

NDRI News

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From the Director's Desk



Indian food processing industry, which is in its nascent stage and worth 26 billion US \$ contributes about 8% to national GDP. The richness of agricultural diversity and rise in per capita income offer greater prospects for Indian food industry. The Indian dairy sector, with over 112 MT milk production and 36% level of processing is an important source of livelihood for more than 70 million small and marginal farmers. Nutritional security is the key issue at the global level. Health concerns are attributed to poor nutrition in low income segments of the population, whereas, the affluent strata of the society need to address health issues that are emerging from changing lifestyles and food habits. In such a scenario, a lot of emphasis is placed on diet. Functional foods have a special significance in our country, where malnutrition and infectious diseases remain a silent emergency. A large proportion of the Indian population is vulnerable to hidden hunger. In addition, very high rates of mortality occur due to coronary


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heart-diseases (CHDs), cancer and diabetes, all related to diet and food habit.

Wide varieties of traditional foods are prepared by combining cereal grains/flour with milk. The unique combination not only enhances the palatability of these commodities, but also improves the nutritional value. Classical example of "composite dairy food" is malted milk products, which offer most of the vital nutrients in more digestible and easily absorbable form to growing children. There is a scope for developing milk-millet based weaning or complementary foods at more economical levels. There has been a rejuvenated interest among the stakeholders regarding the food application of millets and coarse cereals. However, inherent problems like presence of thick pericarp, lack of primary processing equipments, anti-nutrients and lack of awareness among people resulted in continuous decline in consumption of these crops. Recent growth in functional foods and upward trend of Indian food market offer newer opportunities for the development of innovative health foods through judicious formulation of milk or milk ingredients with cereals/ millets/ fruits/ vegetables into convenient, long-life form with proven health benefits to consumers. Milk ingredients specially the whey components have potential to improve the quality characteristics of millet or coarse cereals based bakery, snack foods, weaning food etc. Furthermore, technological innovations for the manufacture of Bajra lassi, whey protein-enriched millet biscuits and snacks, gluten-free bakery products and other convenience composite dairy foods based on milk solids and millets/ coarse cereals could be an effective tool for product diversification.

As such there is a great scope for optimizing the processing technologies to utilize the underutilized agricultural crops in combination with milk ingredients for the manufacture of novel foods with unique nutritional and therapeutic profile. Considering the health benefits of millets/ coarse cereals, the major task that lies ahead is to design these basic ingredients into products that help in alleviating malnutrition in mass population and also appeal health conscious consumers.



(A. K. Srivastava)

RESEARCH NEWS

Anti-anaemic Properties and Storage Stability of Iron Fortified Biscuits from a Composite Dairy-cereal Mix

Iron deficiency is the most common nutritional deficiency in the world today and results in a condition termed iron deficiency anaemia, which at its most advanced form cause several major negative impacts on health and contributes substantially to the risk of early death and disability. Fortification of foods with iron has been a commonly used strategy to combat iron deficiency throughout the world. A major advantage of using biscuits as a fortification vehicle is that it is considered to be a cost-effective, shelf-stable and tasty snack rather than a meal. A protocol was standardized to manufacture biscuits from composite wheat-pearl millet flour in combination with valuable dairy ingredients such as whey solids and enriched with a suitable iron fortificant selected on the basis of sensory evaluation. The iron fortified biscuit contained 6.53 mg iron per 100 g. The other nutrients present were 18.81% fat, 12.23% protein, 1.13% ash, 1.42 crude fiber, 3.2% moisture and 63.28% carbohydrates. The product showed storage stability up to 4 months without any significant change in the sensory as well as nutritional attributes. *In vivo* trials on Wistar rats indicated that the iron fortified biscuits helped to maintain the haematic status of normal animals and repair that of anaemic ones. Biological indices (apparent digestibility coefficient, retention of iron and percentage retention of iron) were greater in anaemic rats than in normal ones indicating that the iron bio-availability is dependent on the iron status of the body. The haemoglobin concentration (mg/dl) increased significantly by about 25% and 70% in normal and anaemic rats respectively. Ferritin concentration in the blood plasma also increased. The cost of manufacture of the product was estimated as Rs. 17 per 100 g of the product.



Iron fortified biscuits from a composite dairy-cereal mix

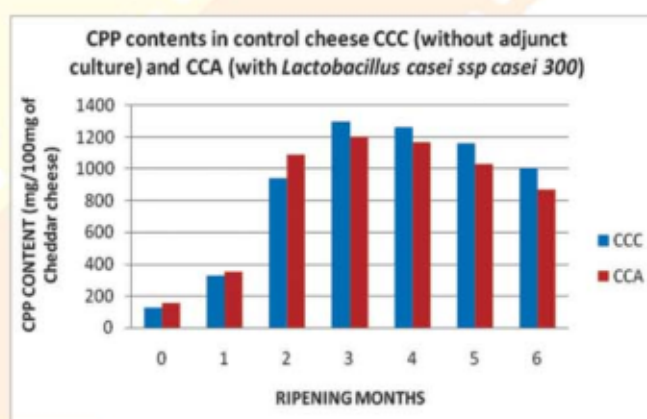
Role of *beta*-glucan and milk fermented with *L. casei* in modulation of gut microflora and immune system in mice

