



## Director's Desk

ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru has been working in the niche areas of fundamental research in animal science and successfully developed sustainable farmer's friendly technologies for the last two decades. In recent years, the institute developed an anti-methanogenic feed supplement 'Harit Dhara' prepared from natural phyto-sources. The incorporation of Harit Dhara in livestock feed significantly reduce enteric methane emission up to 20%. This product has a great potential towards stabilizing the global warming process besides

enhancing the productivity of the animal by rechannelizing the saved biological energy. The technology was commercialized to M/s Saideep Exports Pvt Limited and M/s Core Carbox Solutions Pvt Limited on a non-exclusive basis through AgrInnovate India on 24<sup>th</sup> March and 11<sup>th</sup> June 2022, respectively.

I am happy to share that Kum Shobha Karandlaje, Hon'ble Minister of State for Agriculture and Farmer's Welfare, Government of India inaugurated the 'Farmers-cum-Students Hostel' and 'Community Hall' at ICAR-NIANP on 11<sup>th</sup> June 2022, in the august presence of Dr Trilochan Mohapatra, the Secretary, DARE, Government of India, and the Director General, ICAR, New Delhi. She has complimented all the staff for the achievements of ICAR-NIANP on emerging challenges of livestock sector. In her address, she reiterated the significance of livestock on livelihood security vis a vis rural economy, and given the analogy 'Crop and livestock are two eyes of human being'. She urged the scientists for active technology transfer, greater coordination with state livestock and allied departments, capacity development of veterinary professionals to fulfil the dream of Hon'ble Prime Minister in 'Doubling the farmers' income'. The DG ICAR highlighted the ICAR-NIANP's achievements in making it as an 'Institute of Relevance' on several emerging fronts and he applauded the entire team of ICAR-NIANP for developing required infrastructure facilities, creating state-of-the-art research facilities on climate change, publishing research articles in high impact journals, playing critical roles in doubling farmers income and diversifying research on emerging challenges in the livestock sector.

During this period, the institute organized national level training programs for the faculties of various universities and ICAR institutes of the country such as faculty training sponsored by DBT, Government of India and DBT-Karnataka Skill Vigyan Programme in Life Science and Biotechnology on 'Advancing discovery through cutting-edge molecular and genomic technologies in livestock / veterinary research' and ICAR sponsored winter school on 'Recent advances in nutritional technologies for doubling the farmers income under changing climate scenario'. The institute also hosted an international workshop on 'Climate change and livestock production: Current scenario and way forward' sponsored by Australia-India Council, Australia.

I am sure that the commitments, sense of responsibility and confidence of scientists will ensure the holistic development of the institute.

Raghavendra Bhatta  
Director

## In this issue

Research News  
Events  
Visitors  
Awards & Recognition  
Publications  
Commercialization  
Patents  
Hindi programme  
Women's Cell  
Staff Welfare Activities

## Editorial Board

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## Research News

### Rice Straw Quality Evaluation of Different Bio-fortified Varieties and Breeding Lines

Quality evaluation of bio-fortified straw varieties along with promising breeding lines/check varieties was carried out under CRP-Biofortification project. Bio-fortification refers to genetic enhancement of key food crops with enhanced nutrients. The fundamental purpose of bio-fortification is to enhance the important nutrients like protein, zinc, iron or  $\beta$ -carotene. The crop residues (straws) arising out of bio-fortified crops are precious value-added items for feeding livestock. A total of thirteen varieties of rice (*Oryza sativa*) straw including eight bio-fortified varieties (BFV), two bio-fortified breeding lines (BBL), two breeding lines (BL) and one check variety were subjected to quality evaluation.

#### Different varieties of rice straw evaluated

##### Bio-fortified varieties (RBV)

Zinco rice  
Surabhi  
Protozin  
CGZR2  
DRR Dhan 45  
DRR Dhan 48  
DRR Dhan 49  
CR Dhan 311

