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## The protective effects of trehalose on osmotic tolerance and quality of equine sperm during cold storage and cryopreservation

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In equine breeding program, subfertility of mares after insemination with frozen-thawed semen remains a major problem. Semen cryopreservation is the best method to preserve semen with additional benefit to increase remotely genetic distribution. However, sperm are exposed to extreme changes in temperature and extracellular fluid compositions during cryopreservation which potentially cause the osmotic stress and membrane instability leading to the damage of sperm. Trehalose, a disaccharide sugar, protects plasma membrane during dehydration and has been shown as an outstanding cryoprotective capability. Therefore, we aimed at investigating the osmotic tolerance limits of equine sperm, the protective effects of trehalose on osmotic tolerance and the quality of equine sperm before and after freezing and thawing. Equine ejaculated semen (n=14) was collected from six stallions. Results showed the average of motility and plasma membrane integrity of equine sperm were significantly lower in hypo- (150 mOsm/kg) and hyperosmolarity (450, 600 and 750 mOsm/kg) when compared to iso-osmolarity (300 mOsm/kg). Moreover, these parameters were worsen when osmolarities were increased. This data indicated that equine sperm had limited osmotic tolerance. Pre-incubation of sperm with 100 mM trehalose improved sperm motility, viability and membrane integrity when exposed to anisotonic conditions (450, 600 and 750 mOsm/kg) ( $P<0.05$ ). These results, therefore, demonstrated that trehalose enhanced osmotic tolerance of equine sperm. In addition, supplementation of trehalose into semen extender also increased sperm qualities (sperm motility, viability and membrane integrity) after cooling and cryopreservation when compared with control (no trehalose) ( $P<0.05$ ). It is concluded that trehalose increased osmotic tolerance and improved equine sperm quality during cooling and cryopreservation.

### Biography

Dissaya Srinutiyakorn has completed her Bachelor's degree in Biology (First-Class Honors with Gold Medal Award) from Chulalongkorn University, Thailand. She got a scholarship in Science and Technology named "DPST" from the Government of Thailand since 2008. She received Young Scientist Award from the 8th FAOPS Congress and she went to Tokyo University of Agriculture and Technology for 3 months to conduct the research in 2014. She is currently pursuing a Master's degree in the field of Animal Reproduction at Chulalongkorn University. She is interested in equine reproduction with the aim of improving equine sperm quality during cryopreservation.

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