Functional food ingredients like prebiotic, probiotic and synbiotic are known to stimulate the growth of certain intestinal bacteria of host. Different prebiotics have been reported to play roles in immunomodulation. Administration of probiotics has shown to control the clinical symptoms of atopic diseases in humans. Consumption of certain non-digestible dietary fibers can prevent and /or ameliorate such diseases. Dietary substrates reaching the large intestine influence the number of bacteria (in terms of total and specific populations), and the metabolic byproducts from bacteria utilizing these dietary substrates can affect the gut-associated lymphoid tissue (GALT). There is a paucity of information with reference to prebiotic like barley beta-glucan and synbiotic on the modulation of gut microflora and their immunological aspects. Studies were carried out to investigate the effects of a prebiotic (barley beta-glucan), milk fermented with a potential probiotic (*L. casei*) and a combination of both of these (synbiotic) on the gut microflora and the immune system of mice in ovalbumin induced allergy model. The study revealed that there was significant decrease in the total bacterial counts (as determined by DAPI) in faeces of mice on induction of allergy. The feeding of diets supplemented with prebiotic/ milk fermented with probiotic or synbiotic were found to resist the decrease in bacterial counts. A significant increase in the *Lactobacilli* and *Bifidobacteria* counts in the feces of mice fed different functional food ingredients (barley beta-glucan, milk fermented with probiotic and synbiotic) was observed. Induction of allergy led to different pathological changes like increase in total IgE level in serum, histopathological changes in intestinal tissue. A protective effect of feeding of different functional food ingredients was observed. However, further studies are needed to explain their mechanism of action.

Changes in the Caseinophosphopeptides Contents during Ripening of Cheddar Cheese made with Adjunct Culture (*Lactobacillus casei* ssp. *casei* 300)

Caseinophosphopeptides are multifunctional bioactive peptides derived from milk casein. In recent years, caseinophosphopeptides (CPPs) have received much attention due to its multifunctional properties i.e. mineral binding, antioxidative, anticariogenic

and immunomodulatory properties. The ability of these peptides to increase food stability and promote health makes them potential multifunctional food ingredients for functional foods. Cheese and fermented milk products are thought to be a good source of caseinophosphopeptides. In the present study, two types of cheddar cheeses were prepared, one by using standard cheese culture i.e. NCDC CH-149 named as control cheese (CCC) and other cheese was prepared by using adjunct culture (*Lactobacillus casei* ssp. *casei* 300) along with standard culture named as experimental cheese (CCA). Cheeses were analysed for changes in the sensory parameters and level of caseinophosphopeptides during ripening upto 6 months. Caseinophosphopeptides (CPPs) were isolated from water soluble extracts (WSE) prepared from cheddar cheeses. The level of CPPs in both the cheeses increased with ripening period upto third month and then gradually decreased. The rate of CPP formation was higher in CCA upto second month as compared to CCC. The level of CPPs in both the cheeses i.e. CCA and CCC was almost same after third month (1.296 g/100g of cheese and 1.301 g/100g of cheese, respectively). The overall sensory evaluation showed highest scores in CCA after third month of ripening, whereas for CCC, highest scores were obtained after sixth month of ripening. The cheese prepared with adjunct culture showed better sensory score and higher level of caseinophosphopeptides between ripening periods of 3 to 4 months as compared to control cheese.



A simple and Rapid Method for Cholesterol Estimation in Ghee using o-Phthaldehyde (OPA) Reagent

A method has been developed to estimate cholesterol in ghee, using O-phthaldehyde (OPA) reagent.



Standard Cholesterol Ghee

Benefits of the Method:

- Saponification of fat is achieved in 20 minutes.
- Very small amount of fat is used for saponification and unsaponifiable material is extracted in single extraction.
- Small amount of extraction solvent (hexane) is used unlike conventional saponification method.
- It does not involve the use of acetic anhydride (a controlled item) unlike Liebermann- Burchard reagent based method.
- The recovery of the method is 96.68 to 98.62%.

Development of a Method for Cholesterol Estimation in Milk Fat using Enzymatic Diagnostic Kit

A simple and rapid method has been developed for cholesterol estimation in milk fat using enzymatic diagnostic cholesterol estimation kit.

Benefits of the method:

- ▲ The recovery of the cholesterol using developed method was found to be 98.6 to 99.8% and comparable with that of direct method of cholesterol estimation using LB reagent.
- ▲ The developed method can be easily adopted for cholesterol estimation in fresh as well as heated milk fat samples.

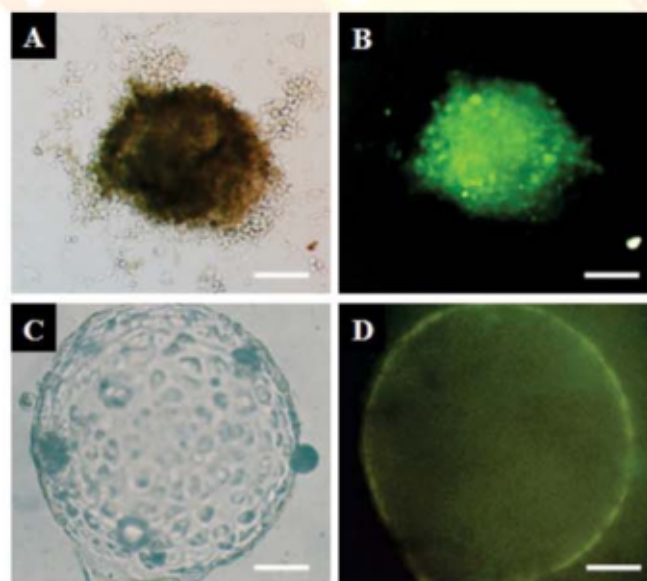
The method is useful to serve as substitute for acetic anhydride, which has become a limiting factor in cholesterol estimation by commonly employed LB reagent method.

