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Published by

Raghavendra Bhatta
Director, ICAR-NIANP



Director's Desk



No matter how hard the past, we shall begin again and I wish you all a healthy and productive New Year 2021.

The year 2020 marked the Silver Jubilee of ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru and due to the unprecedented global health crisis of COVID-19 it was not celebrated. But it is still important for us to reflect on the past, and more importantly, to focus on the future. All changes over the last 25 years came with great efforts and sacrifices, resulting in ICAR-NIANP being recognized in the Indian Council of Agricultural Research system as one of the best institutions, which drives its vision through scientific contribution, expertise, hard work and focus on basic and fundamental research and development of farmers oriented technologies through a sustainable approach.

I am pleased to share that the institute has been granted with many patents and developed various farmers friendly technologies and products. Further, ICAR-NIANP trained the human resource persons throughout the country in the field of animal nutrition, physiology and reproduction during the last 25 years. On the occasion of Silver Jubilee Foundation Day on 24th November 2020, Dr BN Tripathi, Deputy Director General (AS) complimented the institute for its excellent work, advised to further work on feed resources and tackle the challenges of livestock reproduction under field conditions. While congratulating NIANP for its great achievements in terms of the technology, product and patents, Dr Trilochan Mohaparta, Secretary DARE and the Director General ICAR advised for acceleration in translation of research findings into viable technologies and for setting up "global benchmark in research". He further added that the Centre for Laboratory Animal Research (CLAR) facility at ICAR-NIANP, Bengaluru should be recognized as an accredited centre for bioavailability studies in the country. He emphasized the need to take-up research work on new Frontier areas such as 'Nutrigenomics' and to strengthen the capacity building programme using digital platform.

On the significant occasion of the twenty fifth anniversary of the foundation of ICAR-NIANP, it gives me a great pleasure to extend my warm congratulations and best wishes to all the contributors for the growth and development of the institution. I know it has not been an easy journey, but it has been fulfilling its vision and mission, and let's look forward to the development truly capable of catering to the needs and aspirations of our farmers.

Raghavendra Bhatta

Raghavendra Bhatta
Director

Research News

NBT staining and bright-field microscopy based method for detecting and quantifying intracellular ROS in oocytes, cumulus cells and embryos

Assessment of intracellular reactive oxygen species (ROS) is important for evaluating the developmental ability of cumulus-oocyte complexes (COC) and embryos. Although, fluorescence-based 2', 7'-dichlorodihydrofluorescein diacetate (DCFH-DA) staining method is used widely for detecting intracellular ROS in COC and embryos, it is associated with several limitations such as nonspecific oxidation of DCFH-DA, saturation of DCF fluorescence signal and photobleaching and photooxidation of the DCF-based probes. Comparison of DCF fluorescence intensity is difficult if there is a wide difference in the level of intracellular ROS among the experimental groups. In general, for the assessment of ROS level, fluorescence signal in the different experimental groups is documented using the similar camera parameters that are adjusted for the samples emitting intense fluorescence. As a result, the samples with low fluorescence intensity appear extremely dark, resulting poor visual representation of ROS within the cells. Therefore, an alternative method has been developed at ICAR-NIANP for detecting and quantifying intracellular ROS in oocytes, cumulus cells and embryos based on nitroblue tetrazolium (NBT) staining and bright-field microscopy (Fig. 1).

