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Long-term measurement of rumen pH in fattening bulls by an indwelling and wireless data transmitting unit

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Objectives

Subacute rumen acidosis (SARA) is a significant production disease of fattening bulls. The objective of this study was the continuous and long term measurement of the ruminal pH in fattening bulls under defined and exact feeding conditions.

Material and Methods

In the present study 40 bulls were fattened with a typical Austrian bull ration (corn silage ad libitum and concentrates). For measuring ruminal pH, an indwelling system for monitoring ruminal pH and temperature was applied. The indwelling system was given orally to fattening bulls at body weight (BW) 325 kg up to 625 kg stepwise, 16 Sensors in total, to cover the whole fattening period. Ruminal pH and temperature were measured at intervals of 600 sec over a period of 50 days of fattening period. Data were collected in an internal memory chip and sent via radio transmission to an external receiver. Daily mean, minima, maxima and time ruminal pH (min/d) below 6.3; 6.0; 5.8 and 5.5 were calculated. Individual daily dry matter intake, feeding conditions and ration composition in terms of roughage and concentrate sources were determined and nutrient components were analysed. Statistical analysis was conducted by GLM (Statgraphic Plus 5.1).

Results

Radio transmission of data (twice daily) was functioning without any difficulties. Mean ruminal pH for all bulls over the whole fattening period was 6.54, decreasing from pH 6.74 (BW 325 kg) to pH 6.44 (BW 625 kg). Lowest mean pH was found in group BW 475 (pH 6.17), caused by an outbreak of Bovine Respiratory disease, which led to decreased roughage intake whilst intake of concentrates was not reduced. In general, rumen pH was correlated significantly with the body weight and with body weight gain due to the animals increasing dry matter intake. Rations starch content and total starch intake influenced ruminal pH significantly. The rations fibre content was above recommendations during the whole fattening period and hence no correlation between fibre supply and ruminal pH was found.

Conclusions

Recent developments in wireless and microcomputing enable the use of intraruminal boluses, that can be inserted orally. Boluses used in this trial are collecting valid data for at least 50 days. Such continuous measurements provide a complete new insight in rumen physiology and pathology. Results in our trial were significantly influenced by the rations composition, by the dry matter intake and thus by the fattening period. Results show that the presented method is a very useful and proper tool for both, scientific and practical applications.