Phospholipid Derived Signaling Molecules during *In Vitro* Capacitation and Acrosome Reaction of Buffalo Spermatozoa

The phospholipids turn over during capacitation and acrosome reaction of buffalo spermatozoa was investigated. Freshly collected and washed spermatozoa were incubated under capacitating conditions for 6h followed by induction of Acrosome Reaction (AR) by lysophosphatidyl choline (LPC) treatment. Changes in phospholipids classes were studied during these treatments. The results clearly proved that there was a decrease in the total phospholipids content of spermatozoa during capacitation and acrosome reaction with a concomitant rise in the extracellular fluid. It indicated that phospholipids could be utilized as an energy source. Amount of phosphatidyl choline (PC) increased gradually during these processes, while phosphatidyl ethanolamine (PE) decreased significantly ($P<0.05$) suggestive of phospholipids methylation process in which PE was converted to PC. During AR, in diacyl subclass of PC, the percent composition of docosahexanoic acid and oleic acid was higher, while in alkyl acyl subclass, arachidonic acid increased. In alkenyl acyl subclass, arachidonic acid and oleic acid were increased. The enzymatic activity of Phospholipase A2 (PLA2) and Phospholipase C (PI-PLC) was significantly higher ($P<0.01$) during acrosome reaction than at the 6h of capacitation. While the activity of lysophospholipase (LPL) decreased significantly ($P<0.05$) during the acrosome reaction, which might facilitate the maintenance of the levels of LPC (substrate for the LPL), a known inducer of acrosome reaction. Diacyl glycerol (DAG) an intracellular messenger produced by the action of PI-PLC activity in turn activated the PLA2 activity during the acrosome reaction. This was suggestive of the cross-talk between the different signaling pathways during acrosome reaction. Platelet Activating Factor (PAF), a signaling phospholipid molecule at 200 nM with 15 minutes of incubation after capacitation was found to induce the protein tyrosine phosphorylation of a distinct set of proteins during buffalo sperm acrosome reaction. Cis unsaturated fatty acids stimulated significantly higher percentage of the cells for acrosome reaction compared to the control. The study showed that there was active turn over of phospholipids resulting in the production of intracellular signaling molecules during the capacitation and acrosome reaction of buffalo spermatozoa.

Production of GFP Expressing Buffalo Cloned Blastocysts

In vitro generated buffalo Embryonic Stem (ES) cells were transfected using different transfection methods by a green fluorescent protein (GFP) expression vector. The transfection procedures were first optimized by comparison of different methods viz. electroporation, lipofection (using Lipofectamine or Effectene) and nucleofection on somatic cells. Among the three methods compared, electroporation resulted in the lowest and nucleofection gave the highest transfection efficiency for all the three cell types i.e., buffalo fetal fibroblasts (BFF), buffalo newborn fibroblasts (BNF) and buffalo adult fibroblasts (BAF). In terms of viability, effectene scored best, whereas the rest of the methods gave almost similar viability. BFF were found to be the easiest to transfect. Since the best transfection efficiency was obtained with nucleofection, buffalo ES cell cells were transfected by this method and were plated onto fresh feeder layers and propagated for 1-2 passages, after which ES cell culture medium containing G418 was added, and changed every 48 h. Colonies expressing persistent and homogenous GFP expression during subsequent passages, and showing the presence of integrated transgene, as detected by PCR, were expanded further or cryopreserved.



Cloned transgenic blastocysts produced using transfected ES cell: A: GFP tagged ES cell colony (under bright light); B: Corresponding epifluorescence image; C: A transgenic blastocyst produced using transfected ES cell by hand-guided cloning (under bright light) and D: Corresponding epifluorescence image. Scale bar represents 50 μ m

BFF transfected using different transfection methods and selected using G418 were used for hand guided cloning to study the effect of transfection on the developmental competence of cloned transgenic embryos. The cleavage rate of hand guided cloned embryos reconstructed using transfected cells was similar to that for control embryos reconstructed using non-transfected ones. However, the blastocyst

rate for the non-transfected controls was significantly higher ($P < 0.05$) than that for embryos reconstructed using cells transfected by electroporation or Lipofectamine, but was similar to that for the Effectene and nucleofection groups. The health of the transgenic embryos expressing GFP was normal as indicated by similar total cell numbers of day 8 non-transgenic and transgenic cloned blastocysts.

