



From the Director's Desk

ICAR-National Dairy Research Institute is the country's leading institution of higher education in Dairying and ranks first among all Agricultural and Deemed Universities in India. The Institute, since its inception in 1923 has evolved into a world class academic institution, offering four tier educational programs. Its flagship program in B. Tech (Dairy Technology) was started way back in 1957 and remains the best in the country with very high campus placement rates for the past several years.

In line with the philosophy that 'development starts from within', the Institute has been striving to create an enabling environment for the students and the faculty alike. To fulfil this mission, we have received a competitive grant in the form of an ambitious Institute Development Plan (IDP) with a budgetary outlay of Rs. 2477.66 lakhs funded by National Agricultural Higher Education Project (NAHEP) of ICAR. Through the IDP, the Institute proposes to strengthen its Undergraduate programme by introducing industry- oriented course modules relevant to the stakeholders in the industry and the farming community. It aims at providing world class facilities and mentoring to the students to improve their language skills for effective communication, field problem recognition skills through industry linkages, global outlook through twin/sandwich/overseas internship programs with international universities, management and networking skills for establishing themselves to secure local and global employment. The Institute also promotes idea creation and innovation, besides providing scholarship to encourage students turn into entrepreneurs in their relevant areas. One of the hallmarks of this initiative is to make the program sustainable beyond the project duration by exploring opportunities for revenue generation through the existing facilities such as Business Planning Development and state-of-the-art National Referral Laboratory.

IDP also aims at creating a model campus with respect to energy saving, clean and green campus, organic waste recycling, improved hygiene in the hostels, modern dining and cafeteria



facilities and outstanding gymnasium and sports facilities. Further, the Institute will be showcased through print and electronic media and interface events to create national and global awareness about the institute and its academic programs. Finally, the IDP envisages strengthening the outreach programs and community engagement by developing MOOCs/virtual classes, short-duration training programmes for students, short-term courses in cutting edge areas of teaching and research excellence for faculty and staff of other Dairy and Veterinary Science colleges in India and other developing countries. The project has strong built in provisions for equity action plan for disadvantaged students and proposes to engage communities and stakeholders to discharge their social responsibilities conscientiously. Through successful implementation of the activities listed in the IDP, the Institute aspires to emerge as an Institute of global repute.


As a part of the project, the Institute has organized a Global Alumni Scientific Meet-2019 on campus, during March 15-17, 2019. The highlight of the activities has been the Overseas Students' Internship Program, in which 31 B.Tech (Dairy Technology) students completed internship at nine leading global universities in four countries. Overseas training opportunities of varied durations (two weeks to five months)

FROM THE DIRECTOR'S DESK	RESEARCH	ACADEMIC AFFAIRS	EXTENSION	EVENTS	HONOURS/ AWARDS	DINSTINGUISHED VISITORS/ PERSONALIA	राजभाषा एकक	SOUTHERN CAMPUS, BENGALURU	EASTERN CAMPUS, KALYANI
1	2	4	6	7	9	11	12	13	15

are to be made available for scientists (32 during 2019-20) of the institute in cutting areas of science. Some other achievements include linkage development with Future Group (India) for training of B. Tech. (DT) students on aspects of commercial significance viz. consumer buying behaviour, optimization of operational process, customer segmentation, optimization of supply chain channel and new product development and enhancement. Development of MOOCs in commercial dairy farming and milk processing has also been initiated in collaboration with ICAR-NAARM, Hyderabad. An MoU has been signed with the Institute of Rural Management Anand (IRMA), Anand, Gujarat for offering five year Integrated

Postgraduate Diploma in Dairy Management to selected students of B. Tech (Dairy Technology) program enrolled from the ensuing semester.

Through IDP project, ICAR-National Dairy Research Institute proposes to become a world-class model campus for promoting dairy education as dairying is emerging as a major game changer for transforming socio-economic lives of millions of farmers.


(R. R. B. Singh)

RESEARCH

Technology of High Protein Ice Cream Using Whey Protein Isolate as Protein Supplement

(Suchismita Roy, Shaik Abdul Hussain, Writdhama Prasad and Yogesh Khetra)

A technology was developed for manufacture of high protein ice cream from buffalo milk using whey protein isolate (WPI) as the protein source. The main aim of the study was to achieve the maximum level of milk protein in ice cream using WPI without affecting sensorial attributes and physico-chemical properties. Level of WPI supplementation was optimized and appropriate combinations of stabilizers and emulsifiers were employed to optimize the foam stability and textural attributes of ice cream. The developed high protein ice cream (10% milk protein) has similar sensorial, textural and physical attributes as that of control ice cream (4% milk protein). During the two months storage study (at -20°C), non-significant changes were observed in quality attributes of high protein ice cream.



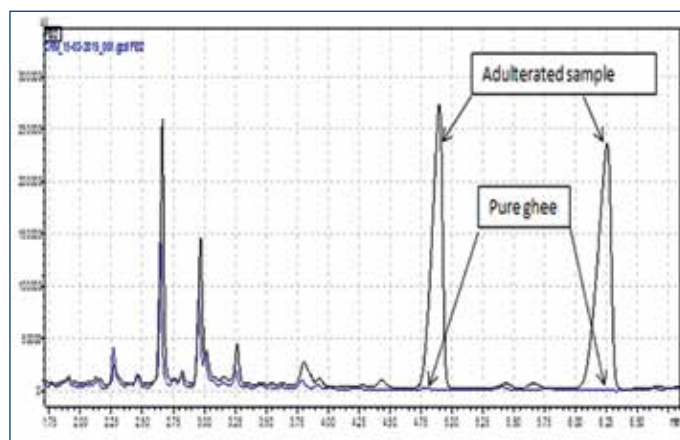
High Protein Ice cream

Development of a Gas-Liquid-Chromatography based Methodology

(Vivek Sharma, Parul, Priyanka Singh Rao and Sumit Arora)

A Gas-liquid-chromatography based methodology was developed to detect one of the very challenging adulterant i.e. RM- adjusted foreign fats by fraudulent traders to adulterate

the ghee. In the said methodology, the signature peaks of RM- adjuster were used as the basis to detect its presence in suspected milk fat samples. In this study, the signature peaks were only observed in RM- adjusters as well as adulterant fat used to adulterate the pure ghee samples. It is possible to detect the said adulterant to the level of as low as 0.5% in ghee (milk fat) by using the standardized signature peaks' approach.



Effect of Supplementation of Nano Zinc on Zinc Bioavailability, Immunity and Performance in Female Murrah Buffalo Calves

(Akash Mishra, Chander Datt, Digvijay Singh, A. K. Mohanty and Veena Mani)

Studies were carried out to study the effect of supplementation of nano-zinc on zinc bioavailability, immunity and performance in female Murrah buffalo calves. Twenty female Murrah buffalo calves were divided into 4 groups of 5 animals each and fed on the basal diet comprising of concentrate mixture and maize fodder in 40: 60 ratio for 120 d (ICAR, 2013). The basal diet contained 21 ppm Zn. In group-1, Zn was not

supplemented in mineral mixture while in groups II, III and IV, diets were supplemented with 40 ppm inorganic Zn ($ZnSO_4$), 10 and 20 ppm nano Zn, respectively. The overall average feed intake, growth performance, digestibility of nutrients, N and mineral balance (Cu, Fe, Ca and P) were not influenced by supplementation of Zn in inorganic or nano Zn above the basal level except Zn balance, which was higher in supplemented groups. Zn retention was the highest in group 2 and group 4. Supplementation of Zn had no effect on the concentration of other serum minerals. However, serum Zn, alkaline

phosphatase, albumin, superoxide dismutase, glutathione peroxidase, catalase, lipid peroxidation, cell mediated, humoral immunity and relative gene expression of ZnT1 improved in 40 ppm inorganic, 10 and 20 ppm nano Zn supplemented groups. The FRAP value and relative gene expression of MT-2A was the highest in nano Zn supplemented groups. Hence, supplementation of 10 nano Zn was comparable to 40 ppm inorganic Zn supplementation in terms of feed intake, nutrient utilization, growth, antioxidant status and relative gene expression of MT-2A in female Murrah buffalo calves.

