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INCLUSION OF SELENIUM AND ZINC SUPPLEMENTATION ON SEMEN QUALITY OF FRIESWAL CATTLE BULLS

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ABSTRACT : This study determined the inclusion of selenium and zinc supplementation in the production of spermatozoa and semen quality of frieswal cattle bulls. Thirty (30) frieswal cattle bulls used for semen production at Central Research Institute on Buffalo, Sirsa Road, Hisar, Haryana were allotted into three treatment groups. The first treatment (T_0) with no supplementary selenium and zinc. The second (T_1) and the third (T_2) treatments were given 35 mg/kg dry matter intake of the animal and 35 mg/Kg + 0.20 mg/kg dry matter intake of the animal for the entire duration of the experiment. The frieswal cattle bulls were fed with rations composed of burseem/green maize/jowar, wheat straw, concentrate (wheat bran, maize, barley and GNC). Semen collection was done bi-weekly using the artificial vagina method and the semen volume (ml), sperm concentration (million per ml), sperm concentration (million per ejaculate), gross motility (%) and progressive motility. The results showed that T_2 produced the highest values on semen volume (6.58±0.42 ml), sperm concentration (6175.79±186.23 million/ejaculate), sperm gross motility (98.09±0.05 %) and progressive motility (35.97±0.05). However, sperm concentration volume maximum found in T_0 (1156.89±76.58 million/ml). Therefore, the basis of results revealed that the average sperm production and semen quality were improved by supplementation of dietary selenium and zinc and their combination.

Key words : Frieswal cattle bulls, zinc, selenium, semen quality.

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INTRODUCTION

Artificial insemination is an effective tool in programs for genetic improvement and a widely used breeding technique in farm animals, especially Indian buffaloes (Sansone *et al*, 2000). Semen processing and cryopreservation cause significant damage to the sperm genome, motility apparatus, plasma membrane and acrosomal cap, intracellular enzyme leakage and thus decreases fertility (Dhami and Kodagali, 1990; Rasul *et al*, 2001). Semen contains a variety of antioxidants that act as free radical scavengers against reactive oxygen species (Agarwal and Prabakaran, 2005). Processing and cryopreservation of semen reduce the semen's antioxidant protection capacity; adding an antioxidant to the freezing diluent has a protective effect against lipid peroxidation (Jiang *et al*, 2007 and Kadirvel *et al*, 2009).

Selenium supplementation can improve testicular and semen glutathione peroxidase (GSH-Px) activity, protect the membrane system integrity (Shi *et al*, 2010) and proliferation of spermatogonial stem cells (Shi *et al*, 2014). Selenium (Se) is also present in the mid piece of spermatozoa and is associated with Cys-rich protein of the mitochondrial sheath (Kleene *et al*, 1990). A deficiency of Se causes changes in mid-piece architecture leading to breakage of the head and tail of sperms and impaired sperm motility (Maiorino *et al*, 2006). Zn is an essential nutrient in growth and reproduction, and an indispensable element. Zn assists in the testicular growth and development of seminiferous tubules, spermatogenesis, test steroidogenesis, follicular stimulating hormone (FSH) synthesis and secretion and luteinizing hormone (LH) (Kumar *et al*, 2014). Zn antioxidant property prevents lipid peroxidation and lysosomal membrane stabilisation (Kimball *et al*, 1995) and thus the fertility increases (Bray *et al*, 1997). The goal of this research is to study the effect of dietary supplementation of Se and Zn on semen quality in frieswal cattle bulls.