ACADEMIC AFFAIRS/ DEEMED UNIVERSITY NEWS

Scholars Qualified for the Award of Ph.D. Degree

Scholar	Guide/ Discipline	Title of Thesis
Mr. Biplob Kumar Roy	Dr. Shiv Prasad / Livestock Production & Management	Body condition score in relation to certain physiological and performance parameters of Sahiwal and Karan Fries cows.
Ms. Saroj Rai	Dr. M. L. Kamboj /Livestock Production & Management	Evaluation of Murrah Buffalo performance and milk quality under organic and conventional production system.
Ms. Vahideh Heidarian	Dr. A.K. Tyagi/ Animal Nutrition	Effect of plant extracts on ruminal CLA producing bacteria.

Thesis Submitted

- A total no of 87 M.Sc. dissertations were submitted during June, 2011.
- A total no of 11 Ph.D. theses were submitted during the quarter April to June 2011.

Entrance Examination for admission to Ph.D. programme

Entrance examination for admission to Ph.D. programme was conducted on 21.6.2011.

Admissions

- A total no of 43 were admitted to B. Tech.(DT) programme for the ensuing academic session on 15.6.2011 through counseling conducted by ICAR
- A total of 137 students were admitted to Master degree programme through counseling conducted by ICAR on 27.6.2011, 30.6.2011 and 1.7.2011.



Dr. Gaya Prasad ADG (ICAR) giving valedictory address during CAFT Course on Advances in Processing and Quality Assurance of Dairy Foods organized at NDRI from 22nd March to 11th April 2011.

TRANSFER OF TECHNOLOGY

Krishi Vigyan Kendra (KVK)

Training Programmes organised

- During the period under report, in all 21 training programmes (On-campus and Off-campus & training-cum-visits) on different aspects of dairy production and processing, crop & vegetable

production, vermi-culture, bee-keeping and home science were organized in which 586 farmers, women, rural youth and extension functionaries were imparted training.



- KVK organized 7 sponsored training programme on Scientific Dairy Farming for 197 farmers, rural youth and extension functionaries. In these training programmes 147 trainees were from Bihar and Assam states.
- KVK also organized 7 exposure and study visits for 176 farmers and farm women from different districts of Uttar Pradesh, Haryana & Himachal Pradesh states.

Animal Health Management Activities

Various Animal Health Management activities were organized through Stockman centers in adopted villages of KVK. At these centers, 511 cattle and 191 buffaloes were artificially inseminated and as a result 429 calves were born. Besides these, 43 animals were treated, 40 calves were dehorned and 16 animals were given infertility treatment.

Front Line Demonstrations on Oilseeds & Pulses

During the Rabi season 2010-11, total 15 FLDs of mustard (variety Pusa Vijay) were laid in six hectare area under irrigated condition. The average yield on the demonstration plot was observed to be 14.75 q/ha., which was 17% higher than local checks. Also 10 FLDs on gram (variety HC-5) were laid in four hectare area under irrigated condition. The average yield on the demonstration plot was observed to be 16.4 q/ha, which was 14.68% higher than the local checks. The overall performance of the varieties was found to be good.

Front Line Demonstrations on Other than Oilseeds and Pulses Crop

During the Rabi season 2010-11, total 21 FLDs on wheat (varieties DBW-17 and HD-2894) were laid in 8.45 hectare area under irrigated condition. An average yield of wheat variety DBW-17 and HD-2894 was observed to be 48.6 q/ha and 48.41q/ha., respectively. The overall performance of the varieties was found to be good.

Dairy Extension Division

Dairy Education at Farmers' Door

Dairy Extension Division organized the Extension Education Programme "Dairy Education at Farmers' Door" to strengthen the effective dissemination of dairy production and processing technologies among farming community at villages viz. NasirPur, Nalipur Tilla and Wazidpur of Karnal district.

Summer Moong and Jowar

During the summer season 2011, total 15 FLDs on summer moong using variety SML-668 in 6 ha area and 6 FLDs on fodder crop jowar (S.S.G. multicut) in 2.42 ha area were laid in different villages of Karnal district under irrigated conditions.

On Farm Trials (OFTs)

Wheat and Berseem: During the rabi season 2010-11, total 5 on farm trials on wheat varieties i.e. HD-2851, HD-2894, HD-2932 and WR-544 were laid in 5.6 ha area in 14 locations under irrigated conditions. The average yield of different varieties was found to be 51q/ha, 49.79 q/ha, 48.9 q/ha and 45q/ha, respectively.

During the rabi season 2010-11, total 3 on farm trials on berseem varieties i.e. BL-42, HB-1, Mescavi were laid in 4.8 ha area in 13 locations under irrigated conditions. The average yield of different varieties was 1040q/ha, 960 q/ha and 880 q/ha, respectively.

Paddy: During the reporting period 10 OFTs on paddy in 4.0 ha area using variety Pusa-1121 and PB-1 have been arranged in different villages of Karnal district.

Horticultural Crops: KVK organized seven demonstrations of cauliflower variety Namdhari-133, early and early wonder in 0.40, 2.42 hectare area, respectively. KVK also organized a demonstration on intercropping of coriander in sugarcane fields in 0.40 hectare area.

Revenue Generated by KVK/DTC

Source	Amount (Rupees)
Training Fee from KVK courses	9,000
Training Fee from sponsored courses	1,38,032
Tuition fee from visits conducted	13,000
Room Rent from Farmers' Hostel	69,450
Vermicompost Unit	500
Bee-keeping Unit	3,680
Fisheries Unit	14,543
Dairy Vikas Kendras	14,780
Total	2,62,985

Field/Farm Technician (FFT) Activity

The Field/Farm Technician (FFT) Laboratory of Dairy Extension Division provides a base for extension work in the adopted villages around Karnal and keeps the records of all extension activities of the Division.