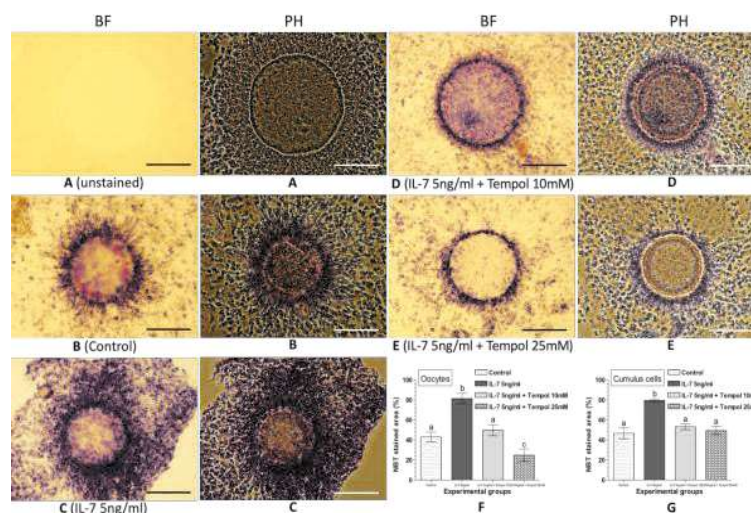


Fig. 1: NBT staining for assessing the effect of Interleukin-7 (IL-7, ROS inducer) and Tempol (superoxide ion scavenger) on intracellular ROS in ovine oocytes and cumulus cells following IVM. BF: bright-field image; PH: phase-contrast image. Scale bar = 100 μ m

The NBT staining offers better visual perception of intracellular ROS with clear visibility. Nitroblue tetrazolium reacts with ROS and forms formazan precipitate that can be detected as dark purple/blue spots under bright-field microscope. The level of intracellular ROS can be expressed as the proportion (%) of the NBT stained area of oocytes, compact cumulus cell masses or embryos (Fig. 2).

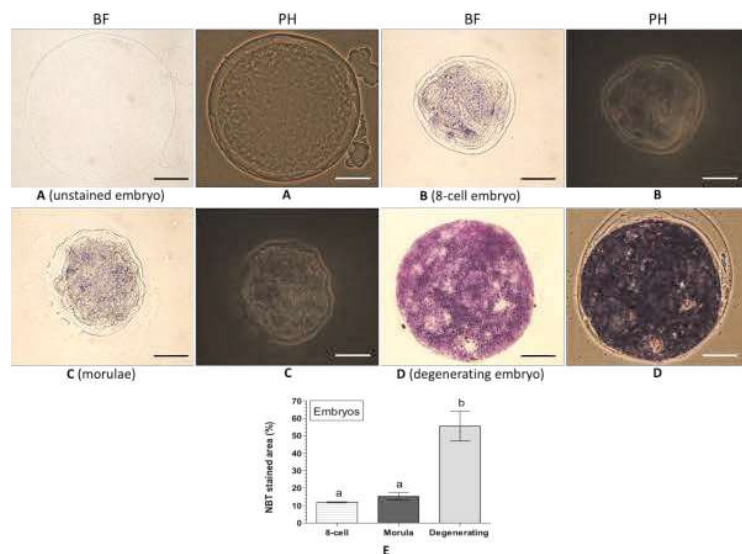


Fig. 2: NBT staining for assessing intracellular ROS in ovine embryos derived in vitro. BF: bright-field image; PH: phase-contrast image. Scale bar = 50 μ m.

The developed NBT staining method is a suitable alternative to the DCFH-DA staining for interpreting the level of intracellular ROS in oocytes, cumulus cells and embryos. This newly developed method would be a useful tool for the developmental biologists for assessing intracellular ROS in individual COC or embryo (Frontiers in Cell and Developmental Biology, 8: 764).

frontiers
in Cell and Developmental Biology

METHODS
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An Efficient Nitroblue Tetrazolium Staining and Bright-Field Microscopy Based Method for Detecting and Quantifying Intracellular Reactive Oxygen Species in Oocytes, Cumulus Cells and Embryos