INSTITUTE TECHNOLOGY MANAGEMENT COMMITTEE (ITMC)

Technology Transferred

S. No.	Name of Technology	Name of Inventors	Name of the Firm to which Technology was Transferred	Date of Licensing
1.	Spore Based Kit for Detection of Antibiotic Residues in Milk at Dairy Farm	Naresh Kumar, A. Khan, S. Arora, Raghu H V, M. Balhara, P. K. Sharma and S. Shaikh	M/s Delmos Research Private Limited, Haryana	13.03.2019 through Agrinnovate India Limited, New Delhi
2.	Technology of Sour Dahi Using Prolific Acidifying Lactic Cultures	Pradip V. Behare, S. K. Tomar and Surjit Mandal	Lacpro Biotech Private Limited, Pune	19.03.2019 through Agrinnovate India Limited, New Delhi
3.	Misti Doi With Fast Acidifying High Sugar Tolerating Lactic Culture(s)	Surjit Mandal, S. K. Tomar and Pradip V. Behare	Lacpro Biotech Private Limited, Pune	19.03.2019 through Agrinnovate India Limited, New Delhi
4.	Process Technology for Palada Payasam Mix Preparation by Dry Crystallization Method in a Mechanical Unit	Menon Rekha, Ravindra, B Surendra Nath, Gajanan P. and Deshmukh	Manjilas Food Tech Private Limited, Kerala	28.03.2019 through Agrinnovate India Limited, New Delhi

Patents Granted

S. No.	Name of Institute	Title of the Patent	Patent Number	Date of Filing	Inventors of the Patent	Patent Grant Number	Grant Date
1.	ICAR-NDRI	A Process for Preparation of Feta Cheese from Buffalo Milk using Microbial Rennet	128/DEL/2011	19/01/2011	Sanjeev Kumar and S. K. Kanawjia	305768	16/01/2019
2.	ICAR-NDRI	Process for Shelf Stable Low-Fat Tomato-Whey Soup	1714/DEL/2006	26/07/2006	Sudhir Singh, Kamavaram Sudheer, Alok Jha, Ashoke Ambalal Patel and G. R. Patil	306128	23/01/2019

Request for Examination for Patent

S. No.	Application/ Registration No	Name of Innovation/ Technology/ Product/ Variety	Date of Submission
1.	201611018434	Oil in Water Curcumin Nanoemulsion and Method of Preparation thereof	January 21, 2019
2.	201711010975	Casinophosphopeptides – Divalent Metal (Iron/Zinc) Nanocomplexes and Method for Preparation thereof	January 21, 2019
3.	201611018434	Rapid Spores-Enzyme based Miniaturised Assay (s) for Detection of Pesticide Residues	February 15, 2019

ACADEMIC AFFAIRS

Seventeenth Convocation of NDRI Deemed University

Seventeenth Convocation of ICAR-NDRI Deemed University was held on 23rd March, 2019. Hon'ble Dr. Trilochan Mohapatra, Secretary, DARE and Director General, ICAR presided over the Function and delivered the Convocation Address. Dr. R. R. B. Singh, Director & Vice Chancellor, NDRI Deemed University presented the Convocation Report. Honble Director General congratulated the graduating students for their excellent academic performance and the Faculty for shaping the young minds. In his address, he emphasized the role of green revolution, Operation Flood, and Doubling Farmer's Income in growth of Indian Agriculture and the need to create an eco system in the campus to enable graduates to be job givers instead of job seekers. A galaxy of eminent guests including Dr. Joykrushna Jena, Deputy Director General (Animal Sciences), graced the occasion.



Dr. K. P. Ramesha, Head SRS Bangalore, receiving the Best Division Award

Three topper students each in B. Tech.(DT), Master's and Doctoral programmes were awarded Director's Gold, Silver and Bronze Medals for overall performance in Course work. Merit Certificates to 20% of the total pass out students in B. Tech. (DT) Programme based on performance in course work were awarded to six students. Merit Certificates to toppers of each discipline in masters' and Ph.D. degree programme for the performance in course work as per the eligibility criteria were also awarded. A total of 16 masters and 14 Ph.D. students were given merit certificates. In all, 80 Ph. D., 144 Masters and 25 B. Tech. students were awarded degrees during the Convocation. Best Thesis Awards for Master's theses/Ph. D. theses and Gold Medals for best thesis research work in Ph.D. Programme of Production, Processing and Management Group were awarded. Dr. Narendra P. Raju, Scientist, Dairy Technology Division was given **Best Teacher Award** for excellence in teaching while Southern Regional Station, ICAR-National Dairy Research Institute, Bangalore (Karnataka) was conferred the **Best Division Award** during the Convocation.

Best Thesis Awards

Best Thesis Awards for Master's theses/Ph. D. theses (one each in Production, Processing and Management Groups) carrying a citation, a certificate and Rs. 5000/- were awarded. Two theses in each programme were recommended by committees in each discipline. The students presented their theses before the Award Committee. The award committees evaluated the theses and gave their recommendations for the Best Thesis Awards in their respective groups as given below:

Best Master's Thesis Awards

Group	Name of the student	Name of the Guide	Discipline
Production	Ms. Neeru Jaglan	Dr. A. K. Tyagi	Animal Nutrition
Processing	Mr. Shivam Panwar	Dr. P. Narendra Raju	Dairy Technology
Social Science & Management	Ms. Suchandra Dutta	Dr. Sanjit Maiti	Agricultural Extension Education

Best Ph.D. Thesis Awards

Group	Name of the student	Name of the Guide	Discipline
Production	Mr. Sushil Kumar	Dr. S. De	Animal Biotechnology
Processing	Mohd. Iqbal Bhat	Dr. Rajeev Kapila	Animal Biochemistry
Social Science & Management	Sudhanand Prasad Lal	Dr. S. K. Jha	Agricultural Extension Education

Dr. D. Sundaresan Memorial Oration Award-2019

Dr. D. Sundaresan Memorial Oration Award-2019 was bestowed on Prof. Hitesh Bhatt, Director, Institute of Rural Management Anand, Gujarat. Prof. Bhatt delivered the lecture on April 1, 2019 in Dr. D. Sundaresan Auditorium on the topic **"Preparing for Transition: What Does the World Expect from a Fresh Graduate"**. The award carries an amount of Rs. 20,000, a citation, shawl and a certificate.



Dr. D. Sundaresan Memorial Oration Award 2019 conferred on Prof. Hitesh Bhatt, Director, Institute of Rural Management Anand, Gujarat

Dr. N. N. Dastur Memorial Oration-2019

Dr. N. N. Dastur Memorial Oration-2019 was bestowed on Mr. R. S. Sodhi, Managing Director, Gujarat Co-operative Milk Marketing Federation Ltd., (GCMMF) Anand, Gujarat. Dr. Sodhi delivered lecture on 14.3.2019 on the topic **“Dairy Industry: Opportunities & Challenges”**.



Dr. N.N. Dastur Memorial Oration -2019 conferred on Mr. R. S. Sodhi, Managing Director, Gujarat Co-operative Milk Marketing Federation Ltd., (GCMMF) Anand, Gujarat

Dr. K. K. Iya Oration award-2019

Dr. K. K. Iya Oration award-2019 was bestowed on Dr. Ashok Dalwai, Chief Executive Officer, National Rainfed Area Authority, Department of Agri., Coop. & Farmers Welfare, New Delhi. Dr. Dalwai delivered lecture on 19.3.2019 on the topic **“Doubling Farmers’ Income (DFI): Perspectives in Animal Husbandry and Fisheries**. The award carries an amount of Rs. 20,000, a citation, shawl and a certificate.



Dr. K. K. Iya Memorial Oration Award 2019 conferred on Dr. Ashok Dalwai, Chief Executive Officer, National Rainfed Area Authority, Department of Agri., Coop. & FW, New Delhi

Global Internship for Students under the Institutional Development Plan

The Institutional Development Plan under the National Agricultural Higher Education Project has facilitated several initiatives to strengthen the B.Tech. (DairyTechnology) programme. Some of these initiatives are global internships for students, faculty improvement program held at universities abroad, motivational and professional talks for the benefit of the students, collaborations with industry and universities,

among others. Thirty one students from B. Tech 2nd and 3rd year classes were selected and interned for 6 weeks at nine top global universities in U.S.A (Purdue university, University of Georgia, Kansas state university and University of Southern Illinois), Ireland (University College Cork, Tegascac), Denmark (University of Copenhagen, Denmark Technical university), New Zealand (Massey University) between January to March 2019. Selection of the students was based strictly on merit and their participation in extracurricular activities. A score card was prepared by giving weightage for Academic score (50%), Taxonomical evaluation (20%), Extra-curricular activities (10%), Sports and related activities (10%), Personal interview (10%). Students had an opportunity to work with eminent researchers and faculty across the globe which helped them to enhance their overall personality.



Students on global internship under the Institutional Development Plan

Intra-university Festival ‘Vasantotsava’

Literary and cultural activities prove a valuable lens to view the inner world of students and thereby enable their holistic



Dr. R.R.B. Singh, Director ICAR-NDRI delivering Inaugural address during Intra-university Vasantotsava Festival

development. The Institute provided several opportunities to the students to showcase their talent. The Institute organised several cultural, literary, fine-arts activities through Intra-university Festival 'Vasantotsava' organised during February 2018 for all round development of students.