Activities Conducted in Adopted Villages (April to June 2011)

Activities Conducted	Nos. of Cases
A.I. in Cows	506
Conception Rate	42%
A.I. in Buffalo	208
Conception Rate	25%
Nos. of Crossbred calves born	65
Nos. of buffalo calves born	14
General Treatment	71

Inter-calving period

in Crossbred animal 18-20 Months

In Buffalo 30-32 Months

Service period

In Crossbred animal 4-5 Months

In Buffalo 12-18Month

During the period under report, 23 Campaigns, 1151 cases were treated for reproductive disorders and various veterinary ailments, ecto and deworming and tick control programmes were conducted for Endo-parasites. Special attention was given to improve the productive and Reproductive cause of Farmers animals by diagnosis and proper treatment.

Empowerment of Women and Mainstreaming of Gender Issues

A total of ten women empowerment training programmes 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 and maintain healthy atmosphere in

their respective family. A total of 150 farm-women Participated in these training programmes from villages Nasirpur, Subri, Kulwheri, Vazidpur and Shahpur.

Kisan Sangosthies

Eight Kisan sangosthies were organized at village level and following topics were discussed in detail.

- Prevention and control of infertility of dairy animals
- Clean milk production practices in rural areas
- Role of reducing inter-calving period in lactating animals,
- Endo and ecto-parasite control of dairy animals
- Importance of animal vaccination against contagious diseases.
- Role of mineral mixture in animal diet
- Heat stress management in buffaloes
- Balance diet of lactating animals

Reaching the Farmers Doorstep through Mobile Extension Unit

The inauguration of Mobile Extension Unit, a unique extension approach initiated by Dairy Extension Division of NDRI with the financial assistance of NABARD, Chandigarh was organized at village Nasirpur, Karnal on 24th June, 2011. Shri. A. K Dhup, Dy. General Manager, NABARD inaugurated the Mobile Unit. This Unit will be having the facilities for carrying out prompt A.I services, facilities for milk testing and feed analysis and projection facilities for communicating scientific dairy farming technologies to farmers through audio/video displays.

RECENT HAPPENINGS

SAARC Countries Meet on Dairy Sector

A two day meeting on 'Dairy Production, Quality Control and Marketing System in SAARC Countries' was organised at NDRI, Karnal. The meeting was attended by representatives from six SAARC countries including **Bangladesh, Pakistan, Bhutan, Nepal, Sri Lanka and India** alongwith invited experts from different institutions in India and faculty of NDRI Karnal. Dr. V. K. Taneja, Vice Chancellor, GADVASU, Ludhiana; Dr. K. M. Bujarbaruah, Vice Chancellor AAU, Jorhat; Sh. Ravi Shankar, Executive Director, National Dairy Development Board, Anand; Dr. B. K. Joshi, Director, NBAGR, Karnal; Dr. R. K. Sethi, Director, CIRB, Hisar, and Sh. Animesh Banerjee, former President, Indian Dairy Association, were the prominent experts from India. Prof. Ramesh Chand, Director National Centre for Agricultural policy, New Delhi and Member, Governing Body of SAARC Agriculture Centre, Dhaka (Bangladesh), chaired the concluding session. The

conference comprised of three technical sessions in which different issues related to milk production, quality, and marketing of dairy products were discussed. The recommendations of the conference were finalized for submission to the SAARC Secretariat through relevant channels. The major points include:



Dr. V. K. Taneja, V. C. GADVASU inaugurating the SAARC meet



Prof., Ramesh Chand, Director NCAP chairing the concluding session



Dr. K. M. Bujarbaruah, V. C. AAU Jorhat addressing the SAARC meet

- Setting up of regional semen banks for breed improvement in the SAARC region.
- Facilitation of trade in dairy products amongst SAARC nations by removing the trade barriers.
- Establishment of information centers.
- Exchange of information on Dairy and Animal Husbandry.
- Exchange of students and trainees for promotion of dairy education in the region
- Address trans-border diseases of animals through harmonization of action plans.

National Dairy Research Institute, Karnal and National Dairy Development Board, Anand have been identified as knowledge centers and will help in the establishment of Information centers and also facilitate training of students and farmers from different countries of SAARC nations.

1st Convocation of National Academy of Dairy Science (India) and National Symposium on Probiotic Dairy Foods for Human Health

On the occasion of the celebration of 11th World Milk Day on June 1, 2011, NDRI, Karnal organized 1st

Convocation of National Academy of Dairy Science (India) and National Symposium on Probiotic Dairy Foods for Human Health. During the inaugural function, the Chief Guest Prof Dr. S. A. H. Abidi, Former Director & Vice Chancellor, CIFE, Mumbai and Former member, ASRB admired the efforts of scientists in creating new innovations in production and processing of milk and stressed the need to handle milk adulteration issues very carefully. He also conferred Fellowships on the 21 founder members of National Academy of Dairy Science (India) and released a manual on Design and Experiments.

