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Effect of vitamin E injection and seasonal changes on ram semen characteristics

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ABSTRACT

Background: This study aimed to examine the effect of vitamin E injection and seasonal changes on semen characteristics (pH, ejaculation volume, mass motility, progressive motility, sperm concentration, live sperm, dead sperm, and abnormal sperm) in rams.

Aim: This study aimed to evaluate the effectiveness of vitamin E injections in improving semen characteristics in rams.

Methods: Twenty-one healthy rams were randomly divided into three groups (7 animals for each group) as follows: (1) control group injected with saline solution, (2) rams injected with 2 ml of vitamin E, and (3) rams injected with 4 ml of vitamin E. All doses were injected intramuscularly every 2 weeks during the cold season from December to the end of February 2022 and the hot season from June to the end of August 2023.

Results: The results showed significant ($p < 0.05$) differences between the treated groups in most of the semen characteristics. In summer, all of the semen characteristics were significantly increased ($p < 0.05$), except for the count of dead and abnormal sperm, compared with those in winter. Rams treated with 4 ml of E vitamin caused a significant increase ($p < 0.05$) in all semen characteristics, while this dose significantly decreased ($p < 0.05$) the percentage of dead and abnormal sperm in comparison with the control.

Conclusion: The study suggests that treating rams with 4 ml of vitamin E during the hot season could improve semen characteristics such as pH, ejaculation volume, mass motility, progressive motility, sperm concentrations, and live sperm.

Keywords: Vitamin E, Seasonal, Semen characteristics, Rams.

Introduction

Many studies have indicated the role of vitamin E in increasing sexual desire and improving the characteristics and quality of semen in men (Al Rifaie *et al.*, 2023). Seasonal factors (months of the year) may influence the sexual behavior of males through many factors, such as temperature, the rate of rain flow, lighting, available food, age, geographic location, humidity and rate and short generation period (Rosa and Bryant, 2003; Al-Ghalban *et al.*, 2004; Farshad *et al.*, 2012; Eman, 2019; and Ayyat *et al.*, 2021). These factors play a role in stimulating or inhibiting sexual testosterone secretion, spermatogenesis, testicular size, and scrotal circumference (Zamiri and Khodaei, 2005; Kridli *et al.*, 2007; Tajangookeh *et al.*, 2007). Vitamins are organic compounds used in small doses. Vitamin E and selenium are powerful antioxidants that enhance animal immunity by protecting cells and tissues from oxidative damage caused by peroxides and free radicals. In addition, they play a significant role in boosting and improving fertility (Anita and Jacyno, 2005; Yue *et al.*, 2010).

Furthermore, vitamin E plays an essential role in improving semen characteristics by improving sperm motility and increasing the concentration of sperm in the ejaculate, which leads to improved fertility rates in rams (Yousef *et al.*, 2003). Vitamin E plays an important role in improving the characteristics of male semen in terms of maintaining sperm concentration, increasing and improving motility rates, maintaining sperm membranes, and balancing osmotic pressure within the sperm membrane (Ammar Bin *et al.*, 2009; Soleimani *et al.*, 2009; Mahmoud *et al.*, 2013). Vitamin E and selenium (Se) are important nutrients that act synergistically and can affect several biological processes, including spermatogenesis and semen quality (Yousuf *et al.*, 2003; Hussain *et al.*, 2012). They also play a role in smooth and skeletal muscle movement by elevating the rates of Ca^{++} and P absorption (Holick, 2006). In rabbits, Al-Rifaie *et al.* (2023) suggested that a diet supplemented with nutrients such as selenium and vitamin E can improve the health status of male rabbits and enhance the physical characteristics of their semen. Therefore, this study aimed to evaluate the effects of

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