2018 and 20 farmwomen were enrolled as students. One day exposure visit and tour was organized at the Institute. Regular classes were being continuously organized on every Friday and Saturday for educating the farmers in dairy farming and its allied activities in village Deepo.

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 subject matter specialists from production, processing and management group visited a new cluster of villages viz. Shahpur, Subri and Pingli in Karnal district on 2nd Saturday of every Month. The key points of interactions were related to management of silent heat in animals, adulteration in milk, care of newly born calves and cutting management of berseem and oats crop.

Kisan Sangoshthies

In all, 46 Kisan Sangoshthies were organized at village level on mastitis control in dairy animals, management of silent heat, role of mineral mixture in animal diet, care and management of calves and clean milk production practices in rural areas.

Empowerment of Women and Mainstreaming of Gender Issues

Ten women empowerment trainings 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 115 women participants were trained in these programmes.

Educational Visits and Tours

A total of 3004 visitors (students & Faculty) of 60 colleges/Institutions/Universities visited the Institute. The groups were sensitized about the different research, teaching and extension achievements and facilities available in the Institute.

Farmers' Farm School

NDRI has started Farmers Farm School (FFS) since August 30, 2017, with the aim of enhancing the productivity of agricultural practices in this series A fifth batch especially for resource poor marginal and landless women farmers was started in August,

KRISHI VIGYAN KENDRA

- KVK organized 19 training programmes (on-campus) on different aspects of dairy production and processing, crop residue management, home science, bee keeping, vermi composting and fish farming for 750 farmers, women and rural youth from Haryana and other states of the country.
- KVK organized 5 sponsored training programmes on dairy production for 146 farmers, farm women and rural youth. Apart from this, three training programmes on integrated training in dairy production and processing for 62 farmers, farm women and rural youth. These training are sponsored by Directorate of Dairy Development, Bihar, Project Director ATMA Shimla (H.P), Project Director, ATMA, Sahebganj, Jharkhand and Milk Producers Co-operative Union Pithoragarh, Uttarakhand.
- KVK also organized 60 exposure visits and short training programmes for 2033 progressive farmers, farm women and rural youth from different parts of Gujarat, Uttar Pradesh, Rajasthan, Himachal Pradesh, Haryana, Madhya Pradesh, Uttarakhand, Chattisgarh, Kerala, J&K and Tamil Nadu.
- KVK organized 8 off campus training programme in 8 villages of Karnal district namely Kunjpura, Dabari, Kulwheri, Sambhali, Kachhva, Unispur, Badarpur and Kalsora on balanced use of fertilizers, integrated nutrient management, soil fertility management, scientific cultivation of rabi crops, weed management, crop protection, crop diversification and vermicomposting for 108 farmers and farmwomen.
- KVK celebrated Mahila Kisan Divas on January 23, 2019 participated 108 women. The theme of the Mahila Divas was "Kheto ki parali khet mein". The women were educated to impress upon male members of the families from farming community not to burn paddy straw and mix it in the fields using machines available in the market for improving soil health.
- Field day on Mustard crop was organized at village Nalvikhurd on January 30, 2019 participated by 16 farmers.
- Scientific Advisory Committee meeting was held on

January 29, 2019 under the chairmanship of Dr. R R B Singh, Director, NDRI, Karnal to review the progress of KVK during the year 2018 and action plan for the year 2019. The meeting was attended by Dr. M. S Meena, PS ICAR-ATARI, Jodhpur, district officials and farmers. The committee reviewed the progress of KVK during the year 2018 and made suggestions for the year 2019.

- Direct telecast of Hon'ble Prime Minister for Farmers and Farm women was arranged on February 24, 2019

for about 400 farmers on the launch of Prime Minister-Kisan scheme (Pradhan Mantri Samman Nidhi) Dr. Shiv Kumar Kimothi, ADG (TC), ICAR, ADC and Director NDRI attended the function.

- KVK arranged direct telecast of PM on International Women's Day on March 8, 2019 followed by the interaction of PM with the women. About 70 farm women participated in the event.

EVENTS

An International Training Programme on Milk and Milk Products Processing

An International Training Programme on 'Milk and Milk Products Processing' for Uganda Nationals was organized at ICAR-NDRI, Karnal from March 4-18, 2019. Ten Ugandan nationals representing different farmer groups and prospective entrepreneurs attended this training programme. The training programme was sponsored by Indian Technical and Economic Cooperation (ITEC), Ministry of External Affairs (MEA), Government of India. The major objective of the training was to impart hands on training on milk & milk products processing.

During training programme, different topics viz. processing of market milk, analysis of milk and milk products, technology of fermented milks and cheese, technology of fat rich dairy products, byproducts utilization, sensory evaluation and packaging of dairy products, animal health management, animal herd maintenance and international food regulations were covered. The training programme was inaugurated by Dr. R. R. B. Singh, Director, ICAR-NDRI, Karnal. He briefed the participants about research, academic and extension activities carried out by the Institute. The Chief Guest of the valedictory function Dr. C. Vasudevappa, Vice Chancellor, NIFTEM distributed the certificates to the participants.



Group photo of participants with Director and faculty of NDRI

National Training Programme on Rapid Bio-sensors and Micro-techniques for Monitoring Contaminants and Adulterants in Dairy Foods

A training program was organized under the aegis of Centre of Advanced Studies in Dairy Processing on "Rapid Bio-sensors and Micro-techniques for Monitoring Contaminants and Adulterants in Dairy Foods" at the Dairy Microbiology Division of the Institute during January 4-24, 2019. Assistants Professors of SAUs and scientists of ICAR-Institutes across the country participated in this training programme.

International Training Programme on Modern Dairy Technology, Management and Cooperatives

Dairy Extension division of ICAR-NDRI organized an International Training programme on Modern Dairy Technology, Management and Cooperatives from February 5-19, 2019 which was sponsored by MANAGE, Hyderabad. The main objective of the training programme was to acquaint the participants with knowledge in principles, planning and technical approach for establishing commercial dairy farms, processing of milk and development of marketing network and Development of value chain in milk production, processing and marketing to minimize the marketing channels. There were 29 executives representing eight member of countries viz., Afghanistan, Cambodia, Myanmar, Malawi, Liberia,



Tanzania and Uganda. The valedictory function was held on February 19, 2019 at ICAR-NDRI, Karnal and it was graced by Chief Guest Dr. Inderjeet Singh, Director, Animal Husbandry, Punjab, Guest of honour Mr. Mustapha El Hamzaoui, Director, USAID and Dr. R. R. B. Singh Director and Vice-Chancellor, NDRI, Karnal. Certificates were given to all Executives along with small memento from NDRI. Special appreciation certificates were given to training coordinators in 10 categories viz., Class Coordinator, Photography Coordinator, Time Management, Cultural Program Coordinator and Yoga Coordinator etc.

International Women's Day

International Women's Day was celebrated on March 8, 2019 at Dilwara village. Farm women expressed their anguish about lack of training support as they have been confined to four walls in the houses and taking care of animals in their farm premises. They showed keenness in understanding the scientific practices, which could help them to increase the milk yield. They were also interested to know about value addition to milk and milk products. They informed that they are trying to educate their girl children up to graduate and above level as education could be a catalyst in bringing socio-economic transformation.

Global Alumni Scientific Meet

NDRI Global Alumni Scientific Meet (NGASM) was organized at ICAR-NDRI Karnal from March 15-17, 2019. The Meet was inaugurated by Dr. Harsh Kumar Bhanwala, Chairman, NABARD in presence of Dr. R. T. Ravi, Chairman & Founder, Krebs Industries Ltd., Mr. S. S. Mann, Founder, Chairman Mann Ventures and Dr. P. Ramasundaram, Dr. P. Ramasundaram, National Coordinator, National Agricultural Higher Education Project (NAHEP), ICAR.

While inaugurating the Leadership and Scientific Global Meet, Dr. Bhanwala, Chairman, NABARD, an alumnus of NDIS

said that Institutes like NDRI should develop an eco-system wherein on-campus innovations should lead to successful business model. He said that dairying is the fastest growing sector in the agriculture in term of its maximum contribution to GDP and should attract students to become entrepreneurs in various segments. He listed several opportunities for young entrepreneurs such as farm automation, farm management, input retailing, higher value management equipment renting, weather forecasting and precision farming etc.