##### Bio-fortified Breeding Lines (BBL)

IET 25443/CNBC  
IET 24773/CNRB

##### Breeding Lines (BL)

Sj3  
MV/2  
Check  
BPT5204

The crude protein (CP%) of rice straw was ranging from 4.2 in Zinco rice to 6.0 in CGZR2 with an average of 5.05 in BFV. In case of BBL and BL, the CP was found to be 5.28 and 4.04%, respectively. Crude protein level was negatively correlated with crude fibre (CF%) content of the straw. The CF of rice straw ranged from 38.1 in CGZR2 to 50.8 in DRR Dhan 49 with average of 45.2% in BFV. In case of BBL and BL, the CF was

found to be 45.0 and 45.2, respectively. CF of rice straw was negatively correlated with important plant breeding parameters such as single plant dry weight, flag leaf length, iron content of brown rice, zinc content both brown and polished rice. Zinc levels (ppm) in the rice straw of zinc fortified varieties is ranged from 5.5 in Zinco Rice to 9.4 in Protozin with average of 7.49. However, straw from BBL and BL, had higher levels of zinc 15.1 and 11.9 ppm, respectively. The Iron (Fe) content of rice straw ranged from 52.9 in Surabhi to 228 in DRR Dhan 48 with average of 135 ppm in BFV. In case of BBL and BL it was found to be 119 and 85.9, respectively. The Fe level in straw was positively correlated CF and straw invitro organic matter digestibility (IVOMD). IVOMD ranged from 37.9 in DRR Dhan 45 to 49.6 in DRR Dhan 49 with an average of 43.0% in BFV. In case of BBL and BL, the IVOMD was found to be 42.7 and 43.7%, respectively. The volatile fatty acid (VFA) concentration ranged from 33.5 in DRR Dhan 45 to 48.6 in Zinco rice with an average of 40.9 mMol per liter in BFV. In case of BBL and BL, the TVFA was found to be 34.3 and 41.8 mMol per liter, respectively. No significant differences were observed between BFV, BBL and BL with regard to volatile fatty acids production (Fig.1).

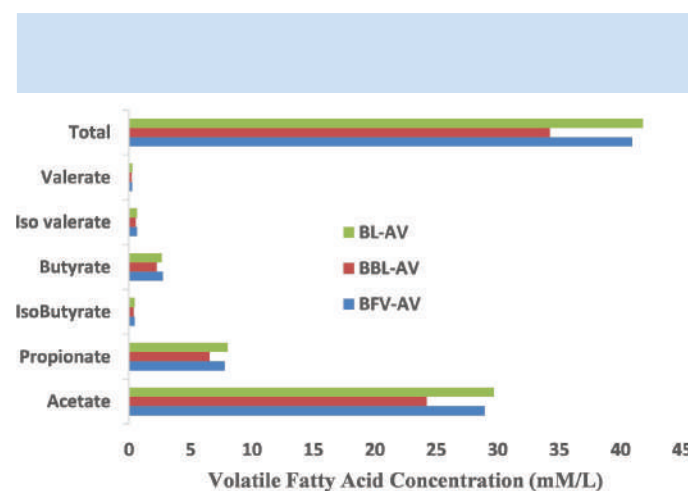


Figure 1: Total volatile fatty concentration in (mMol per liter) incubation medium in different bio-fortified varieties, lines and breeding lines

BFV:Zinco Rice, Surabhi, Protozin, CGZR2, DRR Dhan 45, DRR Dhan 48, DRR Dhan 49, CR Dhan 311; BBL:CNBC, CNRB; BL: SJ/3, MV/2



## EVENTS

### Expert Committee Meeting

The ICAR-NIANP, Bengaluru organized an expert committee meeting during 3-5<sup>th</sup> March 2022 for updating the 'Nutritional requirement of domestic animals and poultry' under the chairmanship of Dr K Pradhan, Chancellor, SOA University, Bhubaneswar. Thirteen Animal Nutrition Experts participated in the event.



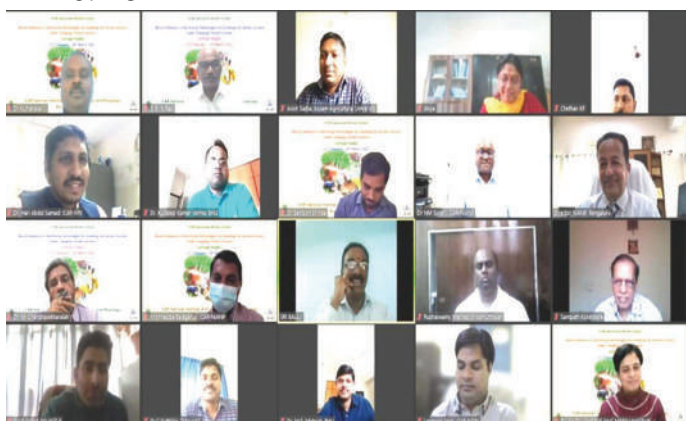
### Faculty Training Programme

ICAR-NIANP, Bengaluru organized a faculty training programme on 'Advancing discovery through cutting-edge molecular and genomic technologies in livestock / veterinary research' during 15-22<sup>nd</sup> March 2022 sponsored by DBT, Govt of India and DBT-Karnataka Skill Vigyan Programme in Life Science & Biotechnology.



