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Evaluation of the serum total antioxidant capacity following administration of selenium nanoparticles, sodium selenite and vitamin E injection in suckling lambs

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Abstract

The set of non-specific antioxidant activities is called Total Antioxidant Capacity (TAC). The aim was to determine the serum TAC level following selenium and Vit.E supplementation in lambs. Thirty two male Macuei lambs under 2 months of age and average weight of 10 kg were selected. Lambs were classified into 8 groups including control, Vit.E, Se nanoparticles (NanoSe), Oral sodium selenite (NaSe), NaSe Injection, NanoSe/Vit.E, Oral NaSe/Vit.E and Se/Vit.E (E/Se) injection and studied for 90 days. Lambs were bled 6 times around 5 ml at days 1, 7, 14, 30, 60 and 90 and sera were used to assess TAC consentration. In all, the lowest TACs in lambs was observed in the NanoSe group (1.17 µmol/l) and the highest was in the injected E/Se group (1.32 µmol/l) on day 60, but the differences among 8 groups during the 90 days were not significant. During the 90 days of investigation the most stable and lowest changes in TAC concentration was observed in the Vit.E group and the most unstable changes were revealed in the NanoSe and injected NanoSe/Vit.E groups. The mean TAC concentrations on days 14 and 60 were significant among groups, which was mainly predominant in the injected sodium selenite and injected selenium/vitamin E groups, respectively. Comparison of TAC concentration among sampling times revealed the difference in NanoSe and NanoSe/vitamin E in which the lowest concentration belonged to NanoSe. The results of the interaction effect of sampling time and groups on TAC concentration showed a significant time difference, especially on days 14 and 60, with no significant difference between groups. TAC concentration in the first day was correlated with day 60 in the control group, day 7 and 14 in NanoSe/Vit.E, group and day 60 in injected E/Se. In conclusion, selenium and Vit.E supplements had no effect on TAC levels, whereas TAC levels were time-dependent. Therefore, the activity of nonspecific antioxidants (TACs) is not affected by specific antioxidants such as selenium and Vit.E and changes over time.

Key words: Nanoselenium, Sodium selenite, Vit.E, Lamb, TAC

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