Dr. Ramasundaram appreciated the efforts of NDRI for navigating the Institutional Development Project (IDP) under National Agricultural Higher Education Project (NAHEP) in an exemplary manner and setting the roadmap for higher education in agriculture. On this occasion, Dr. Ravi and Mr. Mann, both alumni of NDRI shared their journeys of becoming successful entrepreneurs after leaving their jobs. Dr. R.R. B. Singh, Director, NDRI said that objective of such programmes is to motivate the students to think out of the box and become employment generators instead of employment seekers.

The star attraction of the Meet was the presence of Mr. Anand Kumar, Founder, Super 30, Ramanujan School of Mathematics, Mr. Sonam Wangchuk, Founder Director and Advisor, Students' Educational and Cultural Movement of Ladakh (SECMOL), Mr. Anil Bhasin, President at Havells India Ltd. They shared their real life experiences and stories impacting the lives of children of underprivileged strata of society and setting new standards for higher education in the country. Mr. Sonam emphasized that the students and scientists should take up real life problems having environment friendly solutions. Mr. Anand stressed on the need for giving back to the society while being successful in life. Mr. Anil said that to become successful entrepreneur, one should focus on quality, human resource and customer delight. In this event, about 500 participants participated.



A view of Global Alumni Scientific Meet



Three days long Leadership-cum-Scientific Meet was concluded at NDRI during March 17, 2019. During the last day of this event, various alumni of NDRI who have excelled in their fields made their presentation and shared their experiences. Some of the prominent among them were Dr. M. L. Madan, Former Vice Chancellor, DUVASU, Mathura; Dr. S. L. Goswami, Former Vice Chancellor, BUAT, Banda; Dr. G. S. Rajorhia, President, Indian

Dairy Association (IDA); Dr. G. R. Patil, Former Joint Director (Academic), NDRI, Karnal; Dr. Asitava Sur, General Manager Dairy at Metro Dairy Ltd. Kolkata; Dr. Sudhir Gupta, Vice President, South & South East Asia and Managing Director, Cotecna Inspection India Pvt. Ltd.; Dr. Anil Kaw, Global Dairy Applications Manager, New Zealand; Dr. S. K. Singh, US Patent Office; and Mr. Babbar Singh, Director, Delmos Research Pvt. Ltd. Gurgaon.

A poster session was also organized on the four major themes of dairy sector viz., Animal Production and Heat; Product and Process Development; Food Quality and Safety; Biotechnological approaches for improving quality and productivity. First prize was awarded in each category to post-graduate students Ms. Tarunpreet Kaur, Ms. Harisha Bodemala, Ms. Soniya Ranveer and Deepti Mittal.

Dr. R. R. B. Singh, Director, NDRI appreciated the role of Alumni Association of NDRI in constantly supporting the Institute in its effort to maintain its pre-eminent position amongst Dairy Science Education institutions of the world. He further said that such meet also provides opportunity for the entrepreneurs, manufacturers of agro-dairy support systems, financial and other service providers to engage with prospective clientele groups and develop a mutually supportive network.

HONOURS/AWARDS

Best Division Award 2017-18 was conferred on Southern Regional Station of ICAR-NDRI, Bengaluru for outstanding performance in Research and Education on March 23, 2019 during the 16th Convocation of ICAR-NDRI by Dr. T. Mahapatra Hon'ble Director General, ICAR & Secretary, DARE.

Dr. Narender Raju Panjagari, Scientist, Dairy Technology Division received prestigious "**Best Teacher Award**" for the year 2018 at the 17th Convocation of ICAR NDRI Deemed University on March 23, 2019.

Mr. Mohd. Iqbal Bhat, Ph.D. Scholar under the supervision of **Dr. Rajeev Kapila**, Principal Scientist was awarded "**Best Thesis Award**" in "Dairy Processing" during 16th convocation of ICAR-NDRI Deemed University on March 23, 2019.

Dr. Pawan Singh, Principal Scientist, Livestock Production & Management received "**National Fellowship**" of ISAPM Society in ISAPM National Conference in January, 2019 held at Trissur (Kerala).

Dr. Satish Kumar, Principal Scientist, Animal Biotechnology Centre received "**Middle Career Scientist Award**" in the National Seminar of Indian Society of Sheep and Goat Production and Utilization (ISSGPU) on February 14-16, 2019 held at Bihar Animal Sciences University, Patna.

Mr. A. Fahim, Dr. M. L. Kamboj, Mr. S. Prasad, Mr. A. S. Sirohi, and **Mr. R. Bhakat**, Livestock Production & Management Section received "**Best Research Paper Award**" for their paper entitled, "Preference of Side and Standing in Relationship with Milking Characteristics and Temperament Score of Crossbred Dairy Cows Milked in Herringbone Milking Parlour" during National Conference on "Innovation in Animal Production for Sustainability and Doubling Farmer's Income" organised by Indian Society for Animal Production Management at College of Veterinary and Animal Sciences, Munnuthy, Trissur, Kerala from January 23-25, 2019.

Ms. Shabhat Mumtaz, Animal Genetics & Breeding Division received "**Young Scientist Award**" during 16th National Symposium on Animal Genetic Resources for Food and Social Security (Society for Conservation of Domestic Animal Biodiversity) held from February 7-8, 2019 at ICAR-National Bureau of Animal Genetic Resources, Karnal.

Mr. B. Singh, Dr. K. Khamrui, Mr. J. Lodh, Mr. A. Debnath, and **Dr. W. Prasad**, Dairy Technology Division received "**Best**

Paper Award" for the paper entitled "Selection of Levels of Ingredients for the Preparation of Milk-Coconut Sweet based on Sensory and Instrumental Colour Attributes" at 47th Dairy Industry Conference, organized by IDA-East zone, Patna during February 7-9, 2019.

Ms. Kiran Lata, Mr. Laxamn Naik, Dr. Bimlesh Mann, and **Dr. Rajan Sharma**, Dairy Chemistry Division received "**Best Paper Award**" by Indian Dairy Association in the category of "Dairy Processing" for the year 2017 at 47th Dairy Industry Conference, Patna on February 9, 2019.

Mr. Rakesh Kumar Raman, Ms. Uma Karpurapu and **Narender Raju Panjagari**, Dairy Technology Division received "**Best Research Project Award**" under the Basic Sciences category at the Students Research Convention (North Zone ANVESHAN-2019) and qualified for National event during February 27-28, 2019 at National Institute of Food Technology, Entrepreneurship and Management (NIFTEM), Kundli and sponsored by the Association of Indian Universities, New Delhi.

Ms. Rita, Dr. Bimlesh Mann, Dr. Rajan Sharma, Dr. Rajesh Bajaj, and **Mr. Saurabh Gosewade**, Dairy Chemistry Division received "**Best Oral Presentation Award**" for the presentation entitled "Characterization of Bioactive Peptide in Sodium Substituted Cheddar Cheese during Storage" presented in the National Conference on "SLIETCON-2019 held from March 1-2, 2019 at Chandigarh.

Ms. Rajshree Rath, Dr. Pawan Singh, Dr. M. L. Kamboj, Dr. S. S. Lathwal, Dr. T. K. Mohanty and **Ms. Himani Tiwari**, Livestock Production & Management Section were awarded the "**Best Research Paper Award**" on their paper, "Assessing Cognitive Performance of Murrah Buffalo Calves in a Visual Discrimination Task" by Commonwealth Veterinary Association during 7th Pan Commonwealth Veterinary Conference entitled "The Role of Veterinarians in Addressing the Global Challenges to the Lives of our Pets, Livestock, Wildlife, Humans, and our Environment" held at National Institute of Animal Nutrition and Physiology, Bengaluru from March 3-7, 2019.

Dr. M. L. Kamboj, Mr. Pranay Bharti, Mr. P. K. Singh, Ms. Mayamitta Saini and **Dr. Sanjay Choudhary**, Livestock Production & Management Section received the "**Best Research Paper Award**" on their paper entitled, "Effect of

Natural Suckling and Weaning on the Growth, Health and Behaviour of Murrah Buffaloes and Sahiwal Cow Calves” during Animal Welfare and Behaviour Session of the National Conference on “Innovation in Animal Production for Sustainability and Doubling Farmer’s Income” organised by Indian Society for Animal Production Management at College of Veterinary and Animal Sciences, Munnuthy, Trissur, Kerala from January 23-25, 2019.

Dr. Vikas Vohra, Principal Scientist and co-workers, Animal Genetics & Breeding Division received **“Best Oral Presentation Award”** during 16th National Symposium on Animal Genetic Resources for Food and Social Security (Society for Conservation of Domestic Animal Biodiversity) held from February 7-8, 2019 at ICAR-National Bureau of Animal Genetic Resources, Karnal.