### Winter School

ICAR sponsored winter school on 'Recent advances in nutritional technologies for doubling the farmers income under changing climate scenario' was organized from 22<sup>nd</sup> February to March 14<sup>th</sup> 2022 by virtual mode at ICAR-NIANP, Bengaluru. Twenty-five participants from different states of the country attended the training program.



### Australia India Council Workshop

ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru organized a 3-days International Australia-India Council Workshop on 'Climate change and livestock production: Current scenario and way forward' during 11-13<sup>th</sup> April 2022. Total fifty participants participated in the workshop.



### Research Advisory Committee

The 27<sup>th</sup> meeting of the Research Advisory Committee (RAC) was held at ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru from 19<sup>th</sup> to 21<sup>st</sup> April 2022 under the chairmanship of Prof SP Tiwari, Vice Chancellor, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh.



### Institute Research Committee

The 26<sup>th</sup> annual Institute Research Committee (IRC) meeting was held at ICAR-NIANP, Bengaluru from 24 to 26<sup>th</sup> May 2022 under the chairmanship of Dr Raghavendra Bhatta, Director of the institute to review the annual progress of various on-going projects during 2021-22 and to evaluate new research projects proposals.





## Institutional Animal Ethics Committee

The first Institutional Animal Ethics Committee (IAEC) meeting for the year 2022 was held on 27<sup>th</sup> April 2022 at ICAR-NIANP, Bengaluru under the Chairmanship of Dr Raghavendra Bhatta, Director of the institute for clearance of animal experimentation proposed under various new and ongoing research projects.



## World Milk Day

The World Milk Day was celebrated at ICAR-NIANP, Bengaluru in collaboration with Indian Dairy Association-South Zone (IDA-SZ) and Bureau of Indian Standards (BIS), Chennai. The theme of World Milk Day for this year is 'Sustainability in dairy sector with nutrition, environment and socio-economic empowerment'.



## Inauguration of Facilities at ICAR-NIANP

Kum Shobha Karandlaje, Hon'ble Minister of State for Agriculture & Farmer's Welfare Govt of India inaugurated the 'Farmers-cum-Students Hostel' and 'Community Hall' at ICAR-NIANP, Bengaluru on 11<sup>th</sup> June 2022 in the presence of Dr Trilochan Mohapatra, the Secretary, DARE, Government of India and the Director General, ICAR, New Delhi.



## International Day of Yoga

The International Day of Yoga was celebrated at ICAR-NIANP, Bengaluru on 21<sup>st</sup> June 2022. Dr Vinutha Rao, Yoga Consultant & Naturopathy Physician highlighted the importance of Yoga in day-to-day life and demonstrated different types of Yoga Asanas and their benefits.



## Annual Review Meeting of AICRP

The annual review meeting of AICRP on 'Nutritional and physiological interventions for enhancing reproductive performance in animals' was held at ICAR-NIANP, Bengaluru, during 24-25<sup>th</sup> June 2022 under the Chairmanship of Dr BN Tripathi, Deputy Director General (AS), ICAR.



## Annual Review Meeting of Outreach Program

The annual review meeting of outreach program on 'Estimation of methane emission under different feeding systems and development of mitigation strategies' was held at ICAR-NIANP, Bengaluru, during 24-25<sup>th</sup> June 2022 under the Chairmanship of Dr BN Tripathi, Deputy Director General (AS), Dr Raghavendra Bhatta, Director, NIANP presented the coordinator's report.

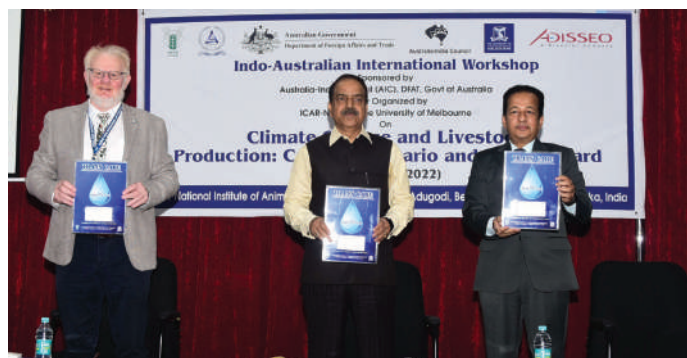




## Visitors

### Deputy Director General (Animal Science), ICAR

The Deputy Director General (Animal Science), ICAR, Dr Bhupendra Nath Tripathi visited ICAR- NIANP, Bengaluru on 11<sup>th</sup> April 2022. DDG interacted with scientists and appreciated the international collaborative projects and he highlighted the effect of climate change on livestock production and the emergence of new diseases in livestock.



