Recently, ICAR-NDRI has developed semen fertility prediction equations based on select sperm functions for cattle and buffalo bulls. Flow cytometry-based sperm functional evaluation has also been standardized and trainings are being offered to the semen lab technicians so that this high-throughput and accurate method could be used at semen stations for ensuring the fertility of frozen semen. A number of our current research projects are focused at development of bull fertility prediction tools based on genomics, epigenetics and proteomics research and the strategies to reduce the sperm numbers in a given frozen semen dose by enriching fertile spermatozoa. The findings of these researches would help us to select a quality male at younger age and to increase the number of frozen semen dose production in the country, which will ultimately benefit the farming community in terms of increased AI coverage with enhanced conception rates and life time productivity of animals.

(M.S. Chauhan)

RESEARCH

Effect of Depotash Vinasse on Production Performance in Lactating Buffaloes

(Gaurav Pratap Singh, Madhu Mohini and Goutam Mondal)

Depotash vinasse (DPV) is a byproduct of distilleries after extraction of ethanol and potassium nitrate causing pollution on land and aquatic life having high biological oxygen demand. The present study was conducted to investigate the utilization of DPV in animal feed sector.

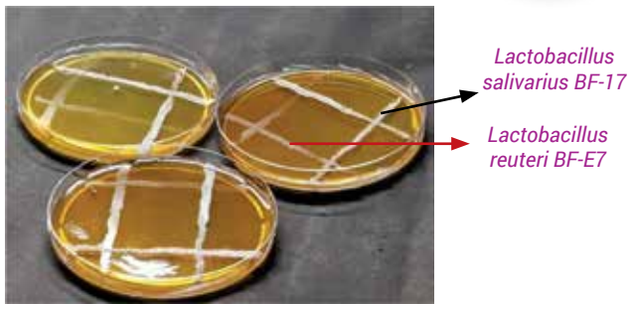
A study on Murrah buffaloes revealed that addition of DPV in the diet had no adverse effect on feed intake, utilization and milk production. The study was conducted on fifteen early lactating Murrah buffaloes divided in three groups *viz.*, T_1, T_2 and T_3. Animals in T_1 fed concentrate mix, oat green and wheat straw; T_2 animals diet was supplemented with pellets containing molasses@8% with oat green and wheat straw while group T_3 animals were fed pellets containing DPV @8%

with oat green and wheat straw. The results indicated that milk yield as well as milk composition was not altered. Blood profile plasma glucose, total protein, albumin, BUN, total cholesterol, HDL, AST and ALT level were within normal biological range in all groups and statistically were also similar. The mineral profile of plasma Ca, Mg, Na, K, Zn, Cu and Fe were not influenced by molasses and depotash vinasse pellets supplementation. Digestibility of dry matter, organic matter, protein and other nutrients were similar in all the groups. Dry matter intake was around 2.35kg/ 100 kg body weight and body condition score was around 3.25 (1-5 scale), also similar in all the groups. It could be concluded that depotash vinasse@ 8% may be utilized for pellet making without any adverse effect on yield and composition of milk, digestibility of nutrients and blood biochemicals of the early lactating buffaloes.

Formulation of a Probiotic Consortium and its Effects on Growth Performance and Gut Health in Murrah Buffalo Calves

(Vinay V. V., Sachin Kumar, Anukarna Singh, Bhawna Tyagi, Rashmi H. M. and A. K. Tyagi)

The present study was carried out in two phases the previously isolated strains (*Lactobacillus salivarius* BF17 (MG966320) and *Lactobacillus reuteri* BFE7 (MG966326) from faecal samples of Murrah buffalo calves for their beneficial probiotic attributes. The compatibility assays between these two stains revealed that there was no inhibition reported in the MRS agar plates. Both the probiotics cultures were lyophilized separately and fed individually or together as a probiotic consortium in powder form to Murrah buffalo calves. Sixteen Murrah buffalo calves (5-7 days old), randomly divided into 4 groups as: control (CON; milk without any probiotic), *Lactobacillus reuteri* BFE7 (T1: 1g/d/calf; 10^8 cfu/g), *Lactobacillus salivarius* BF17 (T2: 1g/d/calf; 10^8 cfu/g) and mixture of both strains (T3: 1g/d/calf; 10^8 cfu/g). Results after 60 days of administration of the probiotics revealed significantly increased ($P<0.05$) final body weight, net body weight gain, dry matter intake, average daily gain and feed conversion efficiency in all the treatment groups compared to control. The faecal pH, and faecal moisture were significantly lower ($P<0.05$) in treatment (T1, T2 and T3) groups. Faecal lactobacilli ($P<0.05$) and Bifidobacterium ($P<0.05$) populations increased in all the probiotic supplemented groups accompanied by trend for reduction ($P<0.05$) in the coliform count. Cell-mediated immune response to phytohaemagglutinin-P and antibody response to chicken RBC were enhanced ($P<0.05$) in the probiotic-fed groups as compared to the CON group. The study concluded that faecal origin probiotic and its consortium can be a promising candidate for augmenting neonatal gut health and designing probiotic product for Murrah buffalo calves.

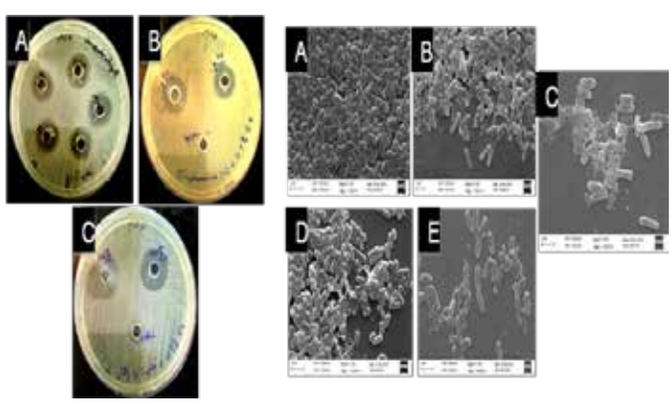


Compatibility between Lactobacillus salivarius BF-17 (MG966320) and Lactobacillus reuteri BF-E7 (MG966326) by cross-streak method in the MRS agar plates

Synergistic Activity of Probiotic *Lactobacillus* Strain with Garlic Extract against *Salmonella* spp.

