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The effect of feeding live yeast cultures on ruminal pH and redox potential in dry cows as continuously measured by a new wireless device

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An experiment was carried out on four dry Holstein cows fitted with rumen cannulas that were divided into two groups. The crossover design experiment was divided into 4 periods of 3 weeks. Each period consisted of a 17-day preliminary period followed by a 4-day experimental period. Cows were fed twice daily the total mixed ration based on maize silage and concentrate. Control cows (Control) received the basal diets while experimental animals (Yeast) received the basal diet supplemented with 3.0 g of live yeast (BIOSAF Sc 47, Lesaffre, France) at each feeding. During each experimental period ruminal pH and redox potential (Eh) were monitored continuously using a developed wireless probe. Further, in each experimental period five samples of ruminal fluid were taken at 6:30, 8:30, 10:30, 13:30 and 16:30 h to determine the content of volatile fatty acids, lactic acids and ammonia. On the last day of each period, blood samples were taken for determination of blood parameters and acid-base balance. Average daily dry matter intake throughout the experiment was 8.2 kg/day and was not affected by the treatment. The average ruminal pH in Control was 6.16 that was significantly lower than in Yeast, being 6.26 ($P < 0.001$). The diurnal pattern of ruminal pH showed a similar trend in both groups. Mean Eh in Control (-210 mV) differed significantly from Yeast (-223 mV, $P < 0.001$). The mean value of rH (Clark's Exponent) calculated for Control (5.33) was higher than that calculated for Yeast (5.09, $P < 0.001$). Total VFA concentrations were on average 40.8mM in Control and 57.2mM in Yeast ($P > 0.05$). Lactate and ammonia concentrations at individual sampling times and overall mean did not differ significantly between treatments ($P > 0.05$). Blood pH and CO₂ were not affected by the treatment.

Keywords:

rumen; physicochemical parameters; Clark's Exponent; wireless measurement

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