

Butylated hydroxytoluene (BHT) improved semen quality and sperm DNA of frozen-thawed Arabian stallions preserved in modified INRA-82 extender

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Abstract

Background: Alpha tocopherol is one of the non-enzymatic lipophilic antioxidants. Butylated hydroxytoluene (BHT) is a synthetic analog that possesses similar modes of actions in protecting the cryopreserved sperms. Objectives: This study hypothesized that a certain concentration of any antioxidant is suitable for improving the post-thaw semen quality of stallions. Study Design: Case control study. Methods: To determine this concentration, a synthetic antioxidant similar to vitamin E in potency and scavenging oxidative stress power in concentrations of 0.0, 0.25, 0.50, 1.0, 2.0, 4.0 mM/ml were added to semen extender. The post-thaw sperm progressive motility at 0, 1h, 2h, 3h, the sperm viability index, the plasma membrane integrity tested by the hypo-osmotic swelling test (HOST), the acrosome integrity, non-fragmented DNA, % of DNA in the comet head, % of DNA in the comet tail, comet tail length, and comet tail moment were compared. Results: According to our hypothesis, 1.0 mM BHT was the most suitable concentration that preserved the highest ($P<0.0001$) post-thaw sperm progressive motility at 0.0, 1h, 2h, 3h., the highest viability index ($P<0.0001$), plasma membrane and acrosome integrities ($P<0.0001$), non-fragmented DNA ($P<0.001$), and % of DNA in the comet head ($P<0.001$), the lowest DNA % in the comet tail ($P<0.001$) and comet tail moment ($P<0.0001$), and the shortest ($P<0.0001$) comet tail length. Main limitations: Collection of semen for research from registered Arabian Horse was the main obstacle for conducting this research. In conclusion, the concentrations of BHT around 1.0 mM/ml (0.5, 2.0mM/ml) proved better post-thaw semen characteristics, but BHT in concentrations >2.0 mM/ml indicated the worst of all concentration which kept the lowest semen quality than non-supplemented control.

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