(Olalekan S. Fadare (RTF-DCS Fellow) and Diwas Pradhan)

In vitro evaluation of the synergistic potential of Garlic extracts (*Allium sativum*) with probiotic *Lactobacillus* against reference strains of *Salmonella* Typhi Ty2 and *Salmonella* Typhimurium LT2 were investigated. A total of 5 *Lactobacillus* isolates showing high antimicrobial activity were identified. The *Salmonella* strains were then grown in combinations with garlic extracts (GE) (12.5%) with either live (individual) *Lactobacillus* isolates or its cell free supernatant (CFS). GE at 12.5% was observed to inhibit *Salmonella* strains, however, no effect was inflicted against lactobacilli. The outcome of the various trails revealed highest inhibition against the indicator organisms when a combination of GE and viable cells of *Lactobacillus* strains were used. GCMS analysis of the various combinations showed the presence of multiple fatty acids, Phenyllactic acid, Pyrrolo [1,2-a]prazine etc. secreted by *Lactobacillus* isolates that contributed in the inhibition of *Salmonella* spp. The number of these volatile metabolites increased in the presence of GE, explaining the phenomena of synergistic effect. The inhibitory effect of GE, probiotic lactobacilli and their combination against *Salmonella* strains was also apparent in the Scanning Electron Microscopy study.

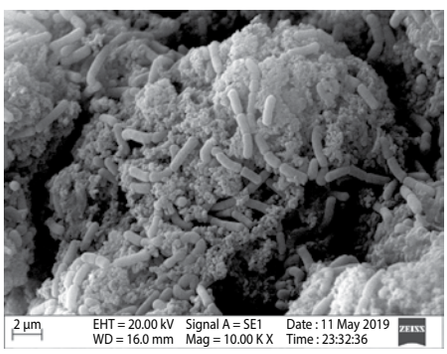


A. 12.5% G.E against S. Typhi Ty2
B. 12.5% G.E against S. Typhimurium LT2
C. CFS of L. paracasei against S. Typhi Ty2
A. L. paracasei DB3 (Control)
B. S. Typhi Ty2 (Control)
C. L. paracasei DB3 + S. Typhi Ty2 + GE
D. S. Typhi Ty2 + GE
E. S. Typhi Ty2 + CFS of L. paracasei DB3

Technology for Vegan Omega-3 Rich Mixed Fat Table Spread

(Kuldeep Kamble and Neelam Upadhyay)

Alpha-linolenic (ALA) acid is the 'essential' fatty acid and falls under the category of omega-3 fatty acids. Omega-3 fatty acids are reported to be vital ingredients of diet for proper functioning of brain and healthy heart, lungs, skin, etc. The most common source of omega-3 fatty acids in diet includes fish, which is consumed by non-vegetarian sector of society and is also reported to be a potential source of environmental contaminants like heavy metals, polychlorobiphenyls, etc. In the present study, vegan source of omega-3 fatty acid was used for formulation of mixed fat table spread using butter as a source of milk fat and flaxseed oil as a source of omega-3 fatty acid. The alpha-linolenic acid of the spread was estimated using Gas Liquid Chromatography and was 13.816g/100g of fat. Based on the Recommended Dietary Allowance (RDA) of ALA, it was calculated that every 10 g of the product per day can serve approximately 50% RDA of ALA. The product showed very good sensorial appeal and spreadability even at refrigerated temperature. The shelf life of the developed spread was 120 days.



Technology of Probiotic Buffalo Milk Ricotta Cheese

(Sameer Bhagwat, Sangita Ganguly, Yogesh Khetra and Latha Sabikhi)

Ricotta is a soft spreadable whey cheese mainly prepared from milk of small ruminants. In India, higher cost and limited availability of small ruminants' milk restricts the production of Ricotta cheese. Buffalo milk Ricotta cheese was prepared from mixture of Mozzarella cheese whey and buffalo milk having 1% fat followed by application of heat treatment and acidification by using citric acid (1%) to obtain a pH of 5.3-5.4. Probiotic organism *Lactobacillus acidophilus* La05 (NCDC-291) was incorporated in pellets form by adjusting counts (~ 8 log CFU/mL) in Ricotta matrix. Probiotic cells and salt were incorporated into Ricotta cheese by homogenous mixing with a Hobart mixer. The moisture, fat, protein and lactose content of probiotic Ricotta cheese was 75%, 6.41%, 11.88% and 4.88%, respectively. The *L. acidophilus* La-05 count was 7.8±0.2 log CFU/g of product. Descriptive sensory analysis characterized the product as white, shiny, consistent in terms of color and uniform in terms of appearance with a flat flavour having high overall acceptability (9.0 out of 10 scales) scores. Scanning electron microscopy revealed that probiotic Ricotta cheese matrix consists mainly of protein network. The particles of coagulated whey proteins were inter-connected, while casein appeared as small clusters with probiotic organism embedded into protein matrix, thus, providing an added protection to organisms. Probiotic NCDC-291 showed better survival under simulated gastrointestinal (GI) conditions in Ricotta matrix (89%) as compared to free cells (72%). Probiotic Ricotta cheese had a 12 days shelf-life at refrigerated storage. The sensory score reduced, however, the probiotic count remained stable (7.6 log CFU/g) at the end of the storage.

EXTENSION

DAIRY EXTENSION DIVISION

Dairy Education at Farmers' Door

Dairy Extension Division organized the ongoing Extension Education Programme "Dairy Education at Farmers' Door" to strengthen the effective dissemination of dairy production and processing technologies among farming community. Under this programme, a team of NDRI scientists including subject matter specialist from production, processing and management group visited a new cluster of villages viz. Subri, Kuwaheri and Bhoji Khalsa in Karnal district on 2nd Saturday of every Month during the period under report. Extension scientists obtained the feedback from the participating farmers. The key point of interactions were: Management of reproductive disorders of dairy animals, Care of newly born calves, Management of silent heat in animals, Management of berseem and oats crop and Adulteration in milk.

Kisan Sangoshthies

Ten Kisan Sangoshthies were organized at village level and discussed various topics comprising: Management of silent heat, Care and management of calves, Clean India campaign, Control measure of mastitis in dairy animals, Role of mineral mixture in animal diet and Clean milk production practices in rural areas.

Empowerment of Women and Mainstreaming of Gender Issues

Three women empowerment training and campaigns were organized with the objective to create awareness in the field of dairying and home science and also impart skill in these areas so that farm women could generate more income from dairying to cater to the needs of their respective families. A total of 63 farmwomen participated in these programme.

