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Correlations among serum beta hydroxyl butyrate, energy indices and trace minerals in late pregnant ewes

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Abstract

Pregnancy toxemia, copper (Cu) and zinc (Zn) deficiencies are common metabolic and nutritional disorders that occur at the end of ewes' pregnancy and cause economic losses in animal industries. Their co-occurrence in ewes increases the likelihood of their effectiveness and relevance. One hundred and twenty-seven ewes at the end month of pregnancy were selected and the relationship between serum concentrations of beta-hydroxybutyrate (BHB) and NEFA, glucose, cholesterol, triglycerides, Cu and Zn was determined at different BHB thresholds. Following confirmation of pregnancy, 5 ml of Jugular blood was prepared and serum was used to evaluate the parameters. The mean BHB concentration was 0.75 and ranged from 0.13-1.39 mmol/l. Frequency and percentage of ewes with BHB <0.79 mmol/l was 72 (56.7%), 0.8-0.99 mmol/l was 48 (37.8%), 1-1.19 mmol/l was 6 (4.7%) and 1.2-1.39 mmol/l was 1 (0.8%). The mean concentrations of NEFA, glucose, cholesterol, triglyceride, Cu and Zn were 0.42 mmol/l, 50, 55.9, 29.3 mg/dl, 98.6 and 76.9 µg/dl, respectively. Mean concentrations of NEFA, glucose and Cu were significant among ewes grouped with less than 0.79 mmol/l BHB. This comparison was significant between ewes with a threshold of 0.8 and 1 mmol/l BHB only for NEFA and cholesterol. There were correlations between BHB/NEFA (r=0.31) and Cu (r=0.42) at the threshold of <0.79 mmol/l BHB and at the 0.8-0.99 mmol/l BHB between BHB/glucose (r=-0.55), glucose/Cu (r=0.38), cholesterol/triglyceride (r=0.33), cholesterol/Cu (r =0.27), cholesterol/Zn (r=0.26) and Cu/Zn (r=0.42) and the same as for 1.2-1.39 mmol/l. In conclusion, the incidence of subclinical ketosis in pregnant ewes at the threshold of 0.8 mmol/l BHB was 37.8% and 1 mmol/l BHB was 4.7%. Serum Cu and Zn concentrations of ewes were in the normal range and no deficiency was observed. BHB was not correlated with Cu and Zn but was effective in NEFA, glucose and cholesterol concentrations. Finally, 4.7% of ewes were suspected to subclinical ketosis and Cu and Zn were not influenced by BHB values.

Key words: Ewes, Pregnancy, NEFA, BHB, Subclinical ketosis, Energy and mineral indices

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