

Centre of Advanced Faculty Training in Animal Nutrition

Animal Nutrition Division

ICAR-Indian Veterinary Research Institute, Iztnagar-243 122, UP, India

Introduction

Animal Nutrition Division, one of the oldest divisions of Indian Veterinary Research Institute, was established in 1921 at Pusa as Laboratory of Physiological Chemist and shifted to the present building of Animal Nutrition Division in 1939. Since inception, the division has been contributing significantly in animal nutrition research and teaching in the country. The division has laboratories named as: energy and protein nutrition, rumen microbiology, feed technology, unconventional feed, mineral and vitamin nutrition, clinical and pet nutrition. The division has maintained a very high standard in both teaching and research since its inception. Keeping in view the significant contribution of the division, it was elevated to the status of the Centre of Advanced Studies (CAS) in 1995 by the Indian Council of Agricultural Research, New Delhi and renamed as Centre of Advanced Faculty Training (CAFT) in 2009. The division has been engaged in teaching of post graduate students and training of teachers and researchers working under National Agricultural Research and Education System (NARES) in the discipline of Animal Nutrition and allied subjects. Since 1995 the Division has conducted 52 short term training courses and imparted training to 798 scientists and teachers of ICAR Institutes and State Agricultural Universities

Objectives of CAFT

To impart training to the scientists and teachers of Universities and Research Institutions in the area of Animal Nutrition.

Faculty: Name & Designation (as on 31.12.2019)

| S.No. | Name | Designation | Area of Expertise |
|-------|---------------------|------------------------------------|---------------------------------|
| 1. | Dr. A.K. Verma | Head, Professor-cum-Director, CAFT | Feed technology & Pig Nutrition |
| 2. | Dr. L.C. Chaudhary | Principal Scientist | Rumen Microbiology |
| 3. | Dr. A.K. Pattanaik | Principal Scientist | Pet and Clinical Nutrition |
| 4. | Dr. Narayan Dutta | Principal Scientist | Protein Nutrition |
| 5. | Dr. V.B. Chaturvedi | Principal Scientist | Energy Nutrition |
| 6. | Dr. S. K. Saha | Principal Scientist | Un-conventional Feeds |
| 7. | Dr. S.E. Jadhav | Senior Scientist | Minerals and Vitamins |
| 8. | Dr. Anju Kala | Scientist | Rumen Microbiology |

Human resource development

Particulars of Short Courses / Training programs for HRD conducted during 2017-2020

| CAFT Course No. | Title of the Course | Course Director | Faculty | No. of Participants |
|-----------------|--|-----------------|--|---------------------|
| 47 | Advances in rumen manipulation to improve livestock productivity (Feb. 1-21, 2017) | A.K. Verma | L.C. Chaudhary* Anju Kala, S.K.Saha, D.N. Kamra | 25 |
| 48 | Advances in Animal Nutrition for Improving Livestock Productivity (September 06-26, 2017) | A.K. Verma | S.K.Saha*, L.C. Chaudhary, V.B. Chaturvedi, Asit Das | 17 |
| 49. | Nutrition for Health: Advances in the Science of Animal Nutrition (February 7-27, 2018) | A.K. Verma | A.K.Pattanaik * S.E.Jadhav N. Dutta, Anju Kala | 19 |
| 50. | Nutrition for Reproduction in Farm Animals (September 26 October 16, 2018) | A.K. Verma | N. Dutta, A.K.Pattanaik, S.E.Jadhav Anju Kala | 15 |
| 51. | Relevance of Feed Processing Technologies to Improve the Economics of Livestock Farming (February 20- March 12, 2019) | A.K. Verma | Putan Singh*, V. B. Chaturvedi, S.E.Jadhav, Anju Kala | 20 |
| 52. | Dietary manipulations for improving energetic efficiency and reducing methane emission in ruminants (December 3-23, 2019) | A.K. Verma | V. B. Chaturvedi*, Anju Kala, S.E.Jadhav, L.C. Chaudhary | 16 |
| 53. | Understanding gut-microbiome crosstalk for augmenting feed efficiency and economizing livestock production (February 7-27, 2020) | A.K. Verma | Anju Kala, L.C. Chaudhary, S.E.Jadhav, | To be organised |