During the presidential address, Prof. Dr. A. K. Srivastava, Director & Vice Chancellor, NDRI informed that the celebration of this Day provides an opportunity to focus attention on milk as a global food and to publicize activities connected with milk and the milk industry. He emphasized the importance of probiotic dairy foods. With the growing awareness and consciousness about health, Indian society is getting receptive to 'Probiotic Culture' and finds these products very attractive source of bioactive ingredients that serve as prophylactics or



Dr. S. A. H. Abidi Former Director CIFE, Mumbai inaugurating the symposium

bio-therapeutics and thus promote human health and well being besides helping in the management of specific diseases. He briefed about the objectives of the newly formed National Academy of Dairy Science. He stressed that the major mandate of the academy is to provide guidelines to policy makers so that issues like malnutrition, dairy food biotechnology for extension of shelf life of dairy products, fortification and bioavailability of micro and macro nutrients and dairy food safety can be taken care of. He emphasized that the vision of National Academy of Dairy Science is to reduce the micronutrient malnutrition by 2025 through guidelines/ awareness programmes, policy papers & human resource development.

The prominent speakers in the Symposium were Dr. Prabhakar Kanade, Chief, R & D Officer, Mother Dairy, New Delhi; Dr. Sanjeev Ganguly, Medical Director,

Nestle, South Asia Region, Gurgaon; Dr. Neerja Hajela, Head Science, Yakult Danone India Pvt Ltd.; Dr. Dipankar Ghosh, Assistant Professor, JNU, New Delhi; Dr. Parikshit Bansal, NIPER, SAS Nagar (Mohali), Punjab and Dr. V. K. Batish, Dr. Latha Sabikhi & Dr. R. K. Sharma from NDRI, Karnal.

National Seminar on "Multi-Sectoral Innovations for Rural Prosperity"

A three day National Seminar on "Multi-Sectoral Innovations for Rural Prosperity" was organized from 19th to 21st May, 2011 at NDRI in collaboration with Society for Community Mobilization for Sustainable Development. The seminar was inaugurated by Shri Harish Rawat, Hon'ble Minister of State for Agriculture and Food Processing Industries, Govt. of India, New Delhi as Chief Guest. Sh. Rawat ji, while addressing more than 250 delegates from different states of the country said that we must ensure judicious conservation and use of soil, water and biodiversity resources, through improved management practices to meet the requirement of providing food and nutritional security to our people in a sustainable manner.

He further said that there is enormous scope for the growth of agro-processing, agro-industries and agribusiness for which the more entrepreneurs should join.

Dr. P. L. Gautam, Chairperson, PPV, FRA, Ministry of Agriculture, Govt. of India and Former, DDG (Crop Sciences) ICAR; and Dr M. C. Sharma, Director, IVRI were the Guests of Honour. Dr Gautam said that multi



Hon'ble Minister Sh. Harish Rawat Ji inaugurating the seminar

sectoral issues and recommendations emerging out from the deliberations of the seminar would help in reshaping the policy issues and newer research areas. Dr. M.C. Sharma spoke on various issues on livestock production in rural area and particular touched upon animal health coverage for having higher herd productivity in rural areas.

Dr. A. K. Srivastava Director and Vice Chancellor,

NDRI in his Presidential Address while presenting the national and international statistics on agriculture and allied areas said that there is an urgent need for evolving new technologies at various fronts so that the farming community is benefited in a holistic fashion. He further added that although we rank number one in the world in milk production, but still much is to be done to capitalize upon our strength of having the large number of cattle and buffalo population of the world



In the valedictory session, Dr C. D. Mayee, Chairman ASRB presented the awards of the MOBILIZATION society.

National Training on Mitigation Strategies for Methane Production from Dairy Animals

National Training on "Mitigation Strategies for Methane Production from Dairy Animals" was organized by NDRI, Karnal from May 02 to May16, 2011. The training was sponsored by National Agricultural Innovation Project, Indian Council of Agricultural Research (ICAR), New Delhi under component-1. A total of 13 participants from different universities and research institutes attended the training programme. Training was imparted on different strategies for mitigation of methane in dairy animals and hand on training was given on practical aspects of different techniques used for isolation, culture, characterization, diversity analysis, and quantification of rumen microbes along with in vivo methane estimation in animals.

Training programme on Technological and Safety Aspects of Dairy Processing

A short training programme on "Technological and Safety Aspects of Dairy Processing" was successfully organized by Dairy Technology division during June 13, 2011 to June 17, 2011 for thirteen professionals of Nestle India Ltd.

Model Dairy Plant certified under ISO: 22000: 2005

Model Dairy Plant (MDP) is certified under ISO: 22000: 2005 (Food Safety Management System).

MDP organized ISO 22000:2005 "Certification Institution Ceremony" on 23rd April, 2011. The delegates from Indian Register Quality Systems & NDRI were invited. Honourable Director, NDRI appreciated the efforts of GM, MDP and his team to implement the Food Safety Management System (ISO 22000:2005) in Model Dairy Plant.