Educational Visits and Tours

A total of 2845 visitors (students & Faculty) of 57 colleges/ Institutions/Universities visited the Institute.The groups were sensitized about different research, teaching and extension achievements and facilities available in the Institute.

Farmers' Farm School

Farmers' Farm School (FFS) under educational approach (sixth batch) of NDRI was started in village Bhoji Khalsa, Karnal. A total of 20 farmers were enrolled as students. One day exposure visit & tour was organized at the institute. Regular classes are continuously organized on every Friday and Saturday for educating the farmers in dairy farming and its allied activities.

KRISHI VIGYAN KENDRA

- KVK organized Crop Residue Management (CRM) Field at Bhainikhurd on January 2, 2020 wherein farmers were motivated for doing *in-situ* CRM. They were also informed about the adverse implications of burning CR waste. The programme was attended by 35 farmers.

- Field Day was organized on crop diversification comprising chick pea and mustard at Sangohi and Kachchwa villages on March 18-19, 2020, respectively.

Trainings organized at KVK

KVK organized five training programmes on Clean milk production, Scientific dairy farming, Fruit preservation, Scientific cultivation of Rabi crops and crop residue management and Training on bee keeping for 125 farmers from different states of the country. The details are given below:

Sr. No.	Date and Duration (days)	Subject of Training	Number of Participants
1	January 6-10, 2020 (5 days)	Clean milk production (for participants from Shekpura, Naveda, Bihar	35
2	January 20-24, 2020 (5 days)	Scientific dairy farming (for people from Kota, Rajasthan)	30
3	January 29, 2020 (1 day)	Fruit preservation	19
4	February 17-20, 2020 (4 days)	Scientific cultivation of Rabi crops and crop residue management	18
5	February 24-27, 2020 (4 days)	Training on bee keeping	23
	Total Number of Participants		**125**

KVK organized International Women's Day at ICAR-NDRI, Karnal on March 8, 2020. The success stories of women from diverse fields were shared among the participants so as to motivate them for exploring their talents and capabilities. Around 50 women participated in this programme including students of NDRI.

EVENTS

Refresher Course on Emerging Trends of Bio-process Technology in Dairy and Food Processing

ICAR-National Dairy Research Institute, Karnal conducted a 21 day Refresher Course on "Emerging Trends of Bio-process Technology in Dairy and Food Processing" under the aegis of Centre of Advanced Faculty Training in (Dairy Processing) from January 15 to February 4, 2020. A total number of 14 participants attended this training programme sponsored by Agricultural Education Division of Indian Council of Agricultural Research, New Delhi. The main objectives of this course were to cover the application of the bio-process technology in functional foods developments, evaluation of

bioactivity and efficacy of functional foods, development of edible, biodegradable and smart packaging and formulation of sensor for detection of contaminants and pathogens. Bioprocess is being considered as a process and it deals with the design and development of equipment and processes for the manufacturing of products food, feed, pharmaceuticals, nutraceuticals from biological materials like bacteria, enzymes to obtain desired dairy products.

Dr. G. R. Patil, Former, Joint Director (Academic), ICAR-NDRI was Chief Guest and delivered a comprehensive lecture on role of bioprocess and biotechnology engineering in the field of dairy processing for improving quality as well as quantity of dairy products. Director, ICAR-NDRI Karnal said that this training programme would help for increasing knowledge of faculties of SAU's about bioprocess technology and its importance for developing high quality dairy products with long shelf-life.

Dr. M S Chauhan, Director ICAR-NDRI with the participants

35th National Training Programme on "Phenomics and Genomic Evaluation of Dairy Animals for Sustainable Production"

A 21 day National Training Programme on "Phenomics and Genomic Evaluation of Dairy Animals for Sustainable Production" was organized from January 2-22, 2020 at Animal Genetics and Breeding Division. The training programme was inaugurated by Dr. S. L. Goswami, Former Vice Chancellor, Banda University of Agriculture and Technology, Banda. In all, 20 participants of Assistant Professor rank or equivalent representing nine states and UT viz. J&K, Punjab, Haryana, Uttar Pradesh, Maharashtra, Chhattisgarh, Tamil Nadu, Karnataka and Nagaland participated in this National Training Programme. The training programme focused on application of advanced phenomics and genomic technologies. Prof. (Dr.) S. N. S. Parmar, Dean Faculty, Nanaji Deshmukh Veterinary Science University, Jabalpur, was Chief Guest for the Valedictory Ceremony and distributed certificates to the trainees.

Certificates being given away to the participants

There were total 42 lectures with 16 hands on practical demonstrations. The internal faculty of the Institute consisted of 38 Scientists and four Guest Speakers with their expertise in the field of phenomics and genomics delivered lectures. Most of the experts focused both on-hands on-practice and practical demonstration in evaluation of phenomics and analysis of genomics data. The skill development was also demonstrated for various softwares pertaining to planning and formulation of effective breeding programme. Total 20 participants of rank Assistant Professor and above representing nine states and UT viz. J&K, Punjab, Haryana, Uttar Pradesh, Maharashtra, Chhattisgarh, Tamil Nadu, Karnataka and Nagaland participated in this National Training Programme.

Training Programme on Documenting Success Stories

ICAR-NDRI, Karnal in collaboration with MANAGE, Hyderabad conducted a Training Programme on "Documenting Success Stories" on February 3, 2020. The training was inaugurated by Dr. A. K. Tyagi, Joint Director (Research). Dr. Tyagi in his inaugural address advised the participants to remove the inhibition in the mindset about preprating good success stories. The major aim of the training was to orient the participants to the process of documentation and facilitate them on the basics for writing success stories so that they will apply the new learnings for increasing the visibility of the research outputs and the institute. A total number of 33 participants attended this programme. Dr. Lakshimi Murthy, Deputy Director from MANAGE, Hyderabad and Dr. K. Ponnusamy, Principal Scientist from Dairy Extension Division of NDRI coordinated this programme.

National Dairy Mela

National Dairy Mela was organized at ICAR- National Dairy Research Institute, Karnal during February 15-17, 2020. A total of 107 exhibition stalls were arranged for showcasing the farmers' friendly technologies developed by ICAR Institutes. A total number of 177 animals from different parts of the country participated in animal competitions. Various competitions of cattle and buffaloes were conducted and prizes were given to the winner animals by the Chief guest, Dr. A. K. Singh, Deputy Director General, Agricultural Extension, ICAR, New Delhi during valedictory function. Dr. Singh said that the indigenous breeds of animals should be adopted by the farmers as these are well adopted for Indian conditions. He advised the scientists to make efforts to upgrade these breeds and ways to increase their milk yield.