Dr. R. B. Kale, Dr. K. Ponnusamy, Dr. A. Mohammad, Dr. S. K. Jha, Dr. B. S. Chandel, and Dr. A. K. Chakravarty, received **“Best Paper Award”** for the article “Differential Dairy Development Status in India: A Perception Analysis”, *Indian Journal of Dairy Science* 70(3): 371-377 during 47th Dairy Industry Conference held from February 7-9, 2019.

Dr. S. Jeyakumar, Principal Scientist received **“Best Researcher Award”** in the field of Infrared Thermal Imaging and its Application in Veterinary Medicine, under Research Ratna Award of the Year 2019 Jointly Awarded by RULA Awards and United Medical Council in Association with World Research Council on February 26, 2019.

Dr. K. Ponnusamy, Principal Scientist, Dairy Extension Division received **“Best Article Award of 2017”** for the article on Differential Dairy Development Status in India: A Perception Analysis published in the *Indian Journal of Dairy Science* given by Indian Dairy Association, New Delhi during 47th Dairy Industry Conference held from February 7-9, 2019 at Patna.

Dr. Pawan Singh, Principal Scientist, Livestock Production & Management Section received **“Best Paper Award”** for the paper entitled “Effect of Micro Climatic Conditions in Different Housing Systems on Performance of Murrah Buffalo Calves” during ISAPM National Conference in January, 2019 held at Trissur (Kerala).

Ms. Priya Patel, Dr. Sumit Arora, Ms. Seema Rana and Mr. Harisha Bodemala, Dairy Chemistry Division received **“Best Poster Award”** for the poster entitled “Evaluation of Storage Stability of Astaxanthin in Flavoured Milk” presented at National Seminar-Vision 2030 for Dairy industry and 13th Alumni Convention held from January 4-5, 2019 at AAU, Anand.

Ms. Aneet Kour and co-workers, Animal Genetics & Breeding Division received **“Best Poster Award”** during 16th National Symposium on Animal Genetic Resources for Food and Social Security (Society for Conservation of Domestic Animal Biodiversity) held from February 7-8, 2019 at ICAR-National Bureau of Animal Genetic Resources, Karnal.

Ms. Kaushalya Devi and co-workers, Animal Genetics & Breeding Division received **“Best Poster Award”** during 16th National Symposium on Animal Genetic Resources for Food and Social Security (Society for Conservation of Domestic

Animal Biodiversity) held from February 7-8, 2019 at ICAR-National Bureau of Animal Genetic Resources, Karnal.

Mr. R. V. Rajanikar, Mr. S. Ranvir, and Dr. P. V. Behare, Dairy Microbiology Division received **“Best Poster Presentation Award”** for the paper on “Production of Phenyllactic Acid Enriched Anti-Microbial Formulation from *L. Plantarum* during 47th Dairy Industry Conference, FSQ 9, held from February 7-9, 2019 at Patna.

Ms. Anjali, M. K., Dairy Microbiology Division received **“Best Poster Presentation Award”** for the paper on “Conducting Polymer Strip Based Sensor for the Detection of Escherichia Coli in Milk” under Food Security, Quality Safety and Regulatory Aspects Category” during 47th Dairy Industry Conference 2019 held on February 7-9, 2019 at Patna.

Ms. Anjali M. K., Mr. Raghu H. V., and Dr. Naresh Kumar, Dairy Microbiology Division got **“First Prize”** for poster presentation on “Conducting Polymer Strip based Sensor for the Detection of Escherichia Coli in Milk” Under Food Security, Quality Safety And Regulatory Aspects Category” to during 47th Dairy Industry Conference held from February 7-9, 2019 at Patna.

Mr. D. Dua, Mr. G. Tripathi, Dr. P. Palta, and Dr. M. K. Singh, Animal Biotechnology Centre received **“Best Poster Award”** for their paper “Developmental Competence of Ovarian Follicles Affected by Culture Media” at Global Conference on Reproductive Health organized by ISSRF at JNU, New Delhi from February 22- 24, 2019.

Ms. Soniya Ranveer, Ms. Vaishali Dasriya, and Dr. Naresh Kumar, Principal Scientist, Dairy Microbiology Division got **“First Prize”** for poster presentation on “Development and Validation of Paper Strip Biosensor for Pesticide Residues Detection in Dairy Farm Chain” during NDRI Global Alumani Scientific Meet held from March 15-17, 2019 at ICAR-National Dairy Research Institute, Karnal.

Ms. Hema J. M., Ms. Richa Singh, Dr. Bimlesh Mann, Dr. Rajesh Bajaj, Dr. Priyanka Rao, and Mr. Saurabh Gosewade, Dairy Chemistry Division received **“Best Poster Award”** for the poster entitled “Comparative Fat Digestibility from Milk of Different Breeds using Simulated GI conditions presented at National Conference on “SLIETCON-2019” held from March 1-2, 2019 at Chandigarh.

Mr. Rakesh Kumar Raman, Ms. Uma Karpurapu and Dr. Narender Raju Panjagari, Dairy Technology Division received **“All India 3rd Best Research Project Award”** under the Basic Sciences category along with a cash prize of Rs. 25,000/- at the National Students Research Convention (ANVESHAN-2019) held during March 12-14, 2019 at Ganpat University, Mehsana, Gujarat and sponsored by the Association of Indian Universities, New Delhi.

Mr. Harisha Bodemala, Dr. Sumit Arora, Ms. Seema Rana, and Dr. Vivek Sharma, Dairy Chemistry Division received **“Best Poster Award”** for the poster entitled “Optimization of Spray Drying Conditions for lab Scale Preparation of Milk Protein-Vitamin Complexes” presented in the NDRI Global Alumni Scientific Meet-2019 held from March 15-17, 2019 at ICAR-National Dairy Research Institute, Karnal.

Dr. Nishant Kumar, Scientist, Livestock Production & Management Section received **"Best Poster Award"** for the paper entitled "Effect of Zinc Supplementation on Performance of Peri-parturient Crossbred Cows during Heat Stress Condition" during Dairy Industry Conference 2019 on "Innovative Approaches for Enhancing Dairy Farmers Income" organized by Indian Dairy Association from February 7-9, 2019 at Patna.

Mr. Ranvir, Dr. Kamal Gandhi, Dr. Rajan Sharma, and Dr. Bimlesh Mann, Dairy Chemistry Division received **"Best Poster Award"** presented in the NDRI Global Alumni Scientific Meet-2019 held from March 15-17, 2019 at ICAR-National Dairy Research Institute, Karnal.

Mr. Prashant Goel, Dr. Naresh Kumar, , Ms. Soniya Ranveer, Mr. Pradip Kumar Sharma, Mr. Karanpriya, Dairy Microbiology Division got **"Second Prize"** for poster presented on "Spore based Technology for Rapid Detection of Antibiotic and Pesticide Residues in Milk" during NDRI Global Alumni Scientific meet held from March 15-17, 2019 at ICAR-National Dairy Research Institute, Karnal.

Dr. S. Mondal, Dr. M. Bhakat, Mr. A. Singh, Dr. T. K. Mohanty, Mr. M. Abdullah and Mr. S. K. Yadav, Artificial Breeding Research Centre got **"2nd Best Oral Presentation Award"** for the paper entitled "Libido Problem is Untraceable through Testosterone and LH Rhythm in Zebu Breeding Bulls presented at 19th Indian Veterinary Congress and 26th Annual Conference of IAAVR and National Symposium on Innovative Progress in Animal Health and Production for Safe and Secured Food Under one Health Perspective held from February 1-2, 2019 at WBUAFS, Kolkata, WB.

Dr. Pawan Singh, Principal Scientist, Livestock Production & Management Section received **2nd Best Paper Award"** for the paper entitled "Relationship among Testicular, Physical and Semen Quality Parameters of Murrah Buffalo Breeding

Bulls" during 47th Dairy Industry Conference (DIC) held from February 7-9, 2019 at Patna.

Dr. S. Roy, Dr. S. A. Hussain, Dr. W. G. Prasad, Dr. Y. Khetra, and Dr. R. R. B. Singh received **"Best Poster Presentation Award"** for the paper entitled "Development of High Protein Ice Cream" presented at 47th Dairy Industry Conference held at Patna, Bihar from February 7-9, 2019.

Mr. Rajender Kumar, Dr. Latha Sabikhi and Mr. Gunvantsinh Rathod and Dairy Technology Division received **"2nd Best Poster Award"** for the poster entitled "Development of Buttermilk Solids-based Omega-3 Oil Encapsulate by Utilizing the Emulsion Stabilization Potential of Buttermilk". NDRI Global Alumni Scientific Meet-2019 held from March 15-17, 2019 at National Dairy Research Institute, Karnal.

