

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

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Title of thesis: Evaluation of the performance of diet containing omega 3 fatty acids supplement in flushing ration on oxidative stress indices of Makuei ewes.

Summary: The present study aimed to evaluate two protocols for estrus synchronization using Controlled Internal Drug Release (CIDR) and oral Megestrol Acetate (MGA) regarding reproductive performance and the establishment of oxidative stress, as well as to investigate the effects of a diet supplemented with omega-3 fatty acids on reproductive performance and oxidative status in Makoi breed ewes. This study was also conducted to achieve an efficient, cost-effective, and convenient method—considering the ease of incorporation into feed—that is ideal for decentralized production systems compared to conventional methods. For this purpose, the ewes were randomly divided into six groups, with 12 animals in each group. The experimental groups included: Control group without omega-3 supplementation. Control group with omega-3 supplementation. CIDR group without omega-3 supplementation. CIDR group with omega-3 supplementation. MGA group (40 mg MGA administered orally per day) without omega-3 supplementation. MGA group (40 mg MGA administered orally per day) with omega-3 supplementation. In this study, the parameters assessed included glucose, albumin, total protein, cholesterol, and triglyceride levels, as well as indicators of oxidative stress such as malondialdehyde (MDA), superoxide dismutase (SOD), glutathione peroxidase (GPX), nitric oxide (NO), catalase (CAT), and total antioxidant capacity (TAC), along with progesterone levels, all measured using standard kits and methods. In the present study, the CT and OCT groups showed relatively stable glucose levels. The MG group demonstrated a significant increase in blood glucose concentration three weeks post-mating compared to other time points, with no statistical differences observed between treatments, time, and the treatment-time interaction ($P < 0.05$) for total serum triglycerides, cholesterol, total protein, and albumin throughout the experimental period. The control group and the groups without omega-3 supplementation had relatively stable triglyceride levels, while the omega-3 treated groups showed a slight (numerical) increase. The groups exhibited stable total protein (TP) levels with minimal fluctuations, indicating that neither omega-3 supplementation nor synchronization with progesterone had a significant effect on TP levels in these groups. In this experiment, the effect of treatment with progesterone without omega-3 supplementation significantly reduced the total antioxidant capacity, particularly for the group treated with cider. MDA levels, as a marker of lipid peroxidation, were examined in various experimental groups. Overall, the groups receiving omega-3 supplementation showed lower MDA values, which may be associated with reduced oxidative stress in these groups. At the time of mating, the omega-3 receiving groups exhibited higher catalase levels, indicative of the antioxidant effects of omega-3. Notably, the effect of

omega-3 treatment on reducing the severity of oxidative stress was reflected by increased SOD levels. The groups synchronized with oral progesterone and receiving omega-3 had higher amounts of this enzyme compared to other groups treated with progesterone. The effect of omega-3 supplementation on nitric oxide and glutathione peroxidase among the treatment groups and at various times studied was non-significant. The findings indicate that omega-3 supplements, particularly in synchronization protocols, may impact lipid metabolism, oxidative stress markers, and antioxidant capacity. Groups receiving omega-3, especially in combination with progesterone treatments, exhibited enhanced antioxidant defense mechanisms. This supplement also demonstrated increased fertility rates in both synchronization methods using cider and oral progesterone. These results highlight the potential of omega-3 as a dietary supplement to improve reproductive and metabolic outcomes in synchronized ewes.

Key Words: oxidative stress, inflammation, sheep, fat, omega 3