Dr. Manmohan Singh Chauhan, Director,NDRI advised farmers to take benefit of facilities available at NDRI and become dairy entrepreneur. The competitions were organized in 10 categories including beauty, milk production. In the HF cross breed category of high milk production competition, Pradeep's cow from Dadupur, Karnal got the first position by giving 58.86 kg milk. The cow from Barani Khalsa farmer Vijender Chauhan gave 58.17 kg milk and Dadipur farmer Pradeep's cow gave 57.65 kg milk got second and third position, respectively.

In another cross-breed cow's milk competition, Ambala farmer Jasdeep Singh's cow secured first place by giving 26.97 kg of milk. In the dairy production competition of Desi cow, the cow of Ramsingh farmer of Taraori got the first position by giving 21.31 kg milk, the cow of farmer Naresh got the second place by giving 15.81 kg of milk and the cow of Rampal of Karnal got the third place by giving 15.75 kg milk. In Murrah buffalo (milk production) competition, buffaloes of Ashandh farmer Randeep (21.77 kg) got first place, buffalo of Mundh village farmer Kuldeep gave (18.94) kg milk got second position and Rakesh, Kaithal farmer's buffalo gave (17.84) kg milk got third place.

Highlighting the need for giving women their due place in value addition and dairy development, competitions were held for women in paneer making and milking on the last day of the Mela. The competition was open to all women and 31 women participated in paneer making and 28 in milking competition, respectively. A question- answer session was also organized for the farmers. The solution of the problems being faced by the farmers in their daily routine life was given to the farmers on the spot. The Mela attracted more 15000 farmers from different states (UP, Haryana, Panjab, Delhi and Rajasthan) of the country.

Dr. M S Chauhan, Director ICAR-NDRI inaugurating the Dairy Mela

Dr. M S Chauhan, Director ICAR-NDRI visiting the exhibition stall during the Dairy Mela

International Women's Day

ICAR-NDRI celebrated International Women's Day on March 8, 2020. During this event, several activities were organized by students of the Institute for empowering women. On this occasion, one key lecture was also delivered by Dr. Jyoti Gupta, MD, Amritdhara Hospital to girl student for promoting health. Dr. Gupta said that women empowerment needs equal participation of women and men in decision-making. Further she said that the empowerment and autonomy of women and the improvement of their political, social, economic and health status is highly important for empowering women.

Dr. Jyoti Gupta, MD, Amritdhara Hospital expressing her views on women health issues

Dr. RRB Singh, Joint Director (Academics) ICAR-NDRI felicitating the guest speaker

Inauguration of Artificial Insemination Center

A new building of Artificial Insemination Center was inaugurated by Dr. M. S. Chauhan, Director, ICAR-NDRI Karnal at Kheri Man Singh village on February 7, 2020 under Network Project on Buffalo Improvement of Animal Genetics and Breeding Division.

Dr. M S Chauhan, Director, ICAR-NDRI inaugurating the New Building of Artificial Insemination Centre

DISTINGUISHED VISITORS/VISITS ABROAD

DINSTINGUISHED VISITORS

25.01.2020	Eleven member Bhutanese delegation from The National Service Core Working Group (NSCWG), Ministry of Agriculture, Royal Govt. of Bhutan.
24.02.2020	Shri Sanjay Singh, Additional Secretary, DARE & Secretary ICAR.

VISITS ABROAD

The following scientists were deputed for Training under International Development Plan (IDP)

Sr. No.	Name of the Scientist	Institute	Period
1.	Dr. Richa Singh, Scientist, Dairy Chemistry Division	Animal Sciences and Industry 220 Call Hall, 530 Mid Campus Deive North Kansas State University Manhattan, USA.	17.02.2020 to 16.07.2020
2.	Dr. Manoj Kumar C.T, Scientist, Dairy Technology Division	Department of Food Science, College of Agriculture Purdual University, 745 Agriculture Mall Drive, West Lafayette In 47907, USA.	1.3.2020 to 31.7.2020
3.	Dr. S. Subhash, Scientist, Dairy Extension Division, SRS, Bangalore	Iowa State University 0030, Curties Hall Ames, Iowa 50011, USA.	17.2.2020 to 16.7.2020
4.	Dr. Sunita Meena, Scientist, Animal Biochemistry Division	Department of Physiology, 71 South Manassas Street, Suite 310 K, Translational Science Res. Building, University of Tenesse Health Science Centre, USA.	25.2.2020 to 23.07.2020
5.	Dr. Yogesh Khetra, Scientist, Dairy Technology Division	Wageningen University & Research, The Netherlands.	1.3.2020 to 30.7.2020
6.	Dr. Rajeev Kapila, Principal Scientist, Animal Biochemistry Division	Department of Internal Medicine Section on Molecular Medicine and the Centre for Redox Biology and Medicine Winston Sallm, Noth Carolina, USA.	9.3.2020 to 23.3.2020
7.	Dr. Rajan Sharma, Principal Scientist, Dairy Chemistry Division	Biosensing & Diagnostics (BSD) Wageningen Food & Biobased Research Wageningen Uni. And Research PO Box 17, 6708 Wagenin The Netherland.	11.3.2020 to 9.5.2020

Dr. Shaik Abdul Hussain, Scientist, Dairy Technology Division was deputed to participate in Skill and curriculum development programme for the faculty of Agriculture and Engineering at university of Jaffna, Sri Lanka from 27.01.2020 to 02.02.2020

