EFFECT OF AMAFERM® ON THE FERMENTATION OF A BASAL RATION IN THE RUMEN SIMULATION TECHNIQUE (RUSITEC)

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AMAFERM has a noticeable effect on the microbial population and the stoichiometry of rumen fermentation.

SUMMARY

DOSE OF AMAFERM USED
250mg per day, per vessel

AMAFERM eliminated the transient fall in pH that normally occurs following the addition of substrate to the Rusitec. Increases in the acetate-to-propionate ratio and the proportion of butyrate were also seen with the addition of AMAFERM, as well as increases in branched chain VFA, and more than a 30% increase in ammonia concentrations. These increases in ammonia and branched-chain fatty acids supports the theory that AMAFERM increases rumen proteolysis. The number of total viable bacteria almost doubled and the cellulolytic population increased threefold with AMAFERM. The proportion of methane in the headspace gas was significantly lower with AMAFERM – a reduction in methane was consistent with the increased production of reduced products such as butyrate and valerate.

VALUE

AMAFERM supplementation has the ability to impact rumen microbial populations, resulting in benefits such as increased cellulolytic bacteria, improved pH stability, increased protein degradation and reduced methane production – all of which provide economic value to the producer.

PROTOCOL

Type of Animals/Experimental Units

- Rusitec fermentation vessels

PROTOCOL (CONTINUED)

Number of Animals/Experimental Units

- 6 vessels

Trial Design

- Randomized

Treatments

- Control
- AMAFERM

Diet Information (General)

- Hay, barley, molasses, fish meal, vitamins and minerals

Data Collection

- Microbial populations, fermentation measurements, degradability of straw

DISCUSSION OF RESULTS

- AMAFERM abolished the post-feeding dip in pH, which was evident in the control vessels (Figure 1). This was not due to increased buffering capacity
- Total VFA concentrations were higher and there was a shift from propionate toward butyrate, valerate, and branched-chain acids in vessels receiving AMAFERM
- The acetate:propionate ratio was increased with AMAFERM
- L-lactate concentration throughout, and dry matter digestibility at 48 hours, was unaffected
- There was a significant reduction in methane production with AMAFERM ($P < 0.01$)
- Ammonia levels were increased by AMAFERM ($P < 0.001$) (Table 1)
- Protozoal numbers were reduced by 45% in the presences of AMAFERM (Table 2)
- Cellulolytic bacteria were increased in absolute terms ($P < 0.001$) and as a percentage of total bacterial population (3.4 vs. 5.4%)
- Total viable bacteria were increased by AMAFERM

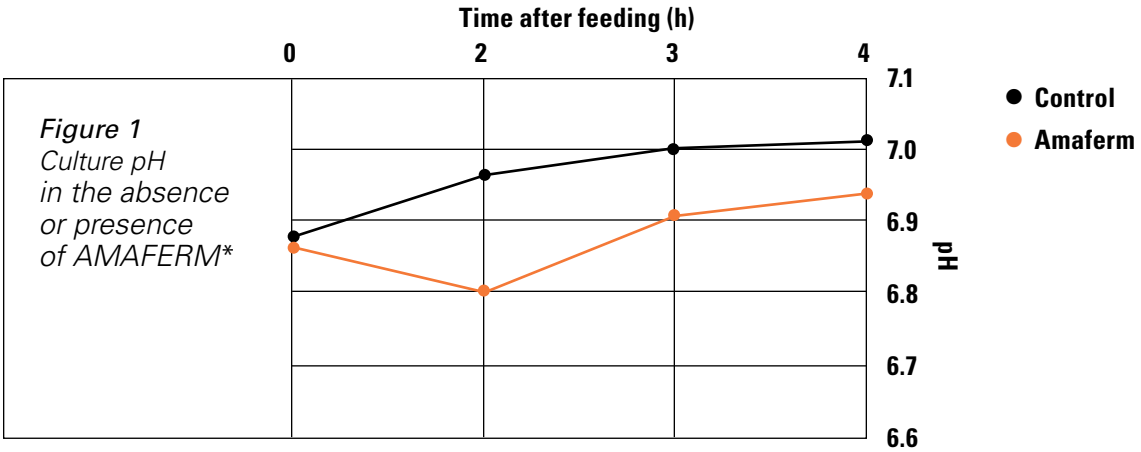

Figure 1
*Culture pH in the absence or presence of AMAFERM**

* Results are the mean ± S.E. (1) from 3 vessels on each treatment.

Table 1
Effect of AMAFERM on pH, dry matter digestion, VFA, L-Lactate and ammonia concentrations, and on the composition of headspace gases in the Rusitec

	Control	AMAFERM	SE
pH	6.87	6.87	0.041
Total VFA (mmol/l)	69.5	76.9	5.33
Acetate (mmol/mol)	441	410	19.7
Propionate (mmol/mol)	257	196	10.9
Isobutyrate (mmol/mol)	9	10	0.49
Butyrate (mmol/mol)	168	210	11.0
Isovalerate (mmol/mol)	39	46	2.0
Valerate (mmol/mol)	85	129	10.0
Acetate:Propionate	1.72	2.1	0.15
L-lactate (mmol/L)	0.41	0.51	0.06
NH3-N (mg/L)	94	124	1.3
Digestion (g/d) of DM after 48 h incubation	11.1	11.0	0.08
Headspace gas (%)			
H2	0.071	0.074	0.020
CH4	6.1	2.9	0.265

Table 2
Effect of AMAFERM on microbial numbers at time of feeding in the Rusitec

	Control	AMAFERM	SE
Total culturable bacteria (x 109/ml)	15.1	27.1	0.450
Cellulolytic bacteria (X 109/ml)	0.51	1.47	0.040
Protozoa (X 104/ml)	3.94	2.15	0.416

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