

EFFECTS OF AN AMYLASE INHIBITOR (ACARBOSE) ON RUMINAL FERMENTATION AND ANIMAL METABOLISM IN LACTATING COWS FED A HIGH-CARBOHYDRATE RATION



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INTRODUCTION

- Ruminal acidosis is one of the most common nutritional disorders in dairy cattle.
- Dairy cows fed a high-NFC ration increase the risk of acidosis.
- Acarbose is an α -amylase and glucosidase inhibitor that slows down the degradation rate of starch to glucose.

OBJECTIVE

The objective of this experiment was to study the effects of acarbose in preventing ruminal acidosis in lactating cows fed a high-NFC ration.

MATERIALS AND METHODS

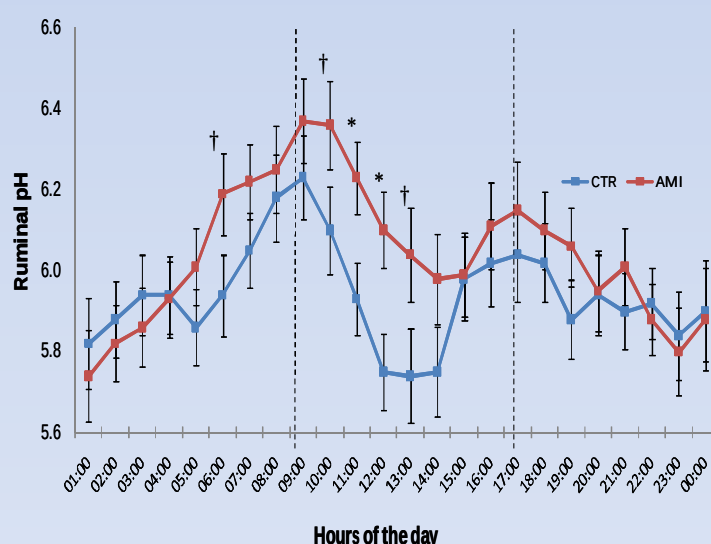
- Eight Holstein cows fitted with rumen cannula (BW = 622 $\pm$ 54kg, DIM = 183 $\pm$ 67).
- Two treatments: CTR (no additive) and AMI (0.75 g acarbose-premix/cow/d).
- Cross-over design (2 x 28d).
- Statistical analyses: mixed-effects model.

Nutrient composition	PMR	Concentrate
CP, %	17.6	16.7
NDF, %	28.3	22.6
ADF, %	15.8	7.78
NFC, %	46.5	54.9
EE, %	3.99	3.85
Net energy, MJ of NEL/kg	7.03	7.41

RESULTS

	CTR	AMI	SEM	P – value
Total DMI, kg/d	22.3	21.8	1.38	0.66
PMR intake, kg/d	21.2	19.9	0.634	0.17
Concentrate intake, kg/d	1.62	1.77	0.224	0.65
4% FCM, kg/d	23.8	21.3	2.17	0.45
Milk protein, %	3.35	3.34	0.085	0.95
Milk fat, %	3.59	3.45	0.258	0.81
Serum Glucose, mg/dL	66.1	65.7	1.74	0.87
Serum Insulin, μ g/L	0.869	0.804	0.127	0.73
Serum Urea, mg/dL	31.6	32.6	2.69	0.80
<i>Streptococcus bovis</i> , ng/mL RF	35.9	63.3	15.5	0.17
<i>Megasphaera elsdenii</i> , ng/mL RF	15.6	312.1	124.9	0.12
<i>S. bovis</i> : <i>M. elsdenii</i> ratio	26.8	4.09	12.0	0.09
Entodiniomorphs, log10/mL RF	5.44	4.71	0.336	0.12
Holotrichus, log10/mL RF	3.59	3.10	0.166	0.06

	CTR	AMI	SEM	P – value
Total VFA, mM	137.0	134.3	5.09	0.71
Acetate:Propionate	2.47	2.54	0.216	0.79
Total Lactate, mM	1.24	0.941	0.393	0.56
Number of hours pH < 5.6	6.52	3.74	0.704	0.02
Average pH	5.92	6.05	0.043	0.04



CONCLUSIONS

These results suggest that supplementing diets with acarbose to dairy cattle fed high-yielding rations may be effective in reducing subacute ruminal acidosis in lactating cows with no negative effects on ruminal fermentation and animal metabolism.