THE EFFECT OF MICRO-CAPSULATED YEAST SUPPLEMENTATION ON RUMEN FERMENTATION IN SHEEP*

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SUMMARY

The aim of our study was to investigate the effects of trehalose producing yeast supplementation on the rumen fermentation of sheep. The experimental design was 3x3 Latin square, using 9, rumen cannulated merino wethers. Group A received trehalose producing yeast (Live-Sacc Dairy), group B received trehalose non-producing yeast supplementation (Live-Sacc), mixed in the ration, group C, without supplementation, served as control. Samples of rumen fluid were taken before and after feeding. Rumen pH, ammonia and VFA concentrations were measured. Ammonia concentrations remained unchanged in the control group, significantly decreased in both groups receiving supplementation. TVFA-concentration increased after feeding in all groups.

Keywords: *Saccharomyces cerevisiae*, sheep, rumen fermentation

INTRODUCTION

Saccharomyces cerevisiae (Sc) yeast strains are widely used as additives in the feeding of ruminants, dairy cows primarily. Being a possible alternative for ionophore antibiotics in growth promotion and other favourable effects have put Sc supplementation in the focus of research. Effects of Sc in vivo and in vitro may differ. Several studies have lead to contradicting conclusions. Such variety of experimental results is presumably due to differences in dosage of the additive, composition of rations or viability of the strains used.

Our previous studies have shown that the intraruminal viability of Live-Sacc Dairy, meaning micro-capsulated *Saccharomyces cerevisiae* NCAIM 1286, improved as a result of increased trehalose producing activity.

The aim of our study was to investigate the effects of micro-capsulated trehalose producing yeast (Live-Sacc Dairy, LSDairy) supplementation on the rumen fermentation of sheep.

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MATERIAL AND METHODS

Animals and diets

The experimental design was 3x3 Latin square, using 9, rumen cannulated yearling merino wethers (*Table 1*.). The sheep were kept individually in cages within sight and auditory communication. The animals were fed twice a day (at 8 am and at 4 pm) with a ration of 800 g meadow hay and 500 g lamb concentrate. Licking salt in blocks and water were provided ad libitum. Group A received trehalose producing yeast (Live-Sacc Dairy) in the amount of 2,5 g mixed in the daily feed. Group B received trehalose non-producing yeast supplementation (Live-Sacc) in the amount of 2,5 g mixed in the ration. Group C, without supplementation, served as control.

Table 1. Experimental design

Animal	Period			Animal	Period			Animal	Period		
	1	2	3		1	2	3		1	2	3
1	A	B	C	4	B	C	A	7	C	A	B
2	A	C	B	5	B	A	C	8	C	B	A
3	A	C	B	6	B	A	C	9	C	B	A

Treatments: A = LSDairy, B = LS, C = control

Samplings and laboratory analysis

Samples of rumen fluid were taken 3 hours before and 3 hours after the morning feeding. Rumen pH, ammonia and VFA concentrations were measured and the redox-potential of the rumen fluid was determined, using the semi-quantitative method of the methylene-blue test.

PRELIMINARY RESULTS

Rumen fluid pH decreased in all groups after feeding (as expected) and no significant difference was found between them *(Figure 1.)*. Ammonia concentrations remained unchanged in the control group, significantly decreased in both groups receiving supplementation (*Figure 2*.). Difference between the two supplemented groups was not significant. According to the methylene-blue test results, the redox potential of rumen fluid samples were physiological both before, and after feeding, showing a slight decrease in reduction times after feeding (*no data shown*). No significant difference was found between groups. Total VFA-concentration (*Figure 3*.) increased after feeding in all groups. The degree of increase was significantly higher in Groups A and B compared to control. Changes in the molar proportion of VFAs are shown in (*Figures 4–6.*). There was no significant difference in the degree of increment between any of the groups.