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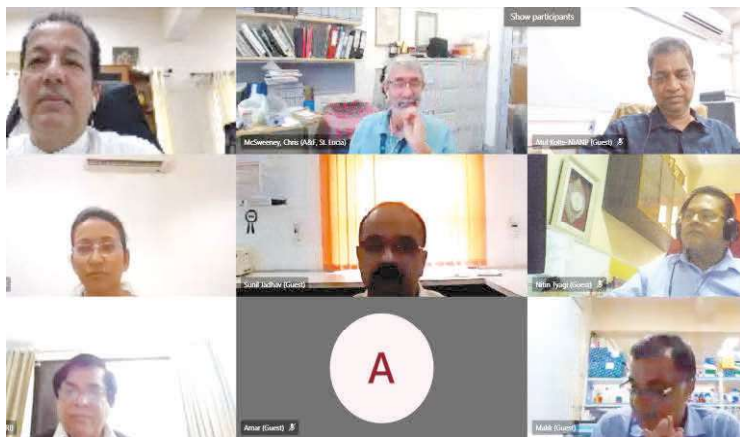
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Assessment of intracellular reactive oxygen species (ROS) is important for evaluating the developmental ability of cumulus-oocyte complexes (COC) and embryos. Although, fluorescence-based 2', 7'-dichlorodihydrofluorescein diacetate (DCFH-DA) staining method is used widely for detecting intracellular ROS in COC and embryos, it is associated with several limitations. This study aimed to develop an alternative method for detecting and quantifying intracellular ROS in oocytes, cumulus cells and embryos based on nitroblue tetrazolium (NBT) staining and bright-field microscopy. Nitroblue tetrazolium reacts with ROS and forms formazan precipitate that can be detected as dark purple/blue spots under bright-field microscope. Ovine COC were matured *in vitro* without (control) or with the supplementation of Interleukin-7 (IL-7; for stimulating intracellular ROS), Tempol (superoxide scavenger) or combination of IL-7 and Tempol. The matured COC were stained with NBT and the formation of intracellular formazan precipitates was assessed. Additionally, the matured COC were stained with DCFH-DA to compare the level of intracellular ROS. Further, ovine embryos (8-cell, morula, and degenerating) were generated *in vitro* and stained with NBT for assessing intracellular ROS. The level of intracellular ROS was expressed as the proportion (%) of the NBT stained area of oocytes, compact cumulus cell masses or embryos. The proportions of NBT stained area in the matured oocytes and cumulus cells was found significantly lesser in the control as compared to the IL-7 (1 and 5 ng/ml) treated groups. A similar trend in the intracellular ROS level was also observed in the matured COC, when assessed based on the DCFH-DA staining. Following the treatment with Tempol (100 mM), negligible NBT stained area in oocytes and cumulus cells was observed. The NBT staining patterns of the oocytes and cumulus cells following the combined

Events

ILRI-ICAR Sponsored International Workshop

Three Days Hands-on-Training cum Workshop on 'Livestock methane emission: Assessment, impact, and amelioration strategies' jointly organized by ILRI, ICAR and NIANP, Bengaluru during 2nd – 12th November, 2020.



ICAR-NIANP 25th Foundation Day

ICAR-NIANP celebrated Silver Jubilee Foundation Day on 24th November, 2020. A special webinar was presided over by Dr T Mohaparta, Secretary DARE & DG, ICAR in the presence of Dr BN Tripathi, DDG (AS) & Dr AK Tyagi, ADG (A&P).



Foundation Day Lecture

The Foundation Day Lecture was delivered by Prof Rattan Lal, recipient of **The World Food Prize 2020** on the topic "Integrating livestock with crops and trees for climate-smart agriculture in India".



Midterm Institute Research Committee

Midterm Institute Research Committee (IRC) meeting was held at ICAR-NIANP during 21st – 23rd December, 2020 under the chairmanship of Dr Raghavendra Bhatta, Director with all precautionary measures against COVID-19.



Institutional Animal Ethics Committee

The Institutional Animal Ethics Committee meeting was held on 30th December, 2020 at ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru under the Chairmanship of Dr Raghavendra Bhatta, Director.



Technology Demonstration

ICAR-NIANP organized a demonstration cum training on "NIANP technologies and animal husbandry management practices" to augment the production performance of dairy animals to the farmers on 12th December, 2020.



Visitors

CPCSEA Nominee

CPCSEA nominee, Dr Raveendra Hegde visited ICAR-NIANP Laboratory Animal House Facility on 3rd October, 2020 to review the facilities for the accreditation of laboratory animal breeding programme.



