Butylated hydroxytoluene can reduce oxidative stress and improve quality of frozen-thawed bull semen processed in lecithin and egg yolk based extenders

ABSTRACT

The aims of this study were to evaluate the effects of anti-oxidant butylated hydroxytoluene (BHT), when added at different concentrations into lecithin-based Bioxcell® (BX) and two egg-yolk-based; Tris (TY) and citrate (CE) semen extenders, on post-thaw bull sperm quality and oxidative stress. A total of 30 ejaculates from three bulls were collected using an electro ejaculator. Ejaculates were extended with one of the BX, TY and CE extenders, which contained different concentrations (0.0 – control, 0.5, 1.0, 1.5, 2.0 and 3.0 mM/ml) of BHT. The extended semen samples were chilled to 4 °C, and then frozen slowly to −196 °C in 0.25 ml straws before being stored in liquid nitrogen for 2 weeks. Results showed that supplementation of BHT improved ($P < 0.05$) general motility, progressive motility, morphology, acrosome integrity, DNA integrity and malondialdehyde of sperm at 0.5 mM/ml for BX and at 1–1.5 mM/ml of BHT for TY and CE when compared with the control. However, greater concentrations of 2.0 and 3.0 mM/ml of BHT had a detrimental ($P < 0.05$) effect compared with the control with all extenders evaluated. In conclusion, BHT supplementation at lesser concentrations (0.5–1.5 mM/ml) could improve frozen–thawed bull sperm quality by reducing oxidative stress produced during the freezing–thawing procedures in either lecithin or egg-yolk based extenders.

Keyword: Anti-oxidant; Butylated hydroxytoluene; Extender; Oxidative stress; Sperm quality