

GROWTH PERFORMANCE AND IMMUNE RESPONSES OF LAMBS AS AFFECTED BY DIETARY SUPPLEMENTATION OF DIFFERENT SELENIUM SOURCES

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SUMMARY

The aim of the study was to evaluate the growth performance and antioxidant status as well as immune responses as affected by supplementation of different selenium (Se) sources in the ration of lambs. This experiment was carried out at the Animal Production Experimental Farm, Faculty of Agriculture, Sohag University, Sohag. Twenty-four healthy Sohagi lambs of about 7-8 month of age and an average body weight of 24.47 ± 0.15 kg were randomly assigned into four dietary treatment groups (6 animals each). The experiment was extended for 25-wk after two weeks as adaptation period. Basal diet was formulated to meet all nutrient requirements except selenium. Lambs in the first group were fed a basal diet as a control (T0), whereas lambs in groups T1, T2, and T3 were fed the basal diet supplemented with 0.1 mg/kg DM from sodium selenite, vitamin E and selenium and selenized yeast, respectively. Animals were weighed at the beginning of the experimental period and thereafter at monthly intervals (for two consecutive days) before offering the morning feed and water throughout the experimental period to assess their growth rate. Values of total gain, average daily gain and feed conversion were calculated. Three blood samples from three animals in each group were collected before offering the morning feed and water throughout the experimental period from jugular venipuncture at 8.0 a.m. into 10-mL heparinized tubes at days 0, 30, 60, 90, 120, and 150 of the experiment. The concentrations of Se in whole blood were determined. The activity of glutathione peroxidase (GSH-Px) was determined in whole blood of lambs and the concentrations of interleukins (IL-1& IL-2) in blood plasma were analyzed as well. Results indicated that T3, T2 and T1 treatments increased body weight (BW) at the end of experimental period by 24.17%, 18.24% and 8.53%, respectively compared to control group. Also, T3, T2 and T1 treatments increased the daily gain (DG) by 56.28%, 43.76% and 22.81% respectively in comparison with control group. The feed conversion ratios differed ($P < 0.01$) among treatments. The best values were recorded in T3 followed by T2, while the worst values were recorded in T1 and control groups. Values of blood Se concentrations differed ($P < 0.01$) among groups. The highest value of Se concentration was recorded in T3 followed by T2, T1 and the lowest value was recorded in control group. Moreover, the GSH-Px activities in T3 and T2 were higher ($P < 0.01$) than those in T1 and control groups, but there was no significant difference in the GSH-Px activities between T3 and T2 groups. In addition, data showed that the concentrations of IL-1 and IL-2 in plasma increased in all of the supplemented groups during the period of supplementation. The highest values of plasma IL-1 and IL-2 concentrations were recorded in T3 followed by T2, T1 and the lowest values were recorded in the control group. In conclusion, supplementation of Se in the ration of sheep especially in the form of selenized yeast is highly beneficial for improving the productive performance and physiological responses as a result of positive effect on glutathione peroxidase (GSH-Px) as indicator of antioxidant and interleukins (IL-1& IL-2) concentrations as indicator of immune responses.

Keywords: Selenium sources, productive performance, glutathione peroxidase, interleukins, lambs

INTRODUCTION

Sheep and goat provide an economic support to the small livestock farmers in most developing countries. Imbalance in trace minerals may occur in farm animals, especially ruminants, whose intake of minerals depending largely on the forage species and particularly by the Se status of the soils on which they have grown. Selenium (Se) is an important trace element that has a narrow range between deficiency and toxicity in animals. Serious Se deficiency can lead to nutritional muscular dystrophy, but more common are subclinical symptoms such as weak

lambs, reduced feed consumption and pregnancy complications (NRC, 2007)

The Se is essential for proper health, immunity and reproductive functions of animals. It is a component of glutathione peroxidase (GSH-Px) enzyme, which destroys free radicals in the cytoplasm and protects the tissues against oxidative damage (Awad *et al.* 1994 and Levander *et al.* 1995). Se is also involved in immune function (McKenzie *et al.* 1998) and resistance against diseases (Huang and Yang, 2002). Safir *et al.* (2003) reported that macrophage supplemented with Se increased the release of IL-1 in vitro. However, as far as authors know, there are no previous data available