



Centre of Advanced Faculty Training in Dairy Processing
Dairy Technology Division
ICAR – National Dairy Research Institute
Karnal-132001, Haryana



HRD Achievements (2017-2020)

About CAFT in Dairy Processing

A premier Division of the Institute, Dairy Technology Division is involved in teaching, research, extension and consultancy activities. Dairy Technology Division of NDRI spearheads the Nation's most prestigious under-graduate programme in Dairy Technology and provides elite 'human resource' for various managerial positions in the industry. The division was identified as a key component of the UNDP Centre of Excellence in Dairy Processing. The main R&D thrust of Dairy Technology Division has been on the development of appropriate technologies for processing of buffalo milk which possesses different processing properties than cow milk. The current focus is on up-gradation of technologies of Indian traditional dairy products and functional dairy foods. The Division has adequate facilities for conducting research in the field of nutraceuticals and functional foods. In recent years a number of products have been developed that can fulfill the aspirations of consumers for convenience, long-life, safety and health benefit. Further, there is an increasing thrust on developing food packaging solutions for dairy industry. Technologies of several of these newly developed products have been transferred to industry for commercialization.

Objectives of CAFT in Dairy Processing

1. To provide state-of-the-art knowledge, to the teachers of State Agricultural Universities, ICAR institutions and Deemed Universities, in the emerging areas of Dairy Foods Technology.
2. To develop linkages with the academic institutions within and outside the NARS.
3. To strengthen the teaching and research infrastructure for knowledge dissemination.

Faculty: Name & Designation (as on 20-01-2020)

Name	Division	Designation	Specialization
Dr Latha Sabikhi	Dairy Technology	Head, Dairy Technology Division & Director, CAFT-DP	Nanoemulsions, Probiotic & Functional Dairy Foods
Dr Ashish Kumar Singh		Principal Scientist	Formulated & Functional foods; Valued added foods from minor milk species; Entrepreneurship Development
Dr Kaushik Khamrui		Principal Scientist	Traditional Indian Dairy Products; Sensory Evaluation of Dairy Products

Dr P. Narender Raju		Scientist (Sr. Scale)	Health Foods; Biodegradable, Active and Intelligent Food Packaging
Dr G. S. Meena		Scientist (Sr. Scale)	By-Product Utilization; Membrane Processing
Dr. Yogesh Khetra		Scientist (Sr. Scale)	Cheese Technology
Dr Shaikh Abdul Hussain		Scientist (Sr. Scale)	Nano-emulsion as delivery vehicles of bioactive components; Food rheology
Dr Neelam Upadhyay		Scientist	Food Technology
Dr. Writdhama Prasad		Scientist	Traditional Indian Dairy Products
Dr. Sangita Ganguly		Scientist	Probiotic dairy foods
Dr Heena Sharma		Scientist	Application of non-bovine milk in product formulation; Milk Metabolites Profiling.
Dr. Manoj Kumar C.T.		Scientist	Composite Dairy Foods
Mr. Gaurav Kr. Deshwal		Scientist	Packaging of Dairy Products
Dr. P. Baranwal	Dairy Engineering	Principal Scientist & Head (Acting)	Process Engineering & Packaging Systems
Dr. P.S. Minz		Scientist (Sr. Scale)	Dairy Process Engineering; Machine Vision Systems
Mr. Ankit Deep		Scientist	Dairy Process Engineering
Dr. Amita Vairat		Scientist	Extrusion Technology; 3D- Printing
Dr. Kushboo Kumari		Scientist	Agricultural Process Engineering
Dr. J.K. Dabas		Chief Technical Officer	Energy Audit in Dairy Industry
Dr. Bimlesh Mann	Dairy Chemistry	Principal Scientist & Head	Nanoemulsions; Bioactive Peptides
Dr. Sumit Arora		Principal Scientist	Fortified Dairy foods
Dr. Vivek Sharma		Principal Scientist	Bioactive lipids
Dr. Rajesh Kumar		Principal Scientist	Milk Proteins & Bioactive peptides
Dr. Rajan Sharma		Principal Scientist	Adulteration Detection Kits; Migration from Food Contact Materials; Intellectual Property Rights
Dr. Richa Singh		Scientist	Milk Quality Assurance
Dr. Priyanka Singh Rao		Scientist	Milk Quality Assurance
Dr. Kamal Gandhi		Scientist	Milk Quality Assurance
Dr. Sunita Grover	Dairy Microbiology	Principal Scientist & Head	Probiotics, Metagenomics & Metabolomics
Dr. S.K. Tomar		Principal Scientist	Microbial Interventions for functional Foods
Dr. A.K. Puniya		Principal Scientist	Rumen Microbiology

