

Development Of Alternate Markers For Sub Acute Ruminal Acidosis (SARA)

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Subacute ruminal acidosis (SARA) is an important metabolic disease of high yielding dairy cows, which is characterized by daily episodes of low rumen pH. Diagnosis of this disease currently relies on the measurement of the pH of rumen fluid, but this technique can cause health problems in the cow, and can be inaccurate due to saliva contamination and diurnal variation of rumen pH. As a result, alternate markers for SARA need to be investigated. Eight lactating dairy cows, including 4 rumen cannulated and 4 non-rumen cannulated cows were used during two consecutive 6-wk periods in a cross over design. Blood, feces and urine samples were collected twice daily during two days of each week throughout trial. Rumen pH was monitored continuously in cannulated cows. SARA was induced in week 3, 4, 5 of each period by feeding either alfalfa pellets or grain pellets to obtain a rumen pH below 5.6 for more than 3 h/d. Grain pellets contained 50% ground wheat and 50% ground barley. Alfalfa-pellet induced SARA increased the duration of rumen pH below 5.6 from 43 to 234 min/d. Grain-pellet induced SARA increased the duration of rumen pH below 5.6 from 63 to 349 min/d. Both methods of SARA induction did not affect the pH of feces, nor that of whole blood. Alfalfa-pellet induced SARA increased urine pH (8.1 vs. 8.2) and renal net acid base balance (NABE) (127.6 vs. 182.2 mol/L), whereas grain-pellet induced SARA did not affect these parameters. Alfalfa-pellet induced SARA did not affect pCO₂ in blood, whereas grain-pellet induced SARA increased blood pCO₂ (34.6 vs. 38.3 mm Hg). Alfalfa-pellet induced SARA increased sodium (136.0 vs. 137.1 mmol/L) and glucose levels in blood (135.8 vs. 137.0 mmol/L), but did not affect blood lactate concentrations (1.18 vs. 1.13 mmol/L). Grain-pellet induced SARA increased lactate in blood (0.80 vs. 1.14 mmol/L), but did not affect sodium and glucose. Alfalfa-pellet induced SARA increased PCV (0.26 vs. 0.27 L/L), RBC (5.57 vs. 5.76 X 10¹² /L) and hemoglobin (97.56 vs. 101.48 g/L) in blood. However, grain-pellet induced SARA did not affect PCV, RBC and hemoglobin levels in blood. Both methods of SARA induction did not affect pO₂, chloride, calcium, urea, copper, white blood cell, mean corpuscular volume, mean corpuscular hematocrit, and fibrinogen levels in blood. In conclusion, urine and blood metabolite profile differed depending on whether SARA was induced with grain versus alfalfa pellets. As such, it may be difficult to develop markers for SARA that can be used with all feedstuffs.