HONOURS AND AWARDS

- Dr Dheer Singh, Head Animal Biochemistry Division and Acting Joint Director (Research) was conferred the prestigious **Prof. N. R. Moudgal Memorial Oration Award - 2020** on Reproductive Health with Emphasis on Reproductive Cancers, Infertility and Assisted Reproduction (ISSRF-2020) at the 30th **Annual Meeting of the ISSRF along with the World Congress** during February 14-16, 2020 at Shri Mata Vashino Devi University (SMVDU), Katra, Jammu and Kashmir**.** The award consists of a cash award of Rs. 25,000/- a gold plated medal and a citation and is given to an Indian scientist for outstanding research in the area of reproductive health.
- **Mr. Davuddin Baig Mohammed, Dr. Latha Sabikhi** and **Dr. A. K. Singh** won the **"First Best Oral Presentation Award"** for their paper on "Studies on process standardization for camel milk cheese making" during 9th International Conference on Food Processing, Nutrition and Fortification with emphasis on Vitamin D, organized by School of Interdisciplinary Sciences & Technology alongwith School of Unani Medical Education and Research, Jamia Hamdard, New Delhi held on March 5-6, 2020 at New Delhi.
- **Ms. Rebeka Sinha, Ms. Beena Sinha, Ms. Ragini Kumari, Mr. Vineeth M. R., Dr. Archana Verma** and **Dr. Ishwar Dayal Gupta** received **"Best Oral Presentation Award"** for their research paper "Effect of udder conformation traits on milk production in crossbred cattle of tropical region" during International Conference on "Advances and Innovations in Agriculture and Allied Sciences (AIAAS- 2020)" held at Jawaharlal Nehru University Convention Centre, Delhi (India) from January 31 to February 01, 2020.
- **Ms. Rebeka Sinha, Ms. Beena Sinha, Ms. Ragini Kumari, Mr. Vineeth M. R., Dr. Archana Verma** and **Dr. Ishwar Dayal Gupta** received **"Best Paper Award"** in the Session II for the research paper "Selection of udder and teat morphometric traits for safe and quality milk production in crossbred cattle" during International Conference on "Livestock, Food Security and Food Safety – Challenges, Opportunities and Strategies" held at Madras Veterinary College, Tamil Nadu Veterinary

and Animal Sciences University, Chennai-600007, India during January 28-29, 2020.

- **Dr. Vikas Vohra** received **"Fellow SOCDAB Award"** in recognition of his outstanding contribution towards management and conservation of Animal Genetic Resources. The award was conferred to him by Society for Conservation of Domestic Animal Diversity (SOCDAB) during its XVII National Symposium on February 10, 2020 at NDVSU, College of Veterinary Sciences & A.H., Mhow (M.P.).

Dr. Vikas Vohra receiving fellow SOCDAB Award

- **Ms. Rebeka Sinha, Ms. Beena Sinha, Ms. Ragini Kumari, Mr. Sushil Kumar, Mr. Vineeth M. R., Dr. Archana Verma** and **Dr. Ishwar Dayal Gupta** received **"Best Paper Award"** for their research paper "Principal component analysis of linear udder type traits for milk production in Karan Fries cattle". XVII National Symposium on Enhancement of Farmers' Income through Management of Animal Genetic Resources Organized by Society for Conservation of Domestic Animal Biodiversity (SOCDAB) held at NDVSU-College of Veterinary Science and Animal Husbandry Mhow (M.P.) from February 10-11, 2020.
- **Mr. Ramendra Das, Dr. Ishwar Dayal Gupta, Dr. Archana Verma, Mr. Mahesh Vishwas Chaudhari, Mr. Lalrengpuii Sailo** and **Dr. Sohanvir Singh** received **"First Best Paper Award"** for their paper "Identification of SNPs in ATP1A1 gene and their association with heat tolerance in Sahiwal and Karan Fries (Bos taurus × Bos indicus) cattle under tropical climatic condition" published in Indian Journal of Dairy Science in the category of "Dairy Production" during the 48th Dairy Industry Conference (DIC) at Jaipur at the Plenary Session on February 22, 2020.
- **Ms. Rebeka Sinha, Ms. Beena Sinha, Ms. Ragini Kumari, Mr. Sushil Kumar, Mr. Vineeth M. R., Dr. Archana Verma** and **Dr. Ishwar Dayal Gupta** received **"Best Poster Award"** for their research paper "Effect of udder and teat morphometry on clinical mastitis and milk production in Sahiwal cattle". XVII National Symposium on Enhancement of Farmers' Income through Management of Animal Genetic Resources Organized by Society for Conservation of Domestic Animal Biodiversity (SOCDAB) held at NDVSU-College of Veterinary Science and Animal Husbandry Mhow (M.P.) from February 10-11, 2020.
- **Dr. Shailesh Kumar Meena, Dr. Neelam Upadhyay, Dr. Pradip Behere** and **Dr. Ravinder Kumar Malhotra** won the **"Second Best Poster Presentation Award"** for their poster on "Effect of natural preservatives on antioxidative and antimicrobial activity of naturally coloured, omega-3 rich table spread" during 48th Dairy Industry Conference on Dairying for Health and Wealth organized by Indian Dairy Association at Jaipur, Rajasthan from February 20-22, 2020.

PERSONALIA

Joining/Appointment/Promotion

- Dr. Manmohan Singh Chauhan, joined as Director, ICAR-NDRI, Karnal w.e.f. 30.01.2020.
- Sh. Vivek Saini, Assistant promoted to the post of AAO w.e.f. 06.01.2020.
- Sh. Gurjeet Singh, Assistant promoted to the post of AAO w.e.f. 06.01.2020.

Transfer/Retirement/Relieving

- Sh. Susanta Saha, Joint Director (A) & R retired from Council's service w.e.f. 31.01.2020.
- Dr. A. K. Tyagi, Head, Animal Nutrition relieved from NDRI Karnal to join as Assistant Director General (Animal Nutrition & Physiology), ICAR Hqrs., New Delhi w.e.f. 27.02.2020

- Dr. A. K. Chauhan, PS, Agricultural Economics, retired from Council's service w.e.f. 31.03.2020.
- Dr. Neelam Upadhyay, Scientist (Food Technology) is transferred to Krishi Vigyan Kendra, NDRI, while retaining the existing laboratory of Dairy Technology Division for research work and position of faculty of DT division for allotment of students and teaching.

Additional Responsibility

- Dr. K. S. Kadian, PS entrusted with the responsibility of Acting Head, Dairy Extension Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 01.01.2020.
- Dr. (Mrs.) Bimlesh Mann, PS entrusted with the responsibility of Acting Head, DC Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 02.01.2020.
- Dr. B. S. Chandel, PS entrusted with the responsibility of Acting Head, DES&M Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 09.01.2020.
- Dr. (Mrs.) Madhi Mohini, PS entrusted with the responsibility of Acting Head, Animal Nutrition Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 09.01.2020.
- Sh. Vivek Purwar, CAO entrusted with the responsibility of Incharge JD (A) & R, ICAR-NDRI, Karnal w.e.f. 01.02.2020.
- Dr. M. K. Ghosh, PS entrusted with the responsibility of Acting Head, ERS of ICAR-NDRI, Kalyani, Kolkata for a period of six months w.e.f. 07.02.2020.
- Dr. Dheer Singh, Head, Animal Biochemistry Division entrusted with the responsibility of Acting Joint Director (Research), ICAR-NDRI, Karnal w.e.f. 29.02.2020.
- Dr. S. M. Deb, PS entrusted with the responsibility of Acting Head, AG&B Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 01.03.2020
- Dr. (Mrs.) Latha Sabikhi, PS entrusted with the responsibility of Acting Head, DT Division, ICAR-NDRI, Karnal for a period of six months w.e.f. 10.03.2020.

राजभाषा एकक

राजभाषा समीक्षा बैठक का आयोजन

डॉ. एम.एस. चौहान, निदेशक, भाकृअनुप–राडेअनुसं, करनाल की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की समीक्षा बैठक का दि. 11.2.2020 को आयोजन किया। समिति के पदाधिकारियों द्वारा सभी मुद्दों एवं सुझावों पर महत्वपूर्ण निर्णय लिए गए। निदेशक डॉ. एम. एस. चौहान ने सभी प्रभागाध्यक्षों, वैज्ञानिकों व कर्मचारियों से आग्रह किया कि वे अपने सरकारी कामकाज और अनुसंधान के कार्यों में राजभाषा को प्राथमिकता देते रहें। अपने अध्यक्षीय संबोधन में उन्होंने यह बताया कि एनडीआरआई भारत सरकार गृह मंत्रालय राजभाषा विभाग के निर्देशानुसार संस्थान में सभी राजभाषा नीति एवं नियमों के अनुपालन के लिए प्रतिबद्ध है एवं कार्यालय प्रमुख के द्वारा अधिकारियों व कर्मचारियों के योगदान से ही इन नियमों की सार्थक अनुपालना संभव है।

हिन्दी प्रशिक्षण

रिपोर्टाधीन अवधि में संस्थान के कुशल सहायक कर्मचारी से एलडीसी पद पर पदोन्नति हुए 9 कर्मचारियों को हिन्दी यूनिकोड टाइपिंग सीखने हेतु एक सप्ताह का डेस्क प्रशिक्षण 13 से 21 मार्च 2020 तक प्रदान किया गया। इसी प्रकार संस्थान के 9 कर्मचारियों को भारत सरकार, राजभाषा विभाग, नई दिल्ली से प्राइवेट अभ्यर्थी के रूप में हिन्दी टाइपिंग परीक्षा में शामिल करवाया गया एवं सभी परीक्षार्थी उत्तीर्ण हुए हैं।

नगरस्तरीय राजभाषा गतिविधियां

संस्थान नगर राजभाषा कार्यान्वयन समिति, करनाल के अध्यक्षीय कार्यालय के रूप में करनाल नगर में स्थित 51 सदस्य कार्यालयों को राजभाषा हिन्दी के प्रचार, प्रसार व कार्यान्वयन की दिशा में मार्गदर्शन प्रदान कर रहा है। रिपोर्टाधीन अवधि में संस्थान के द्वारा 9.1.2020 को नगरस्तरीय राजभाषा के संवैधानिक प्रावधान विषय पर सामान्य ज्ञान प्रतियोगिता का आयोजन किया गया, जिसमें संस्थान के श्री कुणाल कालड़ा, वित्त एवं लेखा अधिकारी को प्रथम पुरस्कार व सुश्री निष्ठा, अवर श्रेणी लिपिक को द्वितीय पुरस्कार प्राप्त हुआ। इसी प्रकार दि. 10.1.2020 को संपन्न विश्व हिंदी दिवस पर लिखित प्रश्नोत्तर प्रतियोगिता में संस्थान की सुश्री सोनिका यादव, सहायक को प्रथम पुरस्कार एवं डॉ. चित्रनायक, वरिष्ठ वैज्ञानिक को चतुर्थ स्थान प्राप्त हुआ।

SOUTHERN CAMPUS, BENGALURU

Process Optimization for the Development of Functional Processed Mozzarella Cheese

(Karan Patial and Bikash C. Ghosh)

Processed Mozzarella Cheese (PMC) is made by using Mozzarella cheese as a base material in the presence of heat, emulsifying salts and sodium chloride to produce homogenous glossy mass of cheese with uniform body & texture and extended shelf life. The aim of the present study was to develop functional PMC by incorporating rennet casein gel (RCG), whey protein hydrolysate (WPH) and mixture of emulsifying salts at the rate of 1 to 3%. The meltability of PMC improved in the presence of emulsifiers but its stretchability was adversely affected. Therefore, the challenge was to improve the stretchability of PMC without compromising its meltability and other functional properties. Thus, both RCG and WPH were incorporated in PMC. It was found that on increasing the concentration of RCG, meltability reduced whereas stretchability improved significantly. On the other hand, replacement of some amount of RCG with WPH; improved the meltability and bio-functional characteristics in PMC. The concentration of RCG and WPH was standardized using optimal custom design of response surface methodology. The PMC made with optimized formulation showed acceptable meltability and stretchability even after 45 days of storage.

Utilization of By-products of Non-edible Oils as Alternative Cattle Feeds

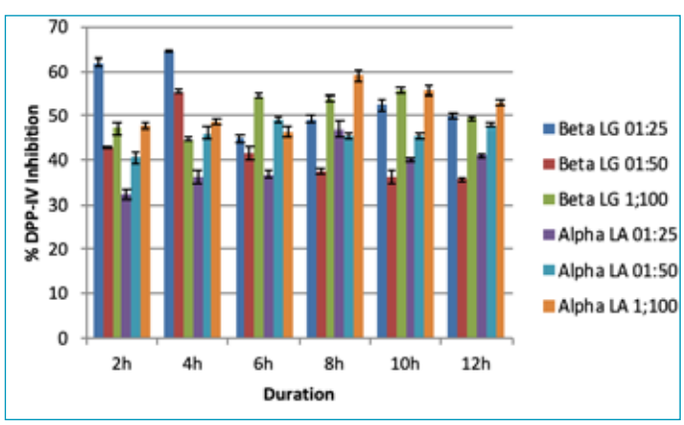
Multi-ingredient nutritional blocks were prepared using the by-products available after production of fatty acid methyl esters from non-edible oils under the DST funded collaborative project of SRS, ICAR-NDRI and Karnataka State Council for Science and Technology, Bengaluru. Pilot experiments are in progress to explore the possibility of patenting the product under the project.

Multi-ingredients blocks prepared with the byproducts available after production of fatty acid methyl ester from non-edible oils

DPP-IV Inhibitory Activity (Antidiabetic Potential) of Flavourzyme Treated Whey Proteins of Gir Cow Milk

(Satish Kumar M.H)

Whey proteins were separated from *Gir* cow milk. Whey proteins [beta-lactoglobulin (β-Lg) and alpha-lactoalbumin (α-La)] were hydrolyzed with flavourzyme enzymes at their optimal temperature (50°C) and pH (7) for 0-12 h duration at enzyme to substrate (E:S) ratios of 1:25, 1:50 and 1:100. Among whey proteins, maximum DPP-IV inhibition (64.52±0.35%) was observed in β-Lg hydrolysates. IC_{50} value of this hydrolysate was 2.67 mg/ml. α-La hydrolysates had maximum inhibition of 59.13±1.42%. Further the degree of hydrolysis (% DH) of maximum DPP-IV inhibition shown samples was measured using OPA method. Flavourzyme treated β-Lg and α-La showed 12.06 and 17.56% DH, respectively.



EVENTS

Farmers Training and Cattle Show

A farmers training programme on "Malnad Gidda Farmers training and Cattle Show" was organized at Shiva Krupa Kalamandira, Sullia, Dakshin Kannada Karnataka on March 7, 2020 under KLDA-MOEF&CC funded project on "Proteo-Genomic approach to elucidate productive and reproductive performance of Malnad Gidda, Amrithmahal & Hallikar breeds of cattle". A total of 325 Malnad Gidda farmers including personnel from NGO's, Gaushala, students, entrepreneurs, and media personnel attended the programme. Dr. K.P. Ramesha, Principal Investigator and Organizing Secretary, briefed the importance of indigenous breeds of Karnataka, in particular about Malnad Gidda cattle and role of SRS, ICAR-NDRI for improvement of this breed through research and

extension activities. In addition, various topics on health care and management of Malnad Gidda cattle, reproductive disorder management and fertility augmentation techniques were also covered by experts. A separate farmers and experts interaction session was also held. During the programme, pamphlets were distributed on Malnad Gidda breed and training kit. In addition, inputs viz. mineral mixtures, probiotic supplements and about 5000 fodder slips/stem cuttings of Sampoorna (DHN6) and Co-5 varieties were also distributed to Malnad Gidda farmers. Malnad Gidda Cattle Show was also organized. The cattle judging committee evaluated and selected best three Malnad Gidda cows, heifers and a best bull for the award/prize. An interactive session between experts & farmers was also organized wherein the farmers raised various questions on indigenous cattle rearing.

A view of the Cattle Show

EXTENSION ACTIVITIES

Advisory Services: Advisory services were rendered to fifteen of the clientele during personal visits to the institute, phone and mail enquiries. The advisory profile comprised information needs for technical advice on dairy start-ups, training programme on preparation of dairy products, scientific management of cross bred and indigenous dairy cattle, hydroponic fodder cultivation and new methods of processing ghee from indigenous cow's milk.

Visitors: During the period under report, 221 visitors visited the Institute in 14 batches comprising small and progressive dairy farmers from different parts of Karnataka, three districts of Tamilnadu and Haryana, students from various educational institutes from various states and field extension/veterinary officers of the region and media personnel. The visitors were taken round the institute to various sections as per their needs and were explained about the ongoing research and extension activities.

Students visiting SRS, Bangaluru

Training Programme: An Exposure cum Training programme was organised for 106 farmer trainees in four batches comprising farmers, farmwomen and farm youth from Pudukottai, Madurai, Karur and Tuticorin districts of Tamilnadu under 'Support to State Extension Programmes for Extension Reforms' (SSEPERS) under Agricultural Technology Management Agency (ATMA) scheme. The farmer trainees were made aware of quality milk production, importance of green fodder production, clean milk production and dairy animal health care through lecture presentations in local language by the faculty. Visits were organised to Livestock Research Centre and Experimental Dairy Plant for the benefit of farmer trainees.

Exhibition Participation - Participated in the Mega Science Exhibition, Pride of India ISC Expo of 107th Indian Science Congress 2020, held during January 3-7, 2020 at GKVK Campus, UAS, Bengaluru, organised by Ministry of Science & Technology, showcasing the institute technologies / relevant research information on dairy production and processing aspects. In the National Horticultural Fair 2020, of ICAR-IIHR, held from February 5-8, 2020 at IIHR Campus,

Hesaraghatta Bengaluru and NDRI stall depicted need-based knowledge sharing and showcasing updated and ongoing institute activities and technologies of dairy production and processing for the benefit of the farming community of the region with participation of multitude of farmers of the region and neighbouring States.

Farmer First Programme: Under the collaborative project of Farmer FIRST Programme of ICAR-IIHR and ICAR-NDRI-SRS, planned extension programmes organised during the period under report comprised, on-farm method demonstration focused on mastitis management on February 20-26, 2020 in the project villages, Yeremgere, Balepura, Hosadurga & Vasappana Doddi of Kanakapura Hobli of Ramnagara Taluk, for the benefit of clientele groups. Orientation programme for Mastitis Management was organised for the needy dairy farm households of project villages and CMT kits were distributed after demonstration. For enhancing green fodder production in the project villages, fodder seeds and seed material of improved varieties of Fodder Napier Hybrid were distributed to the farm beneficiaries of project villages. Farm Visits were made for follow-up & feedback and for Interactive Sessions with Farmers & SHG Groups on Mastitis Management for the benefit of clientele groups of project villages, Yeremgere, Hosa Durga, Balepura, & Vasappana Doddi of Kanakapura Hobli of Ramnagara District of Karnataka.

EASTERN CAMPUS, KALYANI

RESEARCH NEWS

Scope of Rumen Manipulation by Using Himalayan Forest Tree Leaves as Herbal Feed Additives to Reduce Ruminal Methanogenesis

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

Manipulation of rumen microbial ecosystem for reducing ruminal methane production is an important strategy for ensuring efficient utilization of dietary energy in ruminants to improve animal productivity with minimal negative impact on the environment. Plant secondary metabolites present in tree leaves, are capable of manipulating rumen microbial ecosystem for reducing ruminal methanognesis. North-eastern part of India possesses wide variety of Himalayan forest tree leaves which are not yet tested to observe their effect on ruminal methanogenesis as herbal feed additive. Three multipurpose Himalayan forest tree leaves viz. Parari (*Schefflera wallichiana*), Sohiong (*Prunus nepalensis*) and Daqingshu *(Ficus hookeri)* were collected from Meghalaya for studying their effect as herbal feed additives on ruminal methanogenesis *in vitro*.