Dr. Naresh Kumar		Principal Scientist	Microbial Food Safety
Dr. Shilpa Vij		Principal Scientist	Microbial Metabolites; Antimicrobial Packaging
Dr. Raghu HV		Scientist (Sr. Scale)	Microbial Biosensors
Dr. Pradeep Behare		Scientist	Starter Cultures & Proteomics
Dr. Diwas Pradhan		Scientist	Microbial Metabolites; Antimicrobial Packaging
Mr. Saurabh Kadyan		Scientist	Probiotics

Human Resource Development

Particulars of short courses / training program for HRD conducted during 2016-2020.

Sr. No.	Name of the Training Program	Period	No. of Particulars		
			Internal	External	Total
1.	R&D Strategies and Interventions for Effective Agribusiness and Entrepreneurship Development in Dairy and Food Sector (32 nd National Training)	16-09-2016 to 06-10-2016	3	13	16
2.	Probiotics: The therapeutics of 21 st Century (33 rd National Training)	08-11-2016 to 28-11-2016	2	17	19
3.	Advances in Validation of Functional Foods (34 th National Training)	01-12-2017 to 21-12-2017	2	19	21
4.	Dairy and Food Process Engineering: Equipment, Processing and Value Addition (35 th National Training)	10-01-2018 to 30-01-2018	3	15	18
5.	Nano-technological and biochemical techniques for assessing the quality and safety of milk and milk products (36 th National Training)	05-09-2018 to 25-09-2018	1	24	25
6.	Rapid biosensors and micro techniques for monitoring contaminants and adulterants in dairy foods (37 th National Training)	04-01-2019 to 24-01-2019	2	20	22
7.	Recent and Emerging Applications of Membrane Processes in Dairy Industry (38 th National Training)	04-11-2019 to 24-11-2019	2	9	11

8.	Emerging Trends in Bio-Process Technology in Dairy and Food Industry (39 th National Training)	15-11-2020 to 04-02-2020	1	13	14
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Infrastructure Development (equipment, etc.)

- NIL

Renovation of Lecture Room / Laboratories

- NIL

Library upgraded:

Sr. No.	Title	Author / Editor	Publisher
1.	Functional properties of Traditional Foods	Krister	Springer
2.	Flavour from Food to Perception	Elisbarth	Wiley
3.	Food Industry: Design, Technology and Innovation	Traiter	Wiley
4.	Sensory Evaluation Technology, 5 th Edn	Meil Gaard	CRC India
5.	Yoghurt: Roles in Nutrition and Impact on Health	Maratte	CRC India
6.	Drying Phenomena: Theory and Applications	Dincer	Wiley

Awards / Recognitions:

- **Dr. A. K. Singh**, Principal Scientist, Dairy Technology Division received “**Bhart Ratna Dr. C. Subramaniam Award**” for Outstanding Teacher-2015 for Natural Resource Management and Agricultural Engineering on 16th July, 2016.
- **Dr. Sudhir Kumar Tomar**, Principal Scientist, Dairy Microbiology Division was conferred “**Best Teacher (PG)**” award for the year 2015-2016 during 15th Convocation held on 4th March, 2017 at NDRI, Karnal.
- **Dr. Yogesh Khetra**, Scientist, Dairy Technology Division was awarded the “**Best Teacher Award**” for the academic session 2015-16 during 15th Convocation of National Dairy Research Institute, Karnal on 4th March, 2017.
- **Dr. I. K. Sawhney**, Emeritus Scientist was awarded “**Life Time Achievement Award**” by the Indian Dairy Engineers Association (IDEA) for significant contribution to Dairy Engineering Profession, at 10th National Convention of Indian Dairy Engineers, held at AAU Anand on 29th - 30th September, 2016.
- **Dr. Sunita Grover**, Head, Dairy Microbiology Division was awarded “**Fellow of National Academy of Agricultural Sciences**” in January, 2017.
- **Dr. Sumit Arora**, Principal Scientist, Dairy Chemistry Division and **Dr. A. K. Singh**, Principal Scientist, Dairy Technology Division were awarded the “**Fellowship of Indian Dairy Association**” during 16th - 18th February, 2017 at 45th Dairy Industry Conference, Mumbai.
- **Dr. Yogesh Khetra**, Scientist, Dairy Technology Division was awarded with “**Associateship of National Academy of Dairy Sciences, India**”.

- **Dr. Ashish Kumar Singh**, Principal Scientist, Dairy Technology Division was awarded with “**Chellapa Memorial Oration**” during XVI Annual Conference of Indian Society of Veterinary Pharmacology and Toxicology (ISVPT-2016) by the Indian Society of Veterinary Pharmacology and Toxicology at Navsari Agricultural University, Navsari (Gujarat).
- **Dr. Ashish Kumar Singh**, Principal Scientist, Dairy Technology Division, was awarded with “**Best Paper Award**” for his article published in Indian Journal of Dairy Science, 2015 at 45th Dairy Industry Conference, Mumbai during 16th – 18th February, 2017.
- **Dr. Priyanka Singh Rao**, Scientist **Dr. Rajesh Bajaj**, Principal Scientist, **Dr. Bimlesh Mann**, Head, **Dr. Sumit Arora**, Principal Scientist **Dr. Richa Singh**, Scientist received “**Best Oral Presentation Award**” on “**Chitosan for encapsulation of papain hydrolysed sodium caseinate**” in National Conference on Advances in Food Science and Technology on 24th -25th March, 2017 at Eternal University Baru Sahib (HP).
- **Mr. Gaurav Kumar Deshwal**, M.Tech. (Dairy Technology) II Yr (Major Advisor: Dr. P. Narender Raju) received “**Third Best Project Award**” with a Cash Prize of Rs. 25,000/- under *Engineering & Technology* category at National Student Research Convention (ANVESHAN) held at Annamali University, Chidambaram, Tamil Nadu held during 27th – 29th March, 2017.
- **Ms. Prem Kumari Mehta**, Private Secretary, Dairy Technology Division, NDRI, Karnal received “**ICAR Cash Award Scheme 2016 for Administrative Category**” employees of ICAR on 16th July, 2017.
- **Dr. R. R. B. Singh**, Director, NDRI, Karnal received “**Fellow of National Academy of Agricultural Sciences (India)**” from National Academy of Agricultural Sciences (India), NASC, DPS Marg, Pusa, New Delhi.
- **Dr. Rajan Sharma**, Principal Scientist, Dairy Chemistry Division, NDRI, Karnal received “**Fellow of National Academy of Agricultural Sciences (India)**” from National Academy of Agricultural Sciences (India), NASC, DPS Marg, Pusa, New Delhi.
- **Dr. Pradip V. Behare**, Principal Scientist, Dairy Microbiology Division, NDRI, Karnal has been selected for “**National Academy of Agricultural Sciences Associateship**” on January, 2017.
- **Dr. Rajan Sharma**, Principal Scientist, **Dr. Y. S. Rajput**, Principal Scientist, and **Dr. Bimlesh Mann**, Head, Dairy Chemistry Division, NDRI, Karnal received “**Low Cost Technology Development Award-2016**” from Association of Food Scientist & Technologies (India), Mysore (ICFoST 2017) held from 7th - 9th December 2017 at Hyderabad.
- **Dr. Latha Sabikhi**, Head, Dairy Technology Division & Director, CAFT-DP, NDRI, Karnal received “**Fellowship of the Indian Dairy Association**”, 2017-18.
- **Dr. Narender Raju Panjagari**, Scientist, Dairy Technology Division, NDRI, Karnal received “**Best e-Poster Award**” at the 46th Dairy Industry Conference held at Kochi, Kerala during 8th -10th February, 2018.
- **Mr. Shivam Panwar**, M.Tech., 2nd year student and **Dr. Narender Raju Panjagari**, Scientist (Sr. Scale) of Dairy Technology Division, NDRI, Karnal bagged “**2nd Best Poster Award**” at International Symposium for Packaging Industry (ISPI) Research Conclave organized by Indian Institute of Packaging, New Delhi during 27th – 28th October 2017.
- **Mr. Bhopal Singh**, Student, **Dr. Kaushik Khamrui**, Principal Scientist, **Dr. Writdhama Prasad**, Scientist and **Dr. Anindita Debnath** received “**Best Poster Award**” presented at 46th Dairy Industry Conference, organized by IDA-South zone, Kochi during 8th -10th February, 2018.
- **Mr. Shivam Pawar**, M.Tech. (Dairy Technology) II year Student (**Guide: Dr. Narender Raju Panjagari**) received “**First Best Project Award**” under the *Engineering & Technology* category at Students Research Convention (North Zone) (ANVESHAN-2018) held at Manav Rachna International Institute for Research and Studies, Faridabad during 26th -27th February 2018 and represented National Research Convention held at Chitkara University, Rajpura during 15th -16th March 2018.
- **Mr. Saniket Deepak Zagade**, M.Tech. (Dairy Technology) II year Student (**Guide: Dr. Narender Raju Panjagari**) received “**Second Best Project Award**” under the Basic Sciences category at Students

Research Convention (North Zone) (ANVESHAN-2018) held at Manav Rachna International Institute for Research and Studies, Faridabad during 26th -27th February 2018 and represented National Research Convention held at Chitkara University, Rajpura during 15th -16th March 2018.

- National Referral Centre for Milk Quality and Safety (NRCMQS), ICAR-National Dairy Research Institute, Karnal had been granted accreditation by National Accreditation Board for Testing and Calibration Laboratories (NABL) in the discipline of Chemical Testing. The lab has been accredited for two years and accreditation is valid till 21st March, 2020.
- **Dr. Narender Raju Panjagari**, Scientist, Dairy Technology Division received “**Associate Fellowship of the National Academy of Dairy Sciences, India (NADSI)**” on 9th September, 2018.
- **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. 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.
- **Ms. Swati Tiwari, Dr. Neelam Upadhyay, Dr. A. K. Singh and Dr. Bhavesh Baria**, Dairy Technology Division received “**Best Oral Presentation Award**” for the paper entitled “Green Biorefinery Approach: A Novel Way for the Extraction of Carotenoids from Carrot Bio-waste” presented at 50th Annual International Conference in Food Science and Nutrition organised by Nutrition Society of India held from November 15 -17, 2018 at ICMR-National Institute of Nutrition, Hyderabad.
- **Dr. Sangita Ganguly**, Scientist and **Dr. Latha Sabikhi**, Head, Dairy Technology Division received “**Best Oral Presentation Award**” for the paper entitled “Efficacy of Probiotic Whey-cereal based Beverage in Shigella - Induced Pathogenicity” at SERB (DST, Govt. of India) sponsored by National Seminar on Emerging Role for Probiotics in Cognition, Autoimmunity and Metabolic Disorder held at April 13, 2018, Guntur.
- **Mr. Ajay Kumar, Dr. Shaik Abdul Hussain, and Dr. P. N. Raju**, received “**1st Best Oral Presentation Award**” for the paper entitled “Shelf-life Extension of Aloe Vera Supplemented Probiotic Lassi using Non-thermal Interventions” presented at National Seminar on Fermented Dairy Foods and their Health Benefits organized by Swedish South Asian Network on Fermented Foods (SASNET-FF) in Association with NADSI National Academy Dairy Science (India) and ICAR-National Dairy Research Institute, Karnal, at ICAR-NDRI, Karnal, from May 26-27, 2018.
- **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.

