



MINISTRY OF JIHAD-E-AGRICULTURE

Agricultural Research, Education and Extension Organization
Animal science research institute of Iran

Evaluation of rooster sperm freezing improvement using mitochondria targeted antioxidant

Research worker: Reza Masoudi

Abstract

Rooster semen cryopreservation is a useful method to spread qualified semen samples for artificial insemination in commercial flocks, but the freezing-thawing process reduces the quality and fertility potential of post-thawed spermatozoa. The aim of the current study was to investigate the efficacy of the mitochondria-targeted antioxidant Mito-TEMPO on rooster sperm quality and fertility potential improvement during freezing-thawing process. Semen samples were collected and diluted in the Lake medium, assigned into five equal aliquots, supplemented with 0, 0.5, 5, 50 and 500 μM Mito-TEMPO, and cryopreserved in liquid nitrogen. After thawing, semen motility, lipid peroxidation, membrane functionality, normal morphology, mitochondria active potential, acrosome integrity, viability, apoptotic-like changes, DNA fragmentation, ROS concentration and fertility potential were evaluated. According to the results, supplementation of Lake medium with 5 and 50 μM Mito-TEMPO presented greater ($P \leq 0.05$) total motility, progressive motility, average path velocity, membrane functionality, mitochondria active potential, acrosome integrity and viability compared to the other groups. On the other hand, lipid peroxidation, late apoptotic-like changes, DNA fragmentation and ROS concentration were lower ($P \leq 0.05$) in groups received 5 and 50 μM Mito-TEMPO compared to other groups. Moreover, fertility rate was higher in groups received 5 and 50 μM Mito-TEMPO compared to control group. Therefore, mitochondria-targeted antioxidant Mito-TEMPO could be introduced as an efficient cryo additive to improve quality and fertility potential of rooster semen during cryopreservation process.

Keywords: Cryopreservation; Fertility; Mito-TEMPO; Rooster; Spermatozoa.