Methane production was significantly low due to replacement of control substrate by *Ficus hookeri* tree leaves. Methane production by control substrate was 40.0 ml/g DDM/24 h. While, it was 34.3, 30.7 and 27.3 ml/g DDM/24 h due to replacement of control substrate by *Ficus hookeri* tree leaves. However, supplementation of *Schefflera wallichiana* and *Prunus nepalensis* tree leaves in a paddy straw based diet had no effect on ruminal methane production *in vitro*. There was a reduction of 14.2, 23.3 and 31.8% in methane production per g digested dry matter when 25, 50 and 100 mg control substrate was replaced by *Ficus hookeri* tree leaves, respectively Ruminal TVFA production was higher (P<0.01) due to replacement of control substrate by *Ficus hookeri* tree leaves followed by *Schefflera wallichiana* tree leaves. It was concluded from the study that Daqingshu *(Ficus hookeri)* tree leaves might be used as herbal feed additives to manipulate rumen fermentation for reducing ruminal methanogenesis for efficient utilization of dietary energy on paddy straw based diet to improve animal productivity.

F. Hookeri

Cryopreservation of Black Bengal Buck Semen – Effect of Antioxidants Cysteine and Methionine on Cryo-Survivability

(M. Karunakaran, Krishna Chandra Tudu, Mohan Mondal, Ajoy Mandal and S. K. Das)

To improve the post thaw recovery of Black Bengal buck semen, antioxidant additives such as methionine and cysteine

were tested against the standard Tris-fructose- egg yolk-glycerol (TFYG) extender. Semen ejaculates were collected by artificial vagina and ejaculates with ≥ 3 mass motility, > 70 % initial motility were used for the cryopreservation study. Each ejaculate was divided into three fractions; first fraction was diluted in basic extender having Tris- Citric acid- Fructose- Egg yolk and glycerol without any antioxidant (Control group). Second and third fractions were diluted in any one of the anti-oxidants in two different concentrations; methionine and cysteine @ 1mM, 2mM. After extension, the semen samples were equilibrated at refrigeration temperature for three hours and cryopreserved by vapour freezing method in liquid nitrogen and stored. Semen ejaculates were evaluated for post thaw *in vitro* sperm characters such as progressive forward motility, functional membrane integrity, viability and acrosome membrane integrity. Methionine @ 1, 2mM had significantly ($p<0.05$) improved the cryosurvivability of sperm cells compared to control group in respect to the post thaw sperm motility and viable sperm count. Methionine 1 mM group had significantly ($P<0.05$) more acrosome intact sperm cells than the control group. While the addition of cysteine @ 1, 2mM did not have any beneficial effects on cryopreservation of Black Bengal buck semen.

EXTENSION ACTIVITIES

Activities Organized in Adopted Villages

ERS of ICAR-NDRI organized regular extension activities in the adopted village namely Muratipur and South Chandamari village and several extension interventions like organizing veterinary health camp, providing regular animal health check up and artificial Insemination of cattle etc. were provided to the farmers. A total of 143 livestock were treated through the village centre (Dairy Vikas Kendra) and 107 farmers got benefit from those interventions. Artificial Insemination facility was provided to 20 crossbred cows through the centre.

Dairy farm inputs being distributed amongst tribal farmers

Camps Organized under TSP

Under TSP project, 7 scientists-farmers interaction session cum input distribution camps were organized in different parts of West Bengal, Jharkhand and Nagaland. A total of 150 Piglets, 263 Goats, 2875 Chicks, 820 Ducklings, 4000 kg Pig feed, 6000 kg Goat feed, 8250 kg Chick feed, 1000 kg Duck feed, 460 kg Mineral mixture was distributed among tribal farmers through these camps. Through these camps 1100 farmers got benefitted by these interventions.

Activities Undertaken under NEH Project

Three Scientists- farmers' interaction sessions cum input distribution camps was organized under NEH project during the period in Mizoram, Arunachal Pradesh and Meghalaya. Inputs like 91 Piglets, 40 Goats, 6000 Chicks, 122 kg Mineral Mixture, 4650 kg pig feed, 300 kg poultry feed and veterinary medicines etc were distributed among the farmers. Through these interventions farmers from North Eastern Region got immense benefit.

Dairy farm inputs being distributed to farmers in NEH area

Activities Undertaken under SCSP Programme

A total of five camps were organized in different parts of West Bengal. 4000 kg poultry feed, 2000 chicks, 115 goats, 1000 kg

Dairy farm inputs being distributed under SCSP Programme

goat feed, 80 kg mineral mixture, medicines were distributed among scheduled caste farmers. A total of 385 scheduled caste farmers were benefitted by the project during the period under report.

Organization of Livestock-cum-Agricultural Mela in Bolpur of Birbhum District, West Bengal

Eastern Campus of ICAR-NDRI, Kalyani organized Livestock-cum Agricultural Mela under Raipur-Supur Gram Panchayat (near Bolpur) of Birbhum District, West Bengal on February 6, 2020 under NDRI-TSP and SCSP Component. In the mela several inputs like goats, chicks, poultry feed, medicines etc. were distributed among the farmers. There was animal competition in different categories of animals (dairy cattle, heifer, calves, female goat, breedable male goat, kids, poultry, duck) which were judged by the expert committee members and prizes were also distributed to the winners. Different ICAR Institutes, namely, ICAR-Central Research Institute for Jute and Allied Fibres (CRIJAF), Barrackpur, ICAR-National Institute for Natural Fibre Engineering and Technology (NINFET), Kolkata, KVK, east Bardhaman, ICAR-Indian Veterinary Research Institute-ERS, Kolkata, ICAR-National Dairy Research Institute-ERS, Kalyani, different NGOs (including Bolpur Manab Jamin) and Self-Help Goups (SHGs) participated in Mela for technology demonstration of their Institute/Organization to the farmers of Birbhum District. During the Scientists/Experts-Farmers interaction session, farmers were appraised about different scientific technologies/processes which may be easily implemented at farmers' fields for enhancing the return from their livestock farming and agriculture practices. Quiz competition was also organized on different aspects of livestock/poultry rearing and agricultural practices and farmers were encouraged by the NDRI team.

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