Dr. Ganga Sahay Meena, Dr. Ashish Kumar Singh, Dr. Vijay Kumar Gupta, Mr. Dharin Jayswal, Dr. Pankaj T Parmar and Dr. Hari Ram Gupta, Dairy Technology Division received **"2nd Best Research Paper Award"** for the paper entitled "Estimating Cost for Production of Soluble Milk Protein Concentrate 70 (MPC70)" at 47th Dairy Industry Conference organized at Patna, Bihar from February 9-11, 2019.

Mr. Bhagwat Sameer, Mr. Sunil Sakhal, Dr. Sangita Ganguly, Dr. Yogesh Khetra and Dr. Latha Sabikhi, Dairy Technology Division received **"3rd Best Poster Award"** for the poster entitled "Valorization of Mozzarella Cheese Whey into Probiotic Ricotta Cheese" during "NDRI Global Alumni Scientific Meet-2019" held from March 15-17, 2019 at National Dairy Research Institute, Karnal.

Mr. V. Batra, , Dr. Rakesh Kumar, and Dr. T. K. Datta, Animal Biotechnology Centre received the **"3rd Best Poster Award"** for their paper "Unusual Evolutionary Positioning of Buffalo Class A B Defensins and their Distinct Selective Pressures vis-à-vis other Defensins" at NGASM 2019 organised at NDRI Karnal from 15th-17th March, 2019.

DINSTINGUISHED VISITORS/PERSONALIA

DINSTINGUISHED VISITORS

9.01. 2019 Four member delegation from Brazil.



11.01. 2019 Mr. Vinithshivram Poduval, Sr. VP Food Safety & Quality, Schreiber Foods, Washington, USA.

22.03.2018 Dr. Venkatesh, Director General of Health Services, Govt. of India.

PERSONALIA

Joining/Appointment

- Sh. Rajneesh Kumar Singh, Sr. F&AO joined at ICAR-NDRI, Karnal after being relieved from ICAR-IISWC, Dehradun (Uttarakhand) w.e.f. 11.2.2019.
- Sh. Vivek Purwar, Sr. AO joined at ICAR-NDRI, Karnal after being relieved from ICAR-NBPGR, New Delhi w.e.f. 11.3.2019.

Retirement/Relieving

- Dr. Smita Sirohi, Head, Dairy Economics Statistics & Management Division appointed as Advisor (Agricultural Marine Products) at Embassy of India, Brussels & relieved from ICAR-NDRI, Karnal w.e.f. 9.1.2019.

- Sh. Sanket G. Borad, Scientist (Dairy Technology discipline) resigned from the post of Scientist & relieved from ICAR-NDRI, Karnal w.e.f. 1.1.2019.
- Dr. Ashok Kumar Gupta, Principal Scientist, Animal Genetics & Breeding Division retired from Council's service w.e.f. 28.2.2019.
- Sh. Rajinder Kumar, Chief Admn. Officer transferred from ICAR-NDRI, Karnal to join at ICAR H.Q w.e.f. 14.3.2019.

Additional Responsibility

- Dr. Latha Sabikhi, Head, Dairy Technology Division entrusted with the additional responsibility of Acting Joint Director (Research) for a period of six months w.e.f. 11.3.2019.
- Dr. S.M. Deb, Principal Scientist entrusted with the additional responsibility of Acting Head, Animal Genetics & Breeding Division for the period of six months w.e.f. 1.3.2019.

राजभाषा एकक

तिमाही हिन्दी बैठक का आयोजन

संस्थान के निदेशक एवं कुलपति महोदय की अध्यक्षता में संस्थान राजभाषा कार्यान्वयन समिति की तिमाही बैठक संस्थान में दिनांक 29.3.2019 को संपन्न हुई। समिति ने गृह मंत्रालय, राजभाषा विभाग द्वारा जारी चालू वित्तीय वर्ष 2018-19 के लिए केन्द्र सरकार के सभी कार्यालयों के लिए मदवार तय किए गए न्यूनतम वार्षिक लक्ष्यों के कार्यान्वयन के बारे में विस्तार से चर्चा करके कई महत्वपूर्ण निर्णय लिए। बैठक में सभी अधिकारियों एवं कर्मचारियों से निर्धारित न्यूनतम लक्ष्य को प्राप्त करने की दिशा में सार्थक प्रयास करने की अपेक्षा की गई। बैठक में हिन्दी पत्रों पर हिन्दी में हस्ताक्षर करने के साथ-साथ अंग्रेजी पत्रों पर भी हिन्दी हस्ताक्षर करने एवं हिन्दी डाक को प्राप्त करते समय हिन्दी में हस्ताक्षर करके हिन्दी के प्रयोग को बढ़ाने के संबंध में निर्णय लिया गया। बैठक में सरकारी कामकाज के दौरान राजभाषा के प्रयोग को बढ़ाने के लिए संस्थान में चल रही 8 प्रोत्साहन योजनाओं के कार्यान्वयन की समीक्षा करके महत्वपूर्ण निर्णय लिए गए।

संस्थान की अन्य राजभाषा गतिविधियाँ-

- » संस्थान की हिन्दी गृह पत्रिका के आठवें अंक 2018-19 का 29 मार्च 2019 को निदेशक, भाकृअनुप-राडेअनुसं, करनाल के कर कमलों से विमोचन किया गया।
- » नवनियुक्ति पर स्थापना 4 अनुभाग में पदस्थापित की गई 1 अवर श्रेणी लिपिक सुश्री निष्ठा को संस्थान प्रमुख की ओर से अपना संपूर्ण प्रशासनिक कार्य हिन्दी में निपटाने के लिए व्यक्तिशः आदेश जारी किए गए।
- » वार्षिक हिन्दी तकनीकी लेखन प्रोत्साहन योजना वर्ष 2017-18 प्रतियोगिता के अन्तर्गत 6 विभिन्न श्रेणियों के अन्तर्गत 48 वैज्ञानिकों/तकनीशियनों को नकद पुरस्कार

व प्रमाणपत्र के लिए चयनित किया गया है। इन्हें आगामी राजभाषा समारोह में प्रमाणपत्र से सम्मानित किया जाएगा।

- » संस्थान के 18 मंत्रालयिक एवं प्रशासनिक स्टाफ, गृह मंत्रालय, राजभाषा विभाग, नई दिल्ली के तत्वावधान में पत्राचार माध्यम से जनवरी, 2019 माह में हिन्दी टाइपिंग की परीक्षा में शामिल हुए एवं उत्तीर्ण घोषित हुए हैं।
- » संस्थान में एक हिन्दी कार्यशाला का दि. 1.2.2019 को आयोजन किया गया।

नगरस्तरीय राजभाषा गतिविधियाँ-

संस्थान ने नगर राजभाषा कार्यान्वयन समिति, करनाल के अध्यक्षीय कार्यालय के रूप में करनाल स्थित 51 सदस्य कार्यालयों को राजभाषा हिन्दी के प्रचार, प्रसार व कार्यान्वयन हेतु मार्गदर्शन प्रदान किया। समिति द्वारा सदस्य कार्यालयों के सहयोग से कई नगरस्तरीय आयोजन किए गए। 23 जनवरी 2019 को नगरस्तरीय बैंकिंग शब्दावली प्रतियोगिता एवं हिन्दी अनुभव लेखन प्रतियोगिता का आयोजन किया गया। 25.1.2019 को स्वच्छता पर बाल चित्रकला प्रतियोगिता व हिन्दी निबंध लेखन प्रतियोगिता, 4 फरवरी 2019 को राजभाषा संगोष्ठी (विषय-शिक्षण को प्रभावी बनाने में शिक्षकों एवं भाषा का योगदान व विद्यार्थियों में तनाव प्रबंधन), 18 फरवरी 2019 को हिन्दी कार्यशाला व संगोष्ठी (विषय: राजभाषा नीति, नियम, व्यवस्थाओं का कार्यान्वयन तथा हिन्दी के द्वारा बच्चों में रचनात्मकता को कैसे बढ़ावा दिया जाए), 19 फरवरी 2019 को जवाहर नवोदय विद्यालय, सग्गा के कक्षा 9 के विद्यार्थियों के लिए हिन्दी क्विज प्रतियोगिता, 28 फरवरी 2019 को नगरस्तरीय हिन्दी व्याख्यान (राष्ट्रनिर्माण में विद्यार्थियों का योगदान), 15 मार्च 2019 को राजभाषा अधिकारियों हेतु हिन्दी कार्यशाला एवं 19 मार्च 2019 को नगरस्तरीय व्याख्यान "राजभाषा से रोजगार के क्षेत्र में रोजगार के अवसर" का आयोजन किया गया।