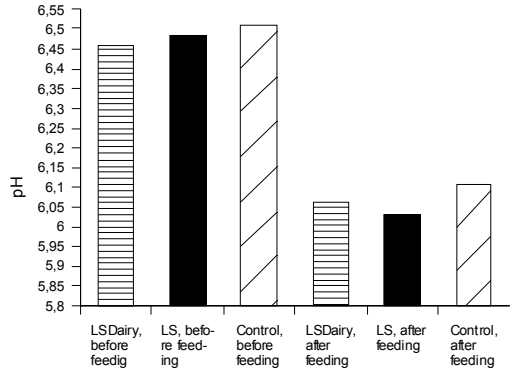

Figure 1. Rumen fluid pH

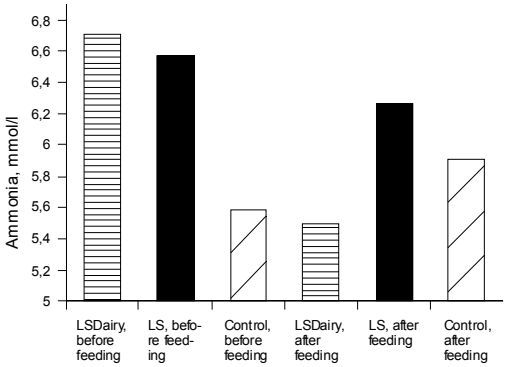

Figure 2. Ammonia concentration in rumen fluid

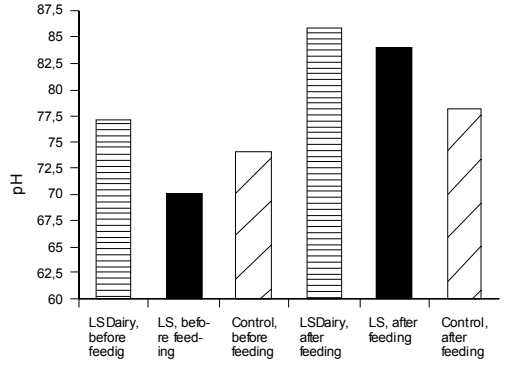

Figure 3. Total volatile fatty acid concentration in rumen fluid

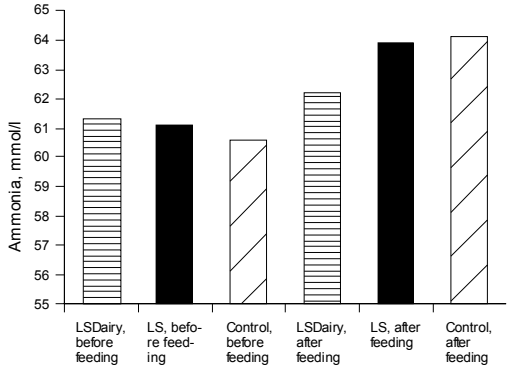

Figure 4. Molar proportion of acetate in rumen fluid

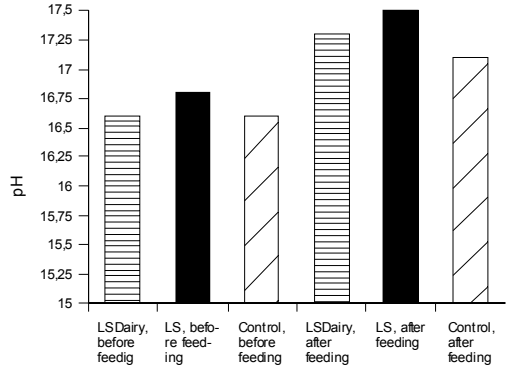

Figure 5. Molar proportion of propionate in rumen fluid

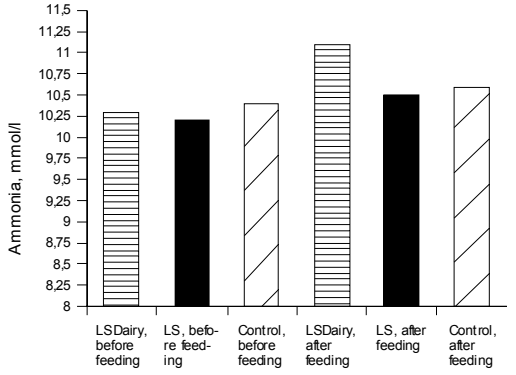

Figure 6. Molar proportion of n-butyrate in rumen fluid