

8. Summary

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Experimental studies on the effect of various anionic salts on ruminal fermentation, trace element-concentration in serum, water intake and urinary volume of rumen-fistulated cows.

In last years the supplementation of strong anions (“acid salts”) 2 to 3 weeks before calving has become more important to prevent parturient paresis (milkfever). The objective of this study was to evaluate the effects of several pure or mixed anionic salts on ruminal fermentation parameters including concentration of volatile fatty acids (VFA), ruminal pH and ruminal digestion of organic matter. Further, the concentration of trace elements in blood serum, the water intake and urinary volume was measured under substitution of anionic salts.

The study was conducted with eleven rumen-fistulated Holstein-Frisian cows. All of them were after the second lactation, dried off and not pregnant. The cows (650-750 kg) received a maintenance diet of 8 kg of hay and 2.5 kg of concentrates. The daily ration included 120-150 g Calcium in total. Eight pure acid salts (CaCl_2 , CaSO_4 , $\text{CaSO}_4\text{-D10}$, MgCl_2 , MgSO_4 , NH_4Cl , $(\text{NH}_4)_2\text{SO}_4$, NaCl), two mixed anionic salts ($\text{CaCl}_2\text{+MgSO}_4$, $\text{NH}_4\text{Cl+CaSO}_4$) and water as control were applied randomly to one of the cows (11 x 11 Latin square) for a 14 day period. The daily dose of 2 equivalents of anionic salts per animal was administered directly into the rumen during feeding time at 7 am and at 2 pm. This period of supplementation was followed by a 14 day “wash-out” period.

Samples of blood and ruminal fluid (to determine the pH) were taken twice a week. Samples of ruminal fluid to examine the concentration of VFA were taken four times daily for three days per period. To measure the ruminal degradation of feedstuffs the *in situ* technique was used three times for every feedstuff. Water intake was registered daily, urinary volume once a period over 24 hours.

The applied salts and salt-combinations showed no significant effects on ruminal fermentation. There has neither been a significant influence on ruminal pH (values between 6,5 and 6,9) nor on VFA contents in ruminal fluid (120-150 mmol/l) at any times of sampling. Also no effects have been observed on analysed single fatty acids. It was not possible to demonstrate a consistent effect of one of the supplemented salts on the organic matter digestibility of several feedstuffs. However, the number of samples was very low and allows no statistically proofed conclusions. It was shown that there is no influence on the

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concentration of trace elements in blood serum. Water intake was not effected by on of the supplemented salts compared to the control but by changes in dietary-cation-anion-balance (DCAB). A cation-anion difference of -150 meq/kg DM and bellow resulted in an increased water consumption. However, it must be considered that due to the existing sample size the resulting confidence interval was very small.

In the present study there weren't as far as possible any effects on the analysed parameters. Concerning these parameters the supplementation of anionic salts to prevent parturient paresis can be considered as harmless.