SOUTHERN CAMPUS, BENGALURU

RESEARCH

Antisperm Antibodies in Bulls and Cows: A Cause for Concern

(Channareddi Kuntareddi and A. Kumaresan)

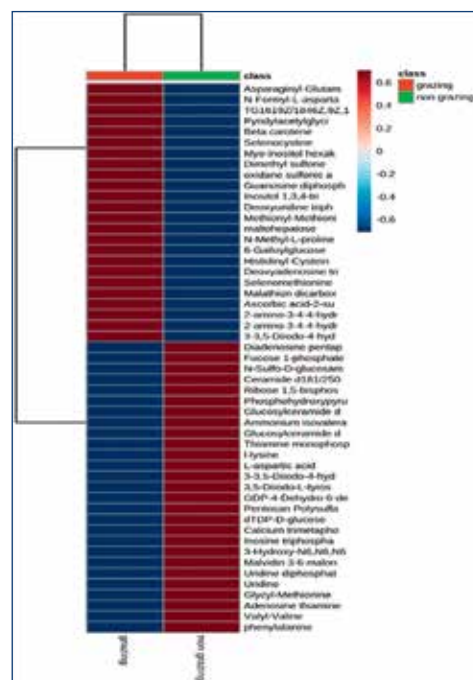
Infertility, in male and female animals, is one of the major problems encountered by the farmers. Among the several forms of infertility, repeat breeding (RB) is the most significant and baffling reproductive problem for the field Veterinarians. Several etiological factors have been attributed to RB; however, recently, immunological infertility has emerged as a significant contributing factor. An ELISA method was developed and the levels of antisperm antibodies (ASA) in blood serum quantified and cervical mucus obtained from RB and normal animals. It was found that the concentration of ASA in serum of repeat breeders was significantly ($P < 0.05$) higher (more than 2 times) compared to normal breeders. Similarly, ASA concentration in cervical mucus of repeat breeders was also higher compared to normal breeders. Another study was also conducted on the proportion of spermatozoa reacting to ASA in 24 crossbred bulls with known fertility. It was found that overall ASA positive spermatozoa were significantly ($P < 0.05$) higher in low fertile bulls. The proportion of membrane intact spermatozoa ($r = -0.750$) and live acrosome intact spermatozoa ($r = -0.745$) were negatively correlated with the proportion of spermatozoa displayed ASA binding over acrosomal area (The figure indicates different binding patterns of ASA to crossbred bull spermatozoa). It could be inferred that the proportion of ASA binding spermatozoa was lower in high-fertile bulls and, ASA concentration in serum and cervical mucus of cows with repeat breeding problem was higher compared to normal cows indicating that ASA negatively affect fertility. ASA might interfere with vital parameters such as sperm motility, capacitation, acrosome reaction, sperm-oocyte interaction and leads to failure of fertilization and early embryonic mortality as was reported earlier. Since ASA positive spermatozoa were greater in low fertile bulls compared to high fertile bulls, it is possible that ASA could reduce the number of competent spermatozoa in an insemination dose thereby reducing the chances of conception leading to repeat breeding.

Liquid Chromatography - Mass Spectrometry Characterization of Milk Metabolome of Malnad Gidda (*Bos indicus*) Cows Reared under Grazing System

(M. Ashokan and K. P. Ramesha)

The milk and milk products produced from cows reared under grazing system has high demand and sold at higher price in Indian market and believed to provide better health benefits. Novel metabolites in milk of grazing Malnad Gidda cows were identified using Liquid chromatography - Mass Spectrometry. Milk samples from healthy multiparous Malnad Gidda cows at early lactation were collected from six cows each reared under grazing and non-grazing systems. Non grazing animals were fed with paddy straw, maize fodder, wheat powder and ground nut powder. Pasture based green grasses and forages were the main feeds of the grazing animals. Dimethyl sulfone, diiodo phenyl sulfoxy propanoic acid, diiodo phenyl propanoic acid, diiodo 4 hydroxy phenyl lactate, beta carotene, ascorbic acid 2 sulfate and hydroxy phenyl lactate and PC (31:2) and LPC (18:2) lipids were up regulated in milk from grazing cows. PE (32:5), Cer (t40:2), PC (30:1), PC (34:3), PS (36:7), PE (36:8(OH)), PS (34:4(OH)) and Cer (d38:2) were down regulated in milk of grazing cows. This study indicates the possibility of using the appropriate levels of Dimethyl sulfone, Sulfoxy propanoic acid, Beta carotene, Ascorbic acid 2

sulfate and Hydroxy phenyl lactate as possible indicators of milk of grazing Malnad Gidda cows.



Small Scale Transesterification Unit Established in SRS, ICAR-NDRI

(B. Srinivas)

A 50-litre capacity transesterification unit is established at SRS of ICAR-NDRI, Bengaluru under the DST, Gol, collaborative project with KSCST, IISc, Bengaluru. The objective is to cater the 'Biofuel' sector and use its by-products in 'Dairy' sector. The unit is efficiently used in conservation of Non-edible oilseeds (NEOs; Pongamia, Simaruba, Neem, Mahua and Jatropha) and waste cooking oil into Biodiesel, glycerol and NEO meals/cakes. Each 100 litre of oil could be converted into 90 litres of biodiesel and 10 litres of glycerol. Most of the NEOs have 40 to 60% oil and yield 40 to 50 kg cake/meal from 100 kg seed which could be used partly in dairy rations or biopesticide. The quality of glycerol harvested from NEOs was thoroughly tested for secondary plant metabolites and their fermentation kinetics. Biodiesel quality was evaluated by KSCST, IISc in running the generators/vehicles with superior performance than natural diesel. Glycerol has been successfully tested as glycogenic supplement in dairy calves, pre-partum cows and lactating cows as density energy source with health benefits.



EXTENSION ACTIVITIES

- Technical Advisory services were rendered to 31 clientele during personal visits to the Institute, phone and mail enquiries. The information needs of the advisory comprised of technical advice for dairy start-ups, preparation of dairy products, establishing cattle feed plant, cattle feed formulation, hi-tech animal housing and health care of crossbred and management of indigenous dairy cattle.
- A total number of 502 visitors visited the institute in 15 batches comprising farmers from different parts of Karnataka, students from educational institutes and field extension/veterinary officers. They were explained the ongoing research and extension activities of the Institute.
- Extension folders in regional language was prepared on Mastitis Management, Green Fodder Production, Azolla Production and Hydroponics Fodder Cultivation for Profitable Dairy Farming and an Extension Bulletin on "Guidelines for Scientific Dairy Management Practices" was prepared under Farmer FIRST Collaborative Project, for the benefit of the farming community of the project villages / adopted villages and other needy clientele groups.
- An Exposure cum training programme was organised for 95 trainees in four batches comprising farmers, farmwomen and farm youth from Trichy, Sivagangai and Theni districts of Tamilnadu and Malappuram, Kerala under 'Support to State Extension Programmes for Extension Reforms' (SSEPERs) under Agricultural Technology Management Agency (ATMA) scheme. The trainees were made aware of technical know-how of related to scientific dairy farming aspects in breeding, feeding and healthcare aspects by lecture presentations in local language, followed by visit to Livestock Research Centre and Experimental Dairy Plant. A demonstration session was organised for the benefit of farmer-trainees on machine milking and clean milk production.
- Interactive sessions with clientele groups were organised in Kempathimmanahalli village with members of Women dairy Co-operative Society and among farmers/farmwomen in Peddenahalli and Hosahalli villages to identify the problems and needs of the farm families involved in dairying and to formulate extension programmes with institute interventions.
- Lecture on 'Scientific Feeding of Dairy Cattle' was made by subject matter specialist on the occasion of farmers' training programme organised by BAMUL & BOSCH foundation on February 5, 2019 at Sanjeevana Doddi, Bidadi, Bangalore attended by more than 1000 farmers.
- Participated in the State Level Pashu Mela 2019, held during January 5-7, 2019 at Sindhanuru, Raichur District, organised by Department of Animal Husbandry & Veterinary Services, Karnataka, showcasing the institute technologies / relevant research information on dairy production and processing aspects for the benefit of the farmers of the region as a part of technology dissemination, well attended by 3 Lakh farmers of the State.
- Participated in the National Horticultural Fair 2019 held from January 23-25, 2019 at IIHR, Hesarghatta, Bengaluru. The event focused on need-based knowledge sharing and showcasing institute activities and technologies for the benefit of the farming community of the region with participation of 15,000 farmers.
- Under the collaborative project of Farmer FIRST Programme of ICAR-IIHR and ICAR-NDRI-SRS, planned extension programmes organised comprised, on-farm method demonstration on mastitis management with CMT Kit on February 7-13, 2019 in the project villages, Yeremgere, Balepura, Hosadurga and Vasappana Doddi of Kanakapura Hobli of Ramnagara Taluk, for the benefit of clientele groups.

