

Evaluation of serum trace mineral effects on the metabolism of thyroid hormones in lambs

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Abstract

Based on genetic factors, trace minerals are essential for thyroid function and hormone metabolism. For this purpose, serum levels of thyroid hormones and some blood micronutrient concentrations in lambs were determined, compared and their relationships were investigated. A 176 lambs including 70 males under 2 months old and 106 females aged over 2 months were selected from Ghezel and Makui breeds. The 5 ml Jugular blood was prepared and the sera were evaluated for the concentrations of T3, T4, TSH, copper, iron and zinc. Thyroid hormones were determined by ELISA and trace minerals by autoanalyzer method. Mean T3 and TSH in males were higher than females and T4 in females were higher than in males but only TSH was significant. The mean serum concentrations of copper, iron and zinc in males were less than females in that only copper and zinc were significant and iron was not different. TSH in males was 36.3% higher than in females, copper and zinc in females were 12.6% and 7.3% higher than in males, respectively. The T3/T4 ratio was higher in males than in females and overall the T3/T4 ratio was low. Significant negative relationships were found between T3/TSH ($r=-0.36$) and T4/copper ($r=-0.24$) in males but not in females. Significant negative relationship was also found between TSH/T3 ($r=-0.16$) for all lambs. Significant positive relationships were presented between copper/zinc ($r=0.38$) and iron/zinc ($r=0.44$) in males, females and overall ($P<0.01$). In conclusion, the thyroid hormones and micronutrient concentrations in lambs' blood were about the standard level. The amount of thyroid hormones and trace minerals with the exception of T3, were higher in females than in males. The T3/T4 ratio was higher in males than in females. Thyroid hormones were not correlated with trace minerals in males and females except between TSH/Zn and T4/copper which were negative. There were positive and significant relationships between copper/zinc and iron/zinc in males, females and overall samples but copper/iron was not correlated. Finally, males are predisposing to trace minerals and thyroid hormones sufficiency than females.

Keywords: T3, T4, TSH, Microelements, Lamb

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