DISTINGUISHED VISITORS

- 07.04.2011 Five members from Dept. of Genetic & Bio-technology, faculty of science and technology, Aarhus University DK-8830, Tjele, Denmark.
- Dr. Mogens Sando Lund
 - Dr. Permadson
 - Mr. Jorn Rind Thomasen
 - Dr. Guosheng Su
 - Dr. Gautam Sahana
- 10.05.2011 Two member delegation from U.K. and Finland.
- Mr. Russell Amos
 - Ms. Martina Kahila
- 16.06.2011 Three member delegation from Republic of Kazakhstan.
- Dr. Bitore Djumahanov
 - Serik B. Kenenbayev
 - Abdirakhman OMBAEV

Visit By Foreign VIP

Mr. David Campbell, Livestock Performance Manager & Project Leader (Special Milks) of Synlait Ltd., New Zealand and New Zealand Nuffield Scholar visited Dairy Technology Division and had discussion on 'Functional Foods & Dairy Products' and his study topic 'Understanding our Asian customers and optimizing opportunities for New Zealand Agriculture'.

VISITS ABROAD

- **Dr. S. S. Thakur**, Principal Scientist, Dairy Cattle Nutrition, Division, participated in the Congress on Fibre in Dairy Production held from 11th to 13th May 2011 at Italy.

- **Dr. T. K. Datta**, Principal Scientist, Animal Biotechnology Centre was deputed for training in the area of "Molecular biology techniques with mammalian oocytes/embryos" in Germany under NAIP sub-project of Component-4 from 14th May to 13th August, 2011.
- **Dr. A. K. Srivastava**, Director, NDRI and Dr. Shiv Prasad, Principal Scientist, In-Charge Cattle Yard, participated in Indo-New Zealand Networking Workshop on "Food & Agriculture" in New Zealand from 20th to 24th June 2011.
- **Dr. M. K. Singh**, Sci, Animal Biotechnology Centre was deputed for training in the area of "Stem Cell Research (Animal Sciences) in USA under NAIP project of Component-I from 20th June to 17th September 2011.
- **Dr. S. K. Sirohi**, Sr.Sci, Dairy Cattle Nutrition Division participated in 4th Conference of European Microbiologists (FEMS 2011) under NAIP project of Component-4 in Switzerland from 26th to 30th June, 2011.

HONOURS/AWARDS

- **Jawaharlal Nehru Award for P.G Outstanding Doctoral Thesis Research** in Agricultural and Allied Sciences 2010 was given to **Dr. Ramya Iyer** (Supervisor: Dr. S. K. Tomar), Dairy Microbiology Division, NDRI, Karnal.
- **Young Scientist Award** was given to **Ms. Seema**, for oral paper at National seminar on fermented foods, BHU, Varanasi held on 8-9th April, 2011.
- **Second Prize** in the IFT AAFSIS poster competition during Annual Institute of Food Technologist meeting held at New Orleans (June 11-14, 2011) was given to **Uma T. Maheswari, Rameshwar Singh, Prashant, Sudhir K. Tomar**.
- **Anbukkarasi. K**, Dhiraj Nanda, Uma Maheswari, T. Prashant and Rameshwar Singh. got **Second Prize** in poster in National conference on "New Horizons in Bioprocessing of foods, Department of



NDRI Team receiving overall Champion Trophy at ICAR Inter-institutional Sports Meet (North Zone) held at Dehradun



A dance performance during Inter-institutional Youth Festival Reverie celebrated at NDRI from 2nd to 5th April 2011



Annual Sports Day Celebrations at NDRI



food engineering and technology", SLIET, Longwal, Punjab. February 25-26, 2011.

FORTHCOMING EVENTS

- Dairy Technology Division is going to organize a course on **"Technological Developments in Cheese and Fermented Dairy Foods"** under the aegis of Centre for Advanced Faculty Training in dairy processing. The course is scheduled to be held during 5th to 25th July, 2011.
- 10 days National Training Programme on **"Basic and Applied Approaches in Designing of Dairy Based Nutraceuticals and Functional Foods"** sponsored by National Agricultural Innovation Project, ICAR, New Delhi is being organized at Dairy Technology Division of NDRI, Karnal from 18th to 27th July, 2011.

PERSONALIA

Joining

- Dr. Ram Kumar, Principal Scientist, nominated as Acting Head, Dairy Extension Division, w.e.f. 22-03-2011.
- Sh. Mithlesh Kumar joined as Sr. Finance & Accounts Officer on transfer from ICAR Research Complex, Patna on 01-04-2011.

- Dr. Ashwani Kumar Roy, Sr. Scientist (Animal Physiology) joined at NDRI, after his transfer from NRC, Camel, Bikaner on 26-05-2011.

Promotion

- Dr. Brajendra Singh Meena, Scientist (Sr. Scale) (Agril. Extension) promoted to the post of Sr. Scientist w.e.f. 19-11-2008.
- The tenure of G.R. Patil, Joint Director (Academic) renewed for the period w.e.f. 24-05-2011 to 31-05-2015 vide ICAR order No.39(3)/05/Per-III dated 14-06-2010

Retirement/Transfer

- Sh. Khub Chand, Private Secretary retired from Council's service on superannuation on 31-03-2011.
- Dr. D. K. Sharma, PS & Head, ERS of NDRI, Kalyani (WB) compulsorily retired from the services vide Council order No.4(9)/09-Vig.(D) dated 13-04-2011.
- Dr. K. K. Kalra, Pri. Scientist (Agril. Economics) retired from Council's service on superannuation on 30-04-2011.
- Dr. Ashok Santra, Sr. Scientist (Animal Nutrition) relieved on transfer from ERS of NDRI, Kalyani on 25-04-2011 A.N. to join at NRC on Yak, Dirang, Arunachal Pradesh.