*Course Coordinator

Publications

1. Dowarah, Runjun, Verma, A. K., Agarwal, N., Patel, B.H.M. and Singh, P. 2017. Effect of swine based probiotic on performance, diarrhoea scores, intestinal microbiota and gut health of grower-finisher crossbred pigs. *Livestock Science*, 195:74-79.
2. Dowarah, Runjun, Verma, A.K. and Agarwal, N. 2017. The use of *Lactobacillus* as an alternative of antibiotic growth promoters in pigs: A review. *Animal Nutrition*, 3: 1-6.
3. Gupta, V.P., Kamra, D. N., Agarwal, N., Chaudhary, L. C. 2017. Effect of sulphate and blend of plants containing secondary metabolites on *in vitro* methanogenesis, digestibility and feed fermentation with buffalo rumen liquor. *Indian J. Anim. Sci.* 87: 199-202 (NAAS :6.17)
4. Ingle, S. L., Pattanaik, A. K., Baliyan, S., Kankoria, S., Narayan Dutta, Jadhav, S.E., Sharma, K. 2017. Long-term effects of feeding a novel phytoadditive on nutrient utilization, growth performance, metabolic profile and antioxidant status of goats. *Agriculture Research*, 6 (1): 82-90.
5. Jose, T., Pattanaik, A. K., Jadhav, S.E. and Narayan Dutta and Sharma, S. 2017. Nutrient digestibility, hindgut metabolites and antioxidant status of dogs supplemented with pomegranate peel extract. *Journal of Nutritional Science*, 6 (e36):1-5. doi:10.1017/jns.2017.34
6. Kala, A., Kamra, D.N., Kumar, K., Agarwal, N., Chaudhary, L.C. and Joshi, C.G. 2017. Impact of levels of total digestible nutrients on microbiome, enzyme profile and degradation of feeds in buffalo rumen. *PLoS ONE* 12(2): e0172051. doi:10.1371/journal.pone.0172051(NAAS :9.25)
7. Kumar, Dinesh, Singh, P., Verma, A.K., Chaturvedi, V.B. 2016. *In vitro* digestibility and rumen fermentation parameters of feeds as affected by supplementary Amla powder and Fenugreek seeds. *Indian J. Anim. Nutr.*, 33:64-69.
8. Kumar, R., Saha, S.K., Kumar, D., Mahesh, M. and Malapure, C.D. 2017). Effect of Feeding sugarcane press mud on carcass traits and meat quality characteristics of lambs. *Tropical Animal health Prod.* DOI 10.1007/s11250-017-1345-1.
9. Kumar, S., Pattanaik, A. K., Sharma, S., Gupta, R., Jadhav, S.E. and Narayan Dutta 2017. Comparative assessment of canine-origin *Lactobacillus johnsonii* CPN23 and dairy-origin *Lactobacillus acidophilus* NCDC 15 for nutrient digestibility, faecal fermentative metabolites and selected gut health indices in dogs. *Journal of Nutritional Science*, 6 (e38):1-5. doi:10.1017/jns.2017.35.
10. Kumar, S., Pattanaik, A. K., Sharma, S., Kankoria, S., Narayan Dutta, Jadhav, S.E., Kumar, A. 2017. Probiotic potential of *Lactobacillus* Bacterium of canine faecal-origin and its impact on select gut health indices and immune response of dog. *Probiotics and Antimicrobial Proteins*, DOI 10.1007/s12602-017-9256-z.
11. Kumar, S., Dutta, N., Pattanaik, A.K., Ojha, B.K., Chaturvedi, V.B. 2017. Effect of feed Restriction on Energy Metabolism and Methane Emission in Goats. *Journal of Animal Research* 7 (2): 369.
12. Mahla, A.S., Chaudhari, R.K., Verma, A.K., Singh, A.K., Singh, S.K., Singh, G. Sarkar, M., Dutta, N., Kumar, H. and Krishnaswamy, N. 2017. Effect of dietary supplementation of omega-3 PUFA rich fish oil on reproductive performance of goat (*Capra hircus*), *Theriogenology* (2017), doi:10.1016/j.theriogenology.2017.05.023.
13. Mishra, D.K., Verma, A.K., Agarwal, N. and Singh, P. 2016. Effect of probiotics on blood biochemical profile, immunity and small intestine morphology in weaned piglets. *Agricultural Research*, 5: 407-412. (doi:10.1007/s40003-016-0231-9)

14. Ojha, B. K., Narayan Dutta, Pattanaik, A. K and Narang, A. 2017. Effect of pre and post-partum supplementation to buffaloes on body condition, lactation and reproductive performance. *Buffalo Bulletin*, 36(1): 43-53
15. Ojha, B. K., Narayan Dutta, Pattanaik, A. K and Narang, A. 2018. Effect of feed restriction on nutrient utilization, growth and metabolic profile in crossbred calves. *Indian Journal of Animal Sciences*, 88(1): 94-99.
16. Pathak, A. K., Narayan Dutta, Pattanaik, A.K., Chaturvedi, V. B. and Sharma, K., 2017. Effect of condensed tannins from *Ficus infectoria* and *Psidium guajava* leaf meal mixture on nutrient metabolism, methane emission and performance of lambs. *Asian Australasian Journal of Animal Sciences*, 30 (12): 1702-10. Doi.org/10.5713/ajas/17.0060.
17. Pathak, A. K., Narayan Dutta, Pattanaik, A.K., Sharma, K., Banerjee, P. S. and Goswami, T. K. 2017. The effect of condensed tannin supplementation through *Ficus infectoria* and *Psidium guajava* leaf meal mixture on erythrocytic antioxidant status, immune response and gastrointestinal nematodes in lambs (*Ovis aries*). *Veterinarski Arhiv*, 87(2): 139-156.
18. Patil, A. K., Chaturvedi, V.B., Singh P., Verma, A.K. and Das, Asit. 2017. Effect of feeding compressed complete feed block with or without deoiled mahua seed cake on methane production and energy utilization in crossbred calves. *Indian J. Anim. Sci.*, 87 (8): 1046-1048.
19. Patil, A. K., Verma, A.K., Singh P., Das, A. and Gaur, G.K. 2017. Effect of molasses based multi-nutrients and chromium supplementation on the haematological and blood biochemical profile in lactating Murrah buffaloes. *Journal of Animal Research*, 7 (2): 401-406.
20. Patil, S. S., Sharma, K., Narayan Dutta and Pattanaik. A. K. 2017. Intake, nutrient utilization and growth performance of lambs fed detoxified *Jatropha curcas* meal, *Indian Journal of Animal Sciences*, 87(3):88-91.
21. Pattanaik, A.K., Ingale, S.L., Baliyan, S., Narayan Dutta, Kamra, D.N. and Sharma, K. 2017. Herbal additives influence in vitro fermentative attributes and methanogenesis differently in cattle vs. buffalo rumen liquor. *Animal Production Science*, doi.org/10.1071/AN15624
22. Pawar, M.M., Pattanaik, A.K., Sinha, D.K., Goswami, T.K., Sharma, K. 2017. Effect of dietary mannanoligosaccharide supplementation on nutrient digestibility, hindgut fermentation, immune response and antioxidant indices in dogs. *Journal of Animal Science and Technology*, DOI: 10.1186/s40781-017-0136-6
23. Sachin Kumar, Pattanaik, A.K., Sharma, S., Gupta, R., Jadhav, S.E. and Dutta, N. 2017. Comparative assessment of canine-origin *Lactobacillus johnsonii* CPN23 and dairy-origin *Lactobacillus acidophilus* NCDC15 for nutrient digestibility, faecal fermentative metabolites, and select gut health indices using dogs. *Journal of Nutritional Science*, 6. doi:10.1017/jns.2017.35
24. Sinha, S.K., Chaturvedi, V.B., Singh, P. Verma, A.K. and Shivani, S. 2016. Evaluation of total mixed rations in terms of nutrient utilization, methane production and gaseous exchange in cattle and buffaloes. *Indian J. Anim. Nutr.*, 33:38-38.
25. Sinha, S.K. and Chaturvedi, V.B. and Singh, P. and Chaudhary, L.C. and Ghosh, M. and Shivani, S .2017 Effect of high and low roughage total mixed ration diets on rumen metabolites and enzymatic profiles in crossbred cattle and buffaloes. *Veterinary World*, 10 (6): 616-622.

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29. Vijay Bhasker, T. V., Gowda, N. K. S., Pal, D.T., Bhat, S.K., Krishnamoorthy, P., Mondal, S., Pattanaik, A.K. and Verma, A.K. 2017. Influence of boron supplementation on performance, immunity and antioxidant status of lambs fed diets with or without adequate level of calcium. *PLoS ONE*, 12(11): e0187203. <https://doi.org/10.1371/journal.pone.0187203>
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32. Ankita, Verma, A.K., Singh P. and Das, A. 2018. Effect of multi-nutrient liquid supplement on serum minerals and hormone profile in buffalo heifers. *Indian Journal of Animal Sciences*, 88(4):453-457.
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35. Chaudhary, S.K., Bhar, R., Mandal, A.B., Rokade, J.J., Gopi, M., Jadhav, S.E., Kannan, A., Aderao, G.N. and Singh, M. 2018. Assessment of phytochemical constituents, fatty acids profile and in vitro antioxidant activity in soapnut shell powder. *Indian Journal of Animal Sciences*, 88: 700-705.
36. Chaudhary, S.K., Mandal, A.B., Bhar, R., Gopi, M., Kannan, A., Jadhav, S.E., and Rokade, J.J. 2019. Effect of graded levels of soapnut (*Sapindus mukorossi*) shell powder on reproductive performance in broiler breeders. *Asian-Australasian Journal of Animal Sciences*, 31: 118-125.
37. Chaudhary, S.K., Bhar, R., Mandal, A.B., Rokade, J.J., Jadhav, S.E., Kannan, A., and Gopi, M.,. 2019. Effect of dietary soapnut (*Sapindus mukorossi*) shell powder on select stress indices, lipid profile and litter quality in broiler breeders. *Animal Nutrition and Feed Technology (Accepted)*

38. De, U.K., Mukherjee, R., Prakash, Chandan, Patel, B.H.M., Nandi, S., Dimri, U., Verma, A.K. and Verma, M.R. 2018. Adding a bio-response modifier and zinc oxide to piglet weaner diets influences immunological responses to weaning. *Animal Production Science*, <https://doi.org/10.1071/AN16332>
39. Dinani, O. P., Tyagi, Pramod K., Mandal, A. B., Tyagi, Praveen K. and Narayan Dutta. 2018. Evaluation of feeding value of rice based Distillers Dried Grains with Solubles(DDGS) for broiler chickens. *Indian Journal of Animal Research*, DOI: 10.18805/ijar.B-3607.
40. Dowarah, Runjun, Verma, A. K. and Singh, P. 2018. *In vitro* assessment of nutritive value of two Indian varieties of grape pomace as livestock feed. *Indian J. Dairy Sci.*, 71(3): 267-272.
41. Dowarah, Runjun, Verma, A. K., Agarwal, N. and Singh, P. 2018. Effect of swine-origin probiotic *Pediococcus acidilactici* FT28 on maintenance of antioxidant status, blood haematology and biochemical profile in early weaned grower-finisher pigs. *Indian Journal of Animal Sciences*, 88(7): 779-785.
42. Dowarah, Runjun, Verma, A. K., Agarwal, N., Singh, P. 2018. Efficacy of species-specific probiotic *Pediococcus acidilactici* FT28 on blood biochemical profile, carcass traits and physicochemical properties of meat in fattening pigs. *Research in Veterinary Science*, 117:60-64. doi: 10.1016/j.rvsc.2017.11.011. Epub 2017 Nov 21.
43. Dowarah, Runjun, Verma, A. K., Agrawal, N., Singh, P. and Singh, B. R. 2018. Selection and characterization of probiotic lactic acid bacteria and its impact on growth, nutrient digestibility, health and antioxidant status in weaned piglets. *PLoS One*, 13(3): e0192978. <https://doi.org/10.1371/journal.pone.0192978>.
44. Gangwar S.S., Chaudhary L.C., Agarwal N., Nath R. and Kamra D.N. 2018. Effect of leaves containing bioactive compounds of north eastern region of India on *in vitro* feed fermentation and methane production. *Anim. Feed Sci. Technol.*, 18: (Accepted)
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46. Kumar, A., Pattanaik, A.K., Baliyan, S., Dutta, N. and Jadhav, S.E. 2018. Nutritional and haemato-biochemical modulation in dairy goats during mid-pregnancy. *Indian Journal of Animal Sciences*, 88: 899-904.
47. Kumar, Sunil and Narayan Dutta. 2018. Condensed tannin and integrated parasite management for livestock. *Journal of Pharmacognosy and Phytochemistry*, 7(4): 869-873.
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49. Mishra, Alok, Verma, A.K., Das, Asit, Singh, Putan, and Sahoo, N.R. 2019. Effect of betaine supplementation on haematology, serum enzymes and hormone profile in gestating sows. *Indian J. Anim. Sci.*, 89 (5): accepted.
50. Patel, J. Singh, A. Chaudhary, R. Kumar, A. Jadhav, S.E., Naskar, S. Maurya, V.P. Mishra, B.P. and Dutt, T. 2018. Factors affecting milk minerals and constituents in indigenous vis-à-vis crossbred cattle and buffaloes. *Indian Journal of Animal Sciences*, 88. 463-469.
51. Pawar, M. M., Kamra, D. N. Chaudhary L.C., Agarwal, N., Chaturvedi, V. B. 2019. Nutrients utilization, methane emission, immune function, blood metabolites and

- performance of buffalo calves fed *Trachyspermum copticum* seed oil. *Indian J Anim. Sci.* 89: (Accepted)
52. Raje, K., Garg, A.K., Jadhav, S.E., Dutta, N., Ojha, B.K. and Mishra, A. 2018. Effect of different levels and sources of supplemental nano zinc on blood-biochemical profile and serum mineral status in Wistar rats (*Rattus norvegicus*). *Journal of Animal Research*, 8: 643-649.
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 59. Verma, A.K., Mahla, A.S., Chaudhari, R.K., Verma, A.K., Singh, Khatti, A., Singh, S.K., Narayan Dutta, Singh, G., Sarkar, M., Kumar, H. and Yadav, D. 2018. Effect of different levels of n-3 polyunsaturated fatty acids rich fish oil supplementation on the ovarian and endometrial functions in goat (*Capra hircus*), *Animal Reproduction Science* (2018), <https://doi.org/10.1016/j.anireprosci.2018.05.019>.
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 62. Chaturvedi, V.B., Singh, P. and Kerketta, S. 2018. Comparative Assessment of Energy Metabolism and Fasting Heat Production of Buffaloes and Crossbred Cattle. *International Journal of Livestock Research*, 8 (1), 158-165. <http://dx.doi.org/10.5455/ijlr.20170508054801>
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64. Gaykwad, C.K., De, U.K., Jadhav, S.E., Chethan, G.E., Sahoo, N.R., Mondal, D.B., Gaur, G.K., Verma, M.R. and Chaudhuri, P. 2019. Adding α -tocopherol-selenium and ascorbic acid to periparturient sow diets influences hemogram, lipid profile, leptin, oxidant/antioxidant imbalance, performance and neonatal piglet mortality. *Research in Veterinary Science*, 125, 360-369.
65. Gopi, M., Narayan Dutta, Rokadea, J. J., Prabakara, G., Kumar, R.D., Beulaha, P., Kolluriala, G., Khillare, G., Tyagi, J.S. and Jag Mohan. 2019. Dietary supplementation of polyphenols alleviates the negative effects of heat stress in broilers, *Biological Rhythm Research*, <https://doi.org/10.1080/09291016.2019.1630923>.
66. Gopi, M., Narayan Dutta, Jadhav, S.E. and Pattanaik, A.K. 2019. Cereal sources alter response to supplementary polyphenols on the performance, serum biochemistry and internal organs of Wistar rats. *Animal Nutrition and Feed Technology* 19(2): 89–100.
67. Kala, A., Kamra, D.N., Chaudhary L.C. and Agarwal, N. 2019. Metagenomics and CAZymes in rumen: A review. *Indian Journal of Animal Nutrition*, 36: 1-10.
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71. Lakhani, Neeti, Kamra, D.N., Kala, Anju, Agarwal, Neeta, Chaudhary, L.C. and Chaturvedi, V.B. 2019. Effects of dietary supplementation with rumen modifier and sodium sulphate on methane production and performance of buffalo calves. *Animal Nutrition and Feed Technology*, 19: 169-180
72. Mishra, Alok, Verma, A.K., Das, Asit, Singh, Putan, and Sahoo, N.R. 2019. Effect of dietary betaine supplementation on production and reproductive performance, milk composition and serum anti-oxidant profile in gestating sows. *The Indian Journal of Animal Sciences*, 89(3): 246-250.
73. Mishra, Alok, Verma, A.K., Das, Asit, Singh, Putan, and Sahoo, N.R. 2019. Effect of betaine supplementation on haematology, serum enzymes and hormone profile in gestating sows. *The Indian Journal of Animal Sciences*, 89 (5): 506-510.
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75. Paswan, V.K., Narayan Dutta, Pattanaik, A. K. Sharma, K., and Gupta, P. K. 2019. *In vitro* fermentation studies of ruminant diets replacing soybean meal with different levels of solvent extracted raw karanj (*Pongamia glabra*) cake. *Indian Journal Animal Research*, DOI: 10.18805/ijar. B-3779.
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77. Pattanaik, A.K., Ingale, S.L., Baliyan, S., Narayan Dutta, Kamra, D.N. and Sharma, K. 2018. Herbal additives influence *in vitro* fermentative attributes and methanogenesis differently in cattle vs. buffalo rumen liquor. *Animal Production Science*. 58(6): 1064-1072.
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