Research Articles (during 2018-19)

- Aggarwal, D., Sabikhi, L., Sathish, K. M. H. and Raju, P. N. (2018) Investigating the effect of resistant starch, polydextrose and biscuit improver on the textural and sensory characteristics of dairy-multigrain composite biscuits uses response surface methodology. *J. Food Meas Charact*, 12: 1167-76.
- Badola, R., Panjagari, N. R., Singh, R. R. B., Singh, A. K. and Prasad, W. G. (2018) Effect of clove bud and curry leaf essential oils on the anti-oxidative and anti-microbial activity of burfi, a milk-based confection. *J. Food Sci. Technol.*, 55, 4802-10.
- Borad, S. G., Singh, A. K., Kapila, S., Behare, P.V., Arora, S., and Sabikhi, L. (2019) Influence of unit operations on immunoglobulins and thermal stability of colostrum fractions. *Int. Dairy J.*, 93: 85-91.
- Das, A., Sanyal, M. K., Debnath, A. and Ganguly, S. (2018) Development of spiced and smoked sausage from buffalo milk. *J. Pharmacognosy and Phytochem*, 7: 121-25.

- Das, J., Raju, R., Sirohi, S., Chandel, B. S., Raju, P. N. and Meena, B. S. (2018). Consumption pattern of fermented probiotic dairy products in metropolitan Delhi. *Agril. Econ. Res. Rev.*, 31: 191.
- Ganguly, S., Sabikhi, L. and Singh, A. K. (2019) Effect of whey-pearl millet-barley based probiotic beverage on Shigella-induced pathogenicity in murine model. *J. Funct. Foods*, 54 : 498-505.
- Hossain, S., Khetra, Y., Khade, S. and Ganguly, S. (2018) Bioactivity of cheddar cheese during ripening. *Int. J. Chem. Studies*, 6: 1583-87.
- Hussain, S. A., Yadav, V., Reddi, S., Patil, G. R., Singh, R. R. B. and Kapila, S. (2019) Thermal processing conditions affect in vitro immunostimulatory activity of Aloe vera juice. *J. Appl. Res. Med. Aromatic Plants*, 12: 73-77.
- Khetra, Y., Kanawjia, S. K., Puri, R., Kumar, R., and Meena, G. S. (2019) Using taste-induced saltiness enhancement for reducing sodium in Cheddar cheese: Effect on physico-chemical and sensorial attributes. *Int. Dairy J.*, 91: 165-71.
- Kumar, C.T.M., Sabikhi, L., Singh, A. K., Raju, P. N., Kumar, R. and Sharma, R. (2019) Effect of incorporation of sodium caseinate, whey protein concentrates and transglutaminase on the properties of depigmented pearl millet based gluten free pasta. *LWT-Food Sci. Technol.*, 103: 19-26.
- Kumar, M., Panjagari, N. R., Kanade, P. P., Singh, A. K., Badola, R., Ganguly, S., Behare, P. V., Sharma, R. and Alam, T. (2018) Sodium caseinate-starch-modified montmorillonite based biodegradable film: Laboratory food extruder assisted exfoliation and characterization. *Food Packaging Shelflife*, 15: 17-27.
- Lodh, J., Khamrui, K. and Prasad, W. G. (2018) Optimization of heat treatment and curcumin level for the preparation of anti-oxidant rich ghee from fermented buffalo cream by central composite rotatable design. *J. Food Sci. Technol.*, 55: 1832-39.
- Meena, G. S., Dewan, A., Upadhyay, N., Barapatre, R., Singh A. K., and Rana, J. S. (2019) Fuzzy analysis of sensorial attributes of gluten free pasta manufactured from brown rice, amaranth, flaxseed flours and whey protein concentrates. *J. Food Sci. Nutr. Res.*, 2: 22-37.
- Meena, G. S., Singh, A. K., Gupta, V. K., Borad, S. and Parmar P. T. (2018) Effect of change in pH of skim milk and ultrafiltered/diafiltered retentates on milk protein concentrates (MPC70) powder properties, *J. Food Sci. Technol.*, 55: 3526-37.
- Meena, G. S., Singh, A. K., Gupta, V. K., Borad, S., Arora, S. and Tomar, S. K. (2019) Alteration in physicochemical, functional, rheological and reconstitution properties of milk protein concentrate powder by ph, homogenization and diafiltration. *J. Food Sci. Technol.*, 56: 1622-30.
- Parmar, P., Singh, A. K., Gupta, V. K., Borad, S. and Raju, P.N. (2018) Effect of packaging materials on shelf-life of basundi manufactured using ohmic heating. *Indian J. Dairy Sci.*, 71: 215-22.
- Parmar. P., Singh. A. K., Meena, G. S., Borad, S. and Raju, P. N. (2018) Application of ohmic heating for concentration of milk. *J. Food Sci. Technol.*, 55: 4956-63.
- Patil, A.T., Meena, G. S., Upadhyay, N., Borad, S., Khetra, Y. and Singh, A. K. (2018) Effect of change in pH, heat treatment and diafiltration on properties of medium protein buffalo milk protein concentrate. *J. Food Sci. Technol.*, 56: 1462-72.
- Prasad, W., Khamrui, K., Badola, R., Sandhya, S. and Gupta H. R. (2018) Effect of incorporation of herbal essential oil on anti-oxidative, instrumental color and sensorial attributes of burfi. *Indian J. Dairy Sci.*, 72: 70-75.
- Prasad, W., Khamrui, K., Mandal, S. and Badola, R. (2018) Effect of combination of essential oils on physico-chemical and sensorial attributes of burfi in comparison to individual essential oil and BHA. *Int. J. Dairy Technol.*, 71: 810-19.
- Rani, R., Sabikhi, L. and Sathish, M. H. K. (2018) Cost estimation of ready-to-serve composite milk-sorghum based breakfast smoothie. *Indian J. Dairy Sci.*, 71: 162-67.
- Sandhya, S., Khamrui, K., Prasad, W. G. and Kumar, C. T. M. (2018) Preparation of pomegranate peel extract powder and evaluation of its effect on functional properties and shelf life of curd. *LWT-Food Sci. Technol.*, doi: 10.1016/j.lwt.2018.02.057.
- Kumar, M. C. T., Raju, P. N. and Singh, A. K. (2017) Effect of packaging materials and storage temperatures on shelf life of micronutrient fortified milk-cereal based complementary food. *J. Packaging Tech. and Res.*, 1(3): 135-48.

Financial Statement:

Expenditure incurred at CAFT-Dairy Processing during 2016-2019:

Budget Head	2016-17	2017-18	2018-19
Operating cost of training	5,26,550	7,03,142	10,26,766
Recurring contingency	3,83,934	3,24,989	3,76,743
Travel allowance	14,568	21,225	10,447
Library	---	35,000	---
Works (Minor repairs / renovation)	---	---	---
Equipment	---	---	---
Total	9,25,052	10,84,356	14,13,956