Communication

Influence of different selenium sources on performance, blood and meat selenium content of fattening lambs

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ABSTRACT – An investigation was conducted to evaluate the bioavailability of different Se sources on fattening lambs. Forty-eight lambs, divided in 3 groups, were ad libitum fed the same diet without Se addition (control, C), or with a supply of 0.03% sodium selenite (IS) or 0.03% of organic selenium (OS; Sel-PlexTM). Growth performances were not affected by treatment. With respect to C, OS significantly increased Se content of blood (P<0.01), liver (P<0.01) and GSH-Px enzyme activity (P<0.01). OS also significantly increased blood (P<0.01) and liver (P<0.05) Se content with respect to IS. It was concluded that Se in organic form had a better bioavailability compared to the inorganic form.

Key words: Lamb, Selenium, Blood, Meat.

Introduction - Levels of selenium in the organism depend on the Se content in food (Cristaldi et al., 2005). In recent years some researches have been conducted in order to compare the bioavailability of different Se compounds (Vignola et al., 2007; Qin et al., 2007; Steen et al., 2008), but very few studies evaluated their effects on Se storage in body tissues. Aim of this work was to compare the effects of different Se sources on the amounts recovered in blood, muscles and organs (liver and kidney) of fattening lambs.

Material and methods - The investigation was conducted during the 50 fattening days, with 48 lambs, 60 days old, divided in 3 groups. Lambs were ad libitum fed meadow hay and a fodder mixture. The control group (C) diet was not supplemented with Se, whereas the diet of the experimental groups was supplied with 0.03% of sodium selenite (IS) or 0.03% of organic selenium - OS (Sel-PlexTM, Alltech, Inc). Fodder mixtures of the C, IS, and OS groups
had respectively 0.146, 0.308, and 0.343 mg Se/kg DM. Blood samples were taken at the end of fattening period, from the jugular vein in sterile vacuum tubes Venoject® (Leuven, Belgium). Determination of Se content was done by Hydride AA method on Perkin-Elmer 2380 MHS-10. From whole blood GSH-Px activity was determined using commercial Ransel kit on Spectrophotometer JENWAY 6305. Blood serum enzyme activity was found by Olympus AU 640. At slaughtering, samples of muscle (M. semimembranosus), liver and kidney were collected and their Se content was detected by atomic absorption (AAS 1100). Differences between groups were statistically tested by Duncan’s multiple range test (Statistica, 2008). Differences were considered as significant at the level of 0.05 or less.

**Results and conclusions** – Treatment did not affect growth performance (Table 1) of lambs. Similar results have been found by Arzola et al. (2006) and Vignola et al. (2007, 2009).

| Performance                  | Unit  | Control | Inorganic selenium | Organic selenium | SEM  |
|------------------------------|-------|---------|--------------------|------------------|------|
| Initial body weight          | kg    | 18.9    | 19.0               | 19.0             | 0.4  |
| Final body weight            | kg    | 36.2    | 37.1               | 36.2             | 0.8  |
| Average daily gain           | g/d   | 345.3   | 364.3              | 344.0            | 12.7 |
| (1st-50th day)               |       |         |                    |                  |      |

**SEM=standard error of the means.**

were found for OS with respect to IS. On the contrary, treatment did not affect the activity of other blood enzymes. Similar values of Se content in the blood and blood GSH-Px activity were obtained by Faixova et al. (2007). In addition, Hadrys et al. (2007) found similar results on the blood GSH-Px activity.

| Indicator                      | Unit    | Control | Inorganic selenium | Organic selenium | SEM  |
|--------------------------------|---------|---------|--------------------|------------------|------|
| Selenium                       | µg/L    | 21.2A   | 49.4B              | 100.3C           | 10.4 |
| GSH-Px- glutathione peroxidase | µkat/L  | 210.2A  | 471.8B             | 483.4B           | 30.3 |
| AST- aspartate transamintransferase | U/L | 121.3 | 149.2             | 135.0            | 14.7 |
| ALT- alanine transamintransferase | U/L | 19.3  | 22.8              | 11.3             | 2.8  |
| CK- creatin kinase             | U/L     | 282.1   | 237.1             | 219.1            | 13.3 |
| LDH- lactate dehydrogenase     | U/L     | 448.7   | 490.0             | 446.4            | 20.7 |

A,B,C: P<0.01; SEM=standard error of the means.

The Se content in the muscle of OS lambs was significantly (P<0.05) higher than that found for the C lambs. The Se content of kidney was not significantly affected by treatment. Steen et al. (2008) found a significantly higher content of Se (from 30 to 50%) in the blood
and muscle of lambs fed diet supplied with organic Se, with respect to inorganic Se. Similar results were obtained by Qin et al. (2007) and Vignola et al. (2007, 2009).

Considering the higher storage of selenium in meat and liver of the fattening lambs receiving organic Se, it was concluded that the Se supply in organic form has a better bioavailability with respect to the inorganic form.

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