Institutional Animal Ethics Committee

The external member of IAEC visited ICAR-NIANP, Bengaluru on 30th December, 2020. The committee members reviewed the management of animals at Experimental Livestock Unit of institute and appreciated the standards of management.



NIANP Scientists Received Global Accolade

Two scientists from ICAR-NIANP, Dr Raghavendra Bhatta, Director and Dr Veerasamy Sejian, Principal Scientist are among the top 2% scientists' in the world. A study published by Stanford University researchers in PLoS Biology journal.



NIANP Best Research Paper Award

Dr BK Binsila, Scientist and co-workers received ICAR-NIANP Best Research Paper Award for the year 2019-2020. Research Paper was published in the Journal of Trace Elements in Medicine and Biology, 55 (2019) : 6-14.



Dr Raghavendra Bhatta, Director, ICAR-NIANP, Bengaluru has been conferred the "Eminent Scientist Award 2020" on 1st December, 2020 by the Society for Science of Climate Change and Sustainable Environment, New Delhi for his exemplary work in the field of climate change impacts on animal production.



Awards & Recognitions

Dr Raghavendra Bhatta, Director, ICAR-NIANP, Bengaluru has been conferred with the prestigious "Rafi Ahmed Kidwai Award" for outstanding research in the field of Animal Science for the year 2019 by ICAR on 16th July, 2020 at New Delhi.



Dr Pradeep Kumar Malik, Principal Scientist, ICAR-NIANP, Bengaluru has been conferred the “Fellowship Award 2020” on 1st December, 2020 by the Society for Science of Climate Change and Sustainable Environment, New Delhi for his outstanding contribution in the field of enteric methane and climate change.



Dr Shraddha Trevedi, Senior Research Fellow, ICAR-NIANP, Bengaluru has been conferred the “Young Scientist Award 2020” on 1st December, 2020 by the Society for Science of Climate Change and Sustainable Environment, New Delhi for her research work in the area of animal biotechnology.



Trainings

Green Fodder Cultivation

ICAR-NIANP organized an awareness programme on “Green fodder cultivation” on 22nd August, 2020 at Kumkumanaahalli milk society, Tumkur milk union and Napier fodder root stem cuttings were distributed to the farmers under AICRP project.



Clean Milk Production

ICAR-NIANP organized an awareness programme on “Clean milk production and mastitis prevention” to mark the celebration of “Mahila Kisan Divas” on 15th October, 2020 at the dairy cooperative society, Ragihalli.



Patents

Patent has been granted to ICAR-NIANP for an invention entitled “Pineapple Fruit Residue Silage based Total Mixed Ration for Livestock Feeding” on 28th August, 2020.

Patent has been filed for “Method and Medium for In Vitro Production of Sex Specific Embryos” on 24th November, 2020.



Mineral Supplementation to Livestock

An awareness programme on “Importance of mineral supplementation to livestock” was organized by ICAR-NIANP on 8th December, 2020 at BK Doddi, Malavalli. Mineral mixtures for sheep and goats were distributed to the farmers.



Personnel



Dr N Ramachandran, Senior Scientist (Livestock Production and Management) joined ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru on 31st August, 2020 on transfer from ICAR-Central Institute for Research on Goats, Makhdoom.



Dr Gopi M, Scientist (Animal Nutrition) joined ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru on 31st August, 2020 on transfer from ICAR-Central Avian Research Institute, Izatnagar.

waste management and other activities including utilization of organic wastes / generation of wealth from waste. Drawing and Slogan writing competitions were conducted among children.



Staff Welfare Activities

Independence Day Celebration

ICAR-NIANP celebrated 73rd Independence Day on 15th August, 2020 and all the permanent and contractual staff have attended the programme. The Director hoisted the National flag, delivered the Independence Day speech.