EVENTS

Farmers Training on Scientific Management of Malnad Gidda Cattle and Malnad Gidda Habba (Cattle Show)

A farmers training programme on "Scientific Management of Malnad Gidda cattle" and a "Malnad Gidda Habba (Cattle Show) and health camp was organized by Southern Regional Campus of ICAR-NDRI, Bengaluru at Honnavar, Uttara Karnataka on March 17, 2019 under KLDA-MOEF&CC funded project on "Proteo-Genomic approach to elucidate productive & reproductive performance of Malnad Gidda, Deoni & Hallikar breeds of cattle". A total of 200 Malnad Gidda farmers attended the training programme. Dr. K. P. Ramesha delivered a lecture on 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 care and management of Malnad Gidda cattle, common toxicity problems and their managements in Malnad Gidda cattle, ethno veterinary practices, reproductive disorder management and fertility augmentation techniques were covered by experts. A separate farmer and experts interaction session was also held wherein farmers' queries were answered. Parallel to the programme, Malnad Gidda Habba (Cattle Show) cum health camp was organized. Farmers from various villages in and around Honnavar brought their Malnad Gidda cattle for the show. Dr. S. Jeyakumar and Dr. A. Manimaran, Conveners of the programme conducted cattle health camp in association with Veterinarians from Animal Husbandry and Veterinary Services Dept., Govt. of Karnataka. In addition, to promote green fodder cultivation, a total of about 2,200 fodder stem cuttings were distributed to farmers and were imparted the technical know-how on fodder cultivation.

EASTERN CAMPUS, KALYANI

RESEARCH

Enhancement of Developmental Competence of Immature Oocytes Supplementing with Epidermal Growth Factor as a Media Supplement for Cattle Embryo Development

(Shiva Prasad, Prakash C, M. Karunakaran, A. Santra and Subrata K. Day)

The study was conducted to improve the production of *in vitro* cattle embryos using epidermal growth factor as a culture media supplement. Fresh cattle ovaries and oviducts were collected from a local abattoir in 0.9% saline solution (30-35 °C) supplemented with antibiotics (400 IU/mL penicillin and 50 mG / mL streptomycin) and transported to the laboratory within 2-3 h following slaughter. A total of 765 cumulus oocyte complexes were collected by aspiration method with 19 gauge hypodermic needle, washed 5-6 times and cultured in maturation media for

24 h in 5% CO₂ incubator at 38.5 °C with maximum humidity. After 24 h of culture, matured oocytes were co-incubated with

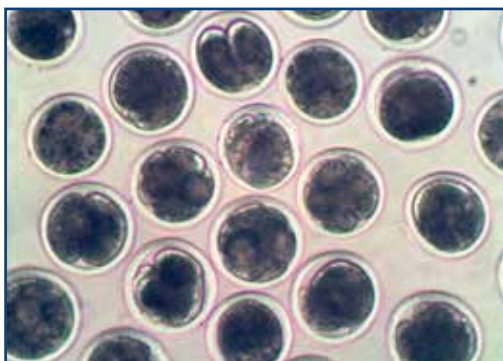


Fig. Cattle embryo developed through *in vitro* technique

in vitro capacitated sperms (2-4 million /mL) for fertilization in Fertilization Bracket Oliphant media at 38.5 °C in 5% CO₂ in air with maximum humidity. After 5-6 h of co-incubation, surrounding cumulus cells were stripped off by repeated gentle pipetting with fine pipette presumptive zygotes were washed thoroughly and cultured in modified Charles Rosenkrans 2 amino acid for cleavage. After 40-42 h. cleavage was observed and embryos were co-incubated with vibrant oviductal cells for further development in same environmental conditions. In the treatment group culture media (maturation media, fertilization media and embryo culture media) were supplemented with epidermal growth factor with three concentrations The mean percentage of cleavage and morula formation rate was significantly higher with 10 ng /mL of EGF than the control group. These results indicate that of epidermal growth factor @ 10 ng/mL could be used as a culture media supplement for *in vitro* production of cattle embryos.

Ameliorating the Toxic Effects of Arsenic by Supplementing Vitamin E and Yeast Culture in Goats

(Debasis Satpathy, T.K. Dutta, A. Chatterjee and Asif Mohammad)

To study the efficacy of vitamin E and *Saccharomyces cerevisiae* to ameliorate the toxic effect of arsenic, thirty number of Black Bengal kids were divided into five groups. Control group (T₀) was fed basal diet. Rest of the four groups (T₁, T₂, T₃ and T₄) were provided 50 ppm arsenic per kg DM in form of NaAsO₂ (T₂: T₁ + Vitamin E (250 IU/kg DM); T₃: T₁ + *S. cerevisiae* (4 X 10⁹

CFU/head/day); T_4 : T_1 + Vitamin E and *S. cerevisiae*). Experiment continued for 20 weeks. DM Intake and growth performance were significantly ($p < 0.01$) reduced in T_1 group because of arsenic supplementation. Significantly ($p < 0.01$) higher arsenic load was observed in hair, blood, faecal and urine samples of arsenic supplemented groups; which was reduced by supplementation of vitamin E alone or along with *S. cerevisiae*. Oxidative stress induced by arsenic toxicity was significantly ($p < 0.05$) reduced by supplementation of vitamin E alone or along with *S. cerevisiae*. Arsenic toxicity induction increased the blood plasma concentration of AST ($p < 0.01$), ALT ($p < 0.01$) and ALP ($p < 0.05$), which was reversed by ameliorative treatments (in T_2 and T_4). Therefore, it may be concluded that Vitamin E supplementation at 250 IU/kg DM either alone or



along with *S. cerevisiae* at 4×10^9 CFU/head/day was partially effective in ameliorating the induced arsenic toxicity in Black Bengal goats given at 50mg/ kg DM as NaAsO_2 .

EXTENSION ACTIVITIES

Activities undertaken in the Tribal area: A total of five 'Scientists farmers interaction sessions cum animal health camps' were organized in different tribal villages of West Bengal and Meghalaya. One camp was organized in the Supur village of Birbhum district on January 25, 2019 and 303 farmers were benefitted from the camp. The institute also participated in a Farmers' fair at Shirshi village of Jhargram district in which one animal health camp was also organized. A total of 104 tribal farmers were benefitted through the initiative. One input distribution camp was organized at Eastern Campus of ICAR-NDRI and 32 goats and 2000 chicks were distributed among the tribal farmers of Nadia district

of West Bengal. One on-campus training programme was also organized during the programme. One 'Scientist Farmers interaction session-cum-input distribution camp' was organized in the state of Meghalaya on February 22, 2019. Another 'farmers-scientists interaction programme' was organized on March 22, 2019 at Manmathapur- Mundapara village and 20 tribal farmers were benefitted.

Activities carried out in NEH region: Three North Eastern states namely Mizoram, Meghalaya and Nagaland were covered from January - March, 2019. A total of 15 piglets, 350 kg pig feed, 1200 poultry birds and 900 kg poultry feed were distributed among 150 farmers of Mizoram state during the camp. At Meghalaya 30 piglets, 2000 poultry birds, 50 kg mineral mixture were distributed among 120 farmers. The scientists-farmers' interaction session-cum-input distribution camps were organized at Samzuiram village, Dist. Peren, Nagaland. A total of 45 farmers benefitted by the distribution of inputs like piglets (45), pig feed (450 kg), veterinary medicines etc. through the camp organized at Nagaland.

Training Programmes Organized

One training programme on 'Scientific Dairy farming' was organized from January 15-24, 2019. A total of 9 trainees participated in the training programme and they were acquainted with the recent scientific approaches of dairy farming. Another training programme on 'Artificial Insemination and Veterinary First Aid' of 32 day duration was initiated from March 26, 2019. A total of 14 participants from AMUL and 'Bardhaman Milk Union' participated in the training programme.



Editorial Board

Patron: Dr. R. R. B. Singh, Director, NDRI Karnal
Editor-in-Chief: Dr. Latha Sabikhi, Acting Joint Director (Res.)
Editors: Dr. Meena Malik, Professor (English)
 Mr. Braj Kishor, Asstt. Chief Technical Officer (P&E)
Member: Dr. S. De, Principal Scientist, ABTC
Layout & Design: Mr. Sunil Sharma, Technical Officer
Photographs: I/c Communication Centre, NDRI Karnal
Published by: Director, NDRI Karnal
 Tel.: 0184-2252800 | Fax: 0184-2250042 | E-mail : dir@ndri.res.in | Gram : DAIRYRESEARCH