

Summary of the DVSc thesis No. 12499, Faculty of Veterinary Medicine, Urmia University.

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Author: Homayoun marabi

Title of thesis: Effects of Lutein supplementation on the sperm quality of canine semen during liquid storage

Summary:

During the freezing process of semen, the sperm is exposed to atmospheric oxygen and temperature shock (cold), which causes the production and release of oxygen free radicals and the imbalance between free radicals and the sperm's antioxidant system. to be Oxygen free radicals in physiological concentrations have positive effects on intracellular processes such as cell proliferation, differentiation and migration. It should be noted that excessive production of free radicals may have destructive effects on the parameters and functional factors of sperm, such as the inactivation of glycolytic enzymes, the level of motility or damage to the acrosome, which causes the production of a series of sperms. which do not have the ability to fertilize the egg. Studies show that the amount of antioxidants has many effects on sperm andrology. Antioxidants prevent fragmentation in DNA, prevent the maturation of unhealthy sperm, protect sperm from the destructive and negative effects of free radicals produced by abnormal sperm. It reduces the destructive damage caused by sperm freezing and improves the results of assisted reproductive technologies. Endogenous antioxidants include antioxidants in seminal plasma and spermatozoa. Plasma contains three main enzymatic antioxidants, glutathione-peroxidase/glutathione reductase (GPX/GRD), catalase and superoxide dismutase (SOD), in addition to the mentioned items, a large number of non-enzymatic antioxidants such as vitamin E, ascorbate, albumin, pyruvate, glutathione and urate. Food antioxidants usually include flavonoids, beta-carotene, vitamin C, carotenoids and vitamin E. Lutein is a dihydroxylated derivative of α -carotene, which is a chemical compound belonging to the group of xanthophylls. This is a yellow pigment found in plants, algae, photosynthetic bacteria and egg yolk. Since animals do not produce lutein, this substance is included in food supplements as an antioxidant. In this study, ejaculate samples taken from three dog collars were analyzed in which three groups were classified. The groups are as follows: the first group (control) with zero micromoles of

lutein, the second group with 5 micromoles of lutein, the third group with 10 micromoles of lutein, the fourth group with 20 micromoles of lutein. The performed evaluations include: overall sperm motility, progressive motility in sperms, examination of sperm motility indicators, sperm viability percentage, sperm plasma membrane integrity (HOST), sperm DNA damage rate, at 0.24 hours. They are 48 and 72. The results indicated that the group containing 20 mM lutein compared to the control group showed a significant increase ($P < 0.05$) in the percentage of overall motility and progressive motility, as well as a decrease in sperm DNA damage. In this study, it was found that there is no significant difference ($P < 0.05$) in DNA integrity between the treatment groups after 72 hours of sperm storage in the refrigerator. As a result, the enrichment of dog semen by adding 20 micromolar lutein has the most positive effect on semen quality during liquid storage.

Keywords: Lutein, semen, canine