Kannada Rajyotsava

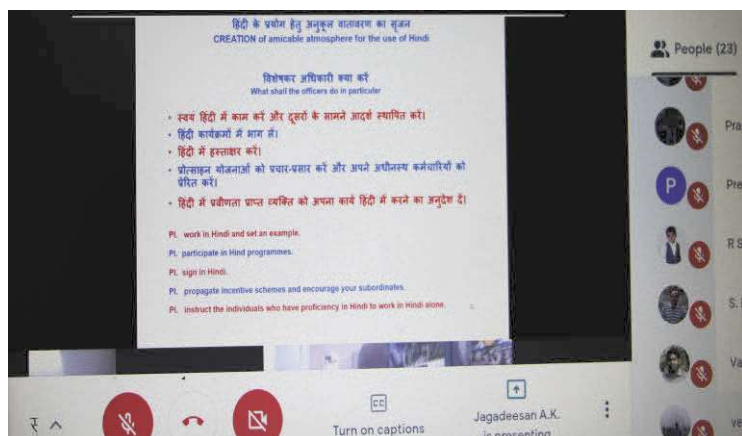
Kannada Rajyotsava was celebrated on 1st November, 2020 at ICAR-NIANP, Bengaluru and the Director distributed prizes to the winners of various competitions in Kannada writing and speech organized by Staff Welfare Club.



Hindi Programmes

Hindi Programmes

Hindi workshop was organized on "General translation - in the context of Syntax formation" on 17th December, 2020 at



ICAR-NIANP. The workshop was conducted online on 'Google meet platform' and the speaker of the session was Dr D R Shukla, Deputy Director (OL), Kendriya Silk Board, Bengaluru. Quarterly meetings of OLIC were held on 26th September and 19th December, 2020 to review the progress in implementation of Official Language in different divisions and sections of the institute.

Swachhta Pakhwada

Swachhta Pakhwada

ICAR-NIANP observed 'Swachhta Pakhwada' from 16th to 31st December, 2020 and organized various activities as per the guideline of Indian Council of Agricultural Research, New Delhi. Cleanliness drive events were taken up by all permanent and contractual staff of institute such as cleaning activities, sanitation drive within campus and surroundings including residential areas, tree plantation, stock taking of

Centre for Laboratory Animal Research (CLAR)



The state-of-the-art facility **Centre for Laboratory Animal Research (CLAR)** has been established at the Institute. This 846m² facility offers provisions for housing and breeding of rats, mice, rabbits, guinea pigs and hamsters, as well as conducting experiments on them. The facility includes animal rooms, holding and quarantine room, surgery/dissection theatre, modern research laboratories and auxiliary rooms under one roof.

Features of CLAR

- An integrated BSL-II facility.
- Double corridor movement through clean and dirty alleys.
- Centrally air-conditioned animal rooms.



- Directional air movement with pressure difference of 10 pascal between corridors and animal rooms.
- Dedicated animal rooms for mice and rats with individually ventilated cage system (IVC) for rat and mouse.
- Service rooms for washing and autoclaving, storage for clean and non-clean materials and, storage for tissue and dead animals.



- Dedicated laboratories for conducting experiments on laboratory animals with facilities for molecular biology and proteomic work, culturing of oocytes, embryos and cells, genetic manipulation of oocytes, embryos and cells and production of recombinant proteins and antibodies.

Intended use of CLAR

- Conducting experiments on laboratory animals in the area of bioavailability of nutrients, developmental biology, production of genetically modified animals, stress-induced alterations in reproductive and immune functions, developing metabolic disease models and association of gut



- microflora with reproductive and immune functions.
- Breeding and supply of mouse/rat strains for own and external uses.
- Production of important antibodies in laboratory animals for own and external uses.
- Imparting trainings on the breeding and management of laboratory animals.

Clean India Make India Clean!

ICAR-NIANP

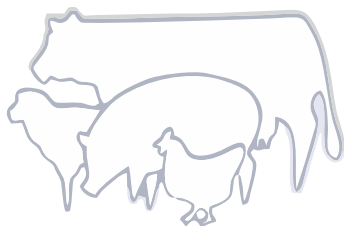


Silver Jubilee 1995-2020

Swacch India Clean India!

Balanced Nutrition

- Enhanced Production



संतुलित आहार - प्रवृद्ध उत्पादन



हर कदम, हर उभार
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch