

Effect of increasing sodium bicarbonate proportion in high concentrate diets on performance, intake, water consumption and feeding behavior in finishing beef heifers.

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Abstract # W168

INTRODUCTION

- Sodium bicarbonate (SB) has been widely used to alleviate the problems caused by low ruminal pH.
- However, there is little information evaluating the effect of dietary SB in finishing rations on feeding behavior.

OBJECTIVE

To determine the effect of increasing levels of sodium bicarbonate on intake, water consumption and performance and feeding behavior of finishing heifers.

MATERIALS AND METHODS

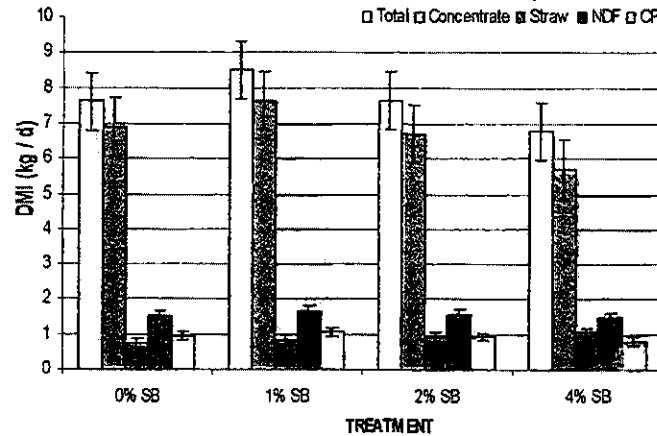
- Four rumen fistulated Holstein heifers (264 ± 12 kg initial BW) in a 4x4 Latin square design. Experimental period lasted 21 d.
- Treatments were: 0, 1, 2 and 4 % sodium bicarbonate, on DM basis.
- Main ingredients of the pelleted concentrate: 33% barley grain, 32% corn grain, 16% tapioca and 10% soybean meal.
- Concentrate and barley straw were offered on an ad-libitum basis, which resulted in a mean F:C ratio of 12:88.
- DMI, water consumption and behavioral video recording was studied from d 15 to d 19.
- Behavior was measured by using scan sampling at 5 minute intervals.
- Linear, quadratic and cubic effects were analyzed with the Type 1 analysis of variance of the PROC MIXED procedure of SAS with animal and period considered random effects.

RESULTS

There was a linear decrease in concentrate DMI ($P < 0.05$) and a linear increase in straw DMI ($P < 0.01$) with increasing SB in the diet, resulting in a tendency for a linear decrease ($P < 0.10$) in total DM intake (Figure 1).

- CP intake decreased linearly ($P < 0.05$) with increasing SB, but there was no effect on NDF intake (Figure 1).
- ADG decreased linearly (1.46, 1.44, 0.98 and 0.52 ± 0.23 kg/d, $P < 0.05$) with increasing SB.

Figure 1. DM, CP and NDF intake as affected by SB.



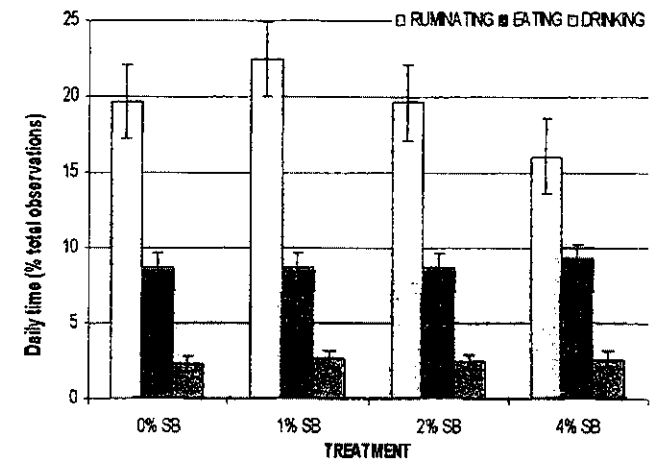
- Water consumption (WC), in L/d or % BW, was not affected by SB addition (Table 1).
- WC increased linearly ($P < 0.05$) when expressed as L / kg DMI or % of total daily water drunk in the morning (from 0830 to 1230), with increasing SB proportion (Table 1).

Table 1. Water consumption with increasing SB proportion.

Item	Treatment				SEM	Effect		
	0	1	2	4		L	Q	C
L / d	28.0	32.1	27	30.1	3.9	0.83	0.93	0.11
% BW	8.1	9.8	8.4	9.4	0.7	0.42	0.76	0.14
L / kg DMI	3.6	4.0	3.6	4.5	0.5	0.03	0.31	0.09
% Daily WC								
0830-1230	18.3	21.9	21.3	30.1	2.6	0.01	0.60	0.38
1230-2030	47.5	45.3	44.3	45.2	2.4	0.57	0.48	0.99
2030-0830	34.1	32.7	34.3	24.7	3.0	0.08	0.33	0.55

- Buffer concentration did not affect feeding behavior. Animals spent 8.9 ± 0.42 , 19.4 ± 1.25 , 2.5 ± 0.16 and 55.5 ± 1.85 percent of the time eating, ruminating, drinking and resting, respectively (Figure 2).

Figure 2. Time spent on activities when increasing SB.



SUMMARY

- High dose of SB resulted in negative effects on DMI, which affected animal performance.
- SB only affected the ratio of daily WC / kg DMI and the time pattern of daily WC.
- No effects of SB were observed in animal behavior.

CONCLUSIONS

- Results indicate that offering high doses of SB to finishing heifers fed high concentrate diets may result in a decreased DM intake and poorer animal performance.

ACKNOWLEDGEMENTS

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