

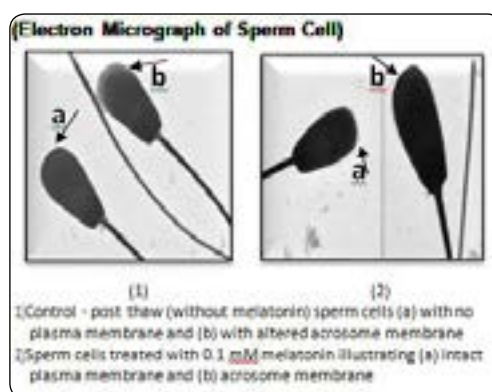
VETERINARY CONGRESS

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Effect of melatonin on bovine sperm characteristics and ultrastructure changes following cryopreservation

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The production of Reactive Oxygen Species (ROS) during cryopreservation of semen alters the sperm motion and mobility characteristics, which results in poor or failure of conception rate after artificial insemination. Melatonin (MLT) being an antioxidant molecule is able to modulate the effect of ROS and prevents spermatozoa by reducing the oxidative stress during freezing process. Total of eight ejaculates were collected from eight healthy Holstein Friesian bulls and diluted with Tris egg yolk glycerol extender. Each ejaculates were divided into five equal aliquots as control - pre-freeze, control - post-thaw without addition of melatonin and other three aliquots with 0.1 mM, 0.2 mM and 0.25 mM melatonin. After 48 hours of cryopreservation, the post-thaw samples were analyzed for motility parameters by Computer-Assisted Sperm Analysis (CASA) and ultrastructure changes by means of transmission electron microscopy. The CASA results showed no significant difference between the control - post-thaw samples and melatonin treated samples, however, the velocity of spermatozoa with regard to the Straight Line Velocity (VSL), Average Path Velocity (VAP) showed highest increase in the 0.25 mM MLT treated semen followed by 0.1 mM MLT treated semen except for VCL where velocity increased with increase in the concentration of melatonin. The vigour of spermatozoa regard to Beat Cross Frequency (BCF), Straightness (STR), Linearity (LIN), recorded highest increase in the 0.25 mM MLT treated semen followed by 0.1 mM MLT treated semen except for the Lateral Head Displacement (ALH) where vigour increased with increase in the concentration of melatonin. The electron micrography images illustrated that the addition of 0.1 mM melatonin protected the plasma membrane and acrosome region and maintained the ultrastructure integrity of the cryopreserved spermatozoa when compared to control group, whereas the electron micrography of spermatozoa treated with 0.2 and 0.25 mM melatonin illustrated highest damage to the plasma and acrosome membrane. Thus concluding that inclusion of melatonin to sperm extender can improve the post-thaw quality of cryopreserved bull spermatozoa.



Recent Publications

1. S P Mohapatra, S D Ingole, S V Bharucha, A S Nagvekar, P M Kekan and S D Kharde (2017) Measurements of Pregnandiol-3-glucuronide and urinary parameters in cyclic and early pregnant Murrah buffaloes. *Journal of Entomology and Zoology Studies* 5(6):656-658.
2. P M Kekan, S D Ingole, S D Sirsat, S V Bharucha, S D Kharde and A S Nagvekar (2017) The role of pheromones in farm animals - a review. *Agricultural Reviews* 38(2):83-93.
3. Salve R R, Ingole S D, Nagvekar A S, Bharucha S V and Dagli N R (2016) Pregnancy associated protein and progesterone concentrations during early pregnancy in Sirohi goats. *Small Ruminant Research* 141:45-47.
4. Patil M P, Nagvekar A S, Ingole S D, Bharucha S V and Palve V T (2015) Somatic cell count and alkaline phosphatase

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activity in milk for evaluation of mastitis in buffalo. *Veterinary World* 8(3):363-366.

5. Ingole S D, Deshmukh, B T, Nagvekar A S and Bharucha S V (2011) Endocrine profile from birth to puberty in buffalo calves and heifers. *Indian Journal of Animal Sciences* 81(6):563-569.

Biography

S D Ingole is a Professor of Veterinary Physiology at Bombay Veterinary College, Mumbai, India, and has 18 years of experience in research and teaching. He has expertise in Reproductive Physiology and Endocrinology and has passion in improving the reproductive status of cattles. He has been conducting research on ovarian stem cells, pregnancy associated glycoproteins, urinary pregnanediol-3-glucoronide in buffaloes and use of melatonin in bull semen.

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