### Vice Chancellor, NDVS University

Prof (Dr) S P Tiwari, Vice Chancellor, Nanaji Deshmukh Veterinary Science University, Jabalpur, Madhya Pradesh visited ICAR-NIANP on 19<sup>th</sup> April 2022. The Vice Chancellor interacted with scientists and appreciated the research projects and technologies developed by the institute especially the farmer's friendly technologies.



### Minister of State for Agriculture & Farmers' Welfare

Kum Shobha Karandlaje, Hon'ble MoS for Agriculture & Farmer's Welfare, Govt of India visited ICAR-NIANP, Bengaluru on 11<sup>th</sup> June 2022. Complimenting the achievements of NIANP on emerging challenges of livestock sector, she urged the scientist for technology transfer, coordination with state livestock and allied departments, and the implication of capacity development of veterinary professionals.



### Director General, ICAR

Dr Trilochan Mohapatra, the Secretary, DARE, Government of India and the Director General, ICAR, New Delhi visited ICAR-NIANP on 11<sup>th</sup> June 2022. DG, appreciated the entire team of ICAR-NIANP for developing required infrastructure facilities, creating state-of-the-art research facilities on climate change and publishing research articles in high impact journals.



## Awards & Recognitions

Dr D Rajendran Principal Scientist, Animal Nutrition Division, ICAR-NIANP conferred with '2<sup>nd</sup> Innovative Award - ICAR KRITHAGYA 2.0' at national level for the development of 'Farm Diary'- a revolutionary mobile app for dairy industry in collaboration with M/s Dairy Enterprises, Bengaluru.



Dr S Selvaraju, ICAR-National Fellow, Animal Physiology Division conferred with 'Fellow of National Academy of Veterinary Sciences (India)' on 21<sup>st</sup> June 2022 at Veterinary college, Nagpur.

Dr Ashish Mishra, Principal Scientist, Animal Physiology Division conferred with 'Associate Fellowship Award of National Academy of Veterinary Sciences (India)' on 21<sup>st</sup> June 2022 at Veterinary college, Nagpur.

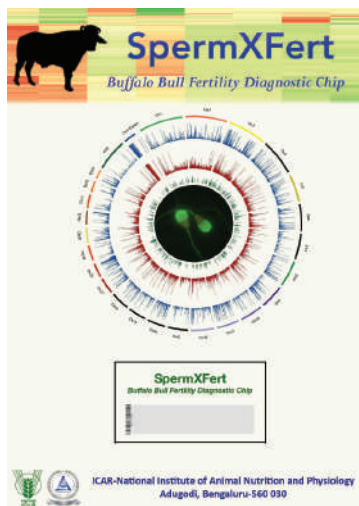
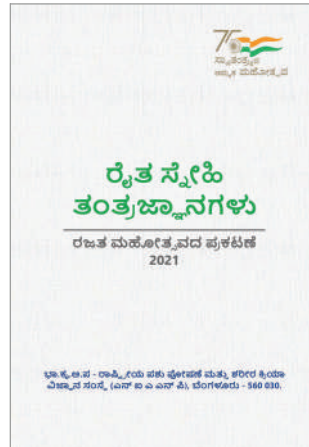
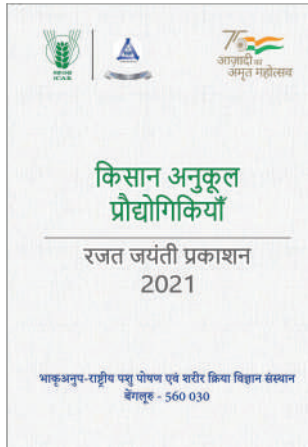
Dr Gopi M, Scientist, Animal Nutrition Division received 'Membership in National Academy of Veterinary Sciences (India)' on 21<sup>st</sup> June 2022 at Veterinary college, Nagpur.

Dr N K S Gowda, Principal Scientist received 'Smt Anne Shikhamany Memorial Award' for the best research paper 'Studies on bioavailability of iron from Fe-fortified commercial edible mushroom *Hypsizygus ulmarius* and standardization of its delivery system for human nutrition'. Journal of Horticultural Sciences, 15(2):197-206.

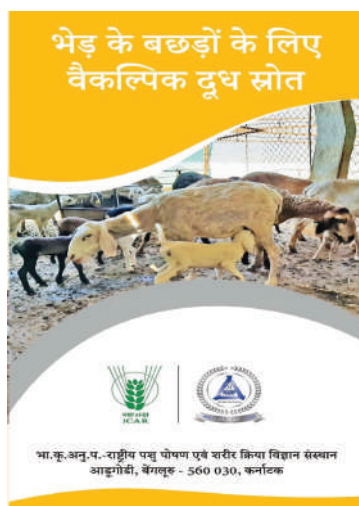


## PUBLICATIONS

The farmers-oriented technologies developed by ICAR-NIANP, Bengaluru during 1995 to 2020 was compiled on the occasion of silver jubilee of NIANP as 'Farmers Friendly Technologies' and published in Hindi and Kannada



ICAR-NIANP developed buffalo bull fertility diagnostic chip 'SpermXFert' which can be used to select superior fertile buffalo breeding bulls for improving overall field fertility.



ICAR-NIANP developed Milk replacer supplementation for economic meat production in lambs' and published in Hindi.

## Commercialization

The ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru, Karnataka commercialized the 'Harit Dhara' technology to the M/s Saideep Exports Pvt Limited on a non-exclusive basis through the AgrInnovate India on 24<sup>th</sup> March 2022.



HaritDhara - an anti-methanogenic feed supplement developed by the ICAR-NIANP, Bengaluru commercialized to M/s Core Carbox Solutions Pvt Limited, Telangana on 11<sup>th</sup> June 2022 on a non-exclusive basis through the AgrInnovate India.



## Patents

ICAR-NIANP, Bengaluru have filed two patents for 'An improved method for in vitro production of embryos through the stimulation of akt signalling' and 'An improved device for collection and measurement of enteric methane emission in ruminants' during January and March 2022, respectively.



## Hindi Programme

### Hindi Workshop

ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru organized two Hindi workshops on 'Hindi Noting and Drafting' on 5<sup>th</sup> March 2022 and 'Information Technology Tools in Hindi' on 4<sup>th</sup> June 2022.



### Quarterly Meeting of OLIC

The quarterly meetings of Official Language Implementation Committee were held at ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru on 25<sup>th</sup> February and 28<sup>th</sup> May 2022, respectively to review the progress in Hindi implementation in different divisions and sections of the institute.



### Women's Cell

ICAR-NIANP celebrated "National Girl Child Day" on 24<sup>th</sup> January 2022 with the theme of "Save Girl Child" and "Educate Girl Child: Eradicate Poverty" and "International Women's Day" on 8<sup>th</sup> March 2022. On these occasions various competitions were organized among girl children of NIANP staff and prizes were distributed to the winners.



# NIANP NEWS & VIEWS

## Staff Welfare Activities

### Celebration of Makar Sankranti

ICAR-NIANP, Bengaluru celebrated Makar Sankranti on 16<sup>th</sup> January 2021 at Experimental Livestock Unit. All the permanent staff and contractual workers of the institute were participated in the celebration.



### Republic Day Celebration

ICAR-National Institute of Animal Nutrition and Physiology, celebrated the 73<sup>rd</sup> Republic Day. The Director hoisted the national flag and delivered the Republic Day speech and distributed prizes to the winners of the sports events organized in the institute.



### Other Activities

Fresh vegetables and fruits were arranged from FarmFreshBangalore.com for the benefit of the residents of the ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru on weekly basis from February 2022 and also organised special camp for updating Aadhaar, Voter id and national health cards during 27-28<sup>th</sup> March, 2022.





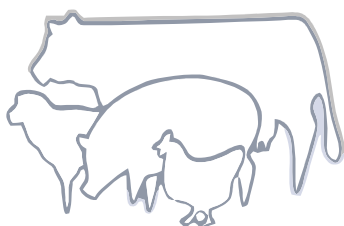


## NIANP



A seed hidden in the heart of an apple is an orchard invisible

Balanced Nutrition - Enhanced Production



संतुलित आहार - प्रवृद्ध उत्पादन



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