REGIONAL STATIONS

SOUTHERN REGIONAL STATION, BANGALORE

Training Programmes

- One week Training was conducted on 'Dairy Production' from 21.03.2011 to 26.03.2011.
- Two months In-Lab Training is being conducted in Dairy Microbiology from 02.05.2011.
- Ten days training was conducted on 'Dairy Cattle Feed Analysis and Feed formulation' from for personnel from Hatsun Agro Product Limited, Chennai from 04.05.2011 to 13.05.2011.
- One week Training was conducted on 'Dairy Production' from 23.05.2011 to 28.05.2011.
- Thirty students of B.Tech.(Agri. Engg.) from Dr. Annasaheb Shinde College of Agricultural Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri, College of Agricultural Engineering and Technology, Marathwada Agriculture University, Parbhani and Aditya Agricultural Engg. & Tech. College, Beed joined for 'Summer Placement Training' for one month with effect from 01.06.2010.
- Six B.Tech (DT) students from College of Dairy Technology, Warud, Pusad completed their four month In plant Training (Feb - June, 2011).



Dairy Farmers of Paramakudy Milk Producers Cooperative Society, Tamilnadu at NDRI fodder farm on One Day Orientation Programme

Consultancy

- A consultancy project for the Fortification of Omega Fatty Acids in Yoghurt was completed on consultancy basis. The project was handled for M/s Strategic Marketing and Research Company, Bengaluru. Team of Technologists from Norway representing the company also participated in the above project.
- A consultancy project for Evaluation of Flavourzyme and Palatase Enzyme in Cheese Production was completed for M/s Strategic Marketing and Research Team, Bengaluru.

- The technology for the production of Set Dahi and Cream Spread was transferred to ABT Dairy Pvt.Ltd., Coimbatore on consultancy basis. The company is launching these products in Tamil Nadu and Kerala in the brand name of 'Shakti' from 15th June 2011.

Extension Activities

- During the period under report, 249 visitors in seven batches comprising students from various educational institutes of southern region, farmers and entrepreneurs visited the institute.
- An on farm-training programme on Scientific Dairy Farming was organised for the dairy farmers / farmwomen on 21st April 2011 at Adde, one of the adopted villages. The focus of the training programme was on balanced feeding of dairy animals and clean milk production, which was well attended by the clientele group.
- An Orientation Programme was organised for the in-plant trainees, B.Tech students from Dr Anna Sahab Shinde college of Agricultural Engineering &



One Day Training Programme on Scientific Dairy Farming for Clientele at adopted village

Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra.

Rural Extension Programme

Regular weekly visits were made by the extension team to the adopted villages under Rural Extension Programme for the benefit of the clientele group in the adopted villages to provide necessary dairy extension services in the adopted villages.

EASTERN REGIONAL STATION, KALYANI

RESEARCH NEWS

Heavy Metals, Pesticides and Antibiotic Residues in Cow Milk under Organic vs Conventional Management System in West Bengal

One hundred and seven fresh cow milk samples were collected during the year 2009, 2010 and 2011 from NDRI, Eastern Regional Station, Kalyani dairy farm and from villages with the objective to find out the status of heavy metals and pesticide residues in milk. In total, 55, 41 & 11 milk samples were obtained from cows under organic management (experimental), conventional (non-experimental) and village conditions. The result showed Mercury (Hg) concentration above permissible limit in some of the milk samples obtained from non-experimental and village cows. The level of Hg obtained in experimental cow milk was within the permissible limit. The mean values of Hg, As, Pb & Cd were BDL (<0.001), 0.01, 3.66 and 0.26 ppm in milk of experimental cows; 0.014, 0.01, 3.92 & 0.32 ppm in milk of conventional cows; 0.006, 0.01, 4.18 & 0.29 ppm in milk of village cows. The level of Arsenic (As) obtained was within

the permissible limit. Most of the milk samples had Lead (Pb) values above maximum residue limit (0.02ppm). The Cadmium (Cd) level in all the samples exceeded the permissible limit. The residue concentrations of three pesticides (commonly used in the area i.e., Endosulfan, Chlorpyrifos and Cypermethrin) in milk were also determined. The level of Cypermethrin for all the samples were within the permissible limit and the level of other two pesticides (Endosulfan & Chlorpyrifos) concentration exceeded the permissible limit in a few samples. However, the levels of pesticide were within the permissible limit for the milk samples collected from the experimental cows during the year 2010 and 2011. The residue concentrations of three antibiotics (Amoxicillin, Ceftriaxone and Enrofloxacin) in milk were also determined. Milk samples obtained from cows under organic management system had antibiotic residues within the permissible limit.

Training Programme

The 15 days Training Programme on Scientific Dairy Farming was conducted from 16th May to 31st May, 2011.

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Chief Editor : Dr. S. L. Goswami
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Editors : Dr. (Mrs.) Meena Malik
Mr. Braj Kishor

Layout & Design : Mr. Sunil Sharma

Photography : Mr. G. D. Joshi

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