Rumensin and Digestibility of Feedlot Rations

J. H. Thornton, F. N. Owens and R. W. Fent

Story in Brief

Rumensin was added to a 95 percent concentrate, whole shelled corn ration containing 9 or 12 percent protein. Rumensin addition reduced intake by steers 9 percent but increased digestibility. Intake of digestible dry matter was not changed. Rumensin increased digestibility of the 12 percent protein ration by about 1 percent and of the 9 percent protein ration by over 4 percent. Benefits of Rumensin feeding on digestibility appear greater with low protein rations.

Introduction

Previous studies have shown that Rumensin addition to whole corn feedlot rations may be more useful with low than high protein rations (Gill *et al.*, 1977). Reduction of methane loss by Rumensin feeding (Thornton *et al.*, 1977) cannot explain this response. This experiment was conducted to examine if digestibility is increased by Rumensin.

Experimental Procedure

Whole shelled corn rations similar to those used in the earlier feedlot trial (Gill *et al.*, 1977) were fed (Table 1) free choice to 12 Angus steer calves. Rumensin was added at a level of 33 ppm in the pelleted soybean meal, mineral-vitamin supplement. Steers averaged 630 lb at the start of the trial and were rotated among the 4 rations. Feces and urine were collected the last 5 days of each 14 day period during which a ration was fed. Digestibility of dry matter, starch and protein were measured and retention of nitrogen was calculated.

Results and Discussion

Rumensin addition across the two protein levels depressed intake by 9 percent (Table 2). Such an intake reduction is commonly observed with Rumensin feeding. Energy digestibility was increased by Rumensin. This

Table 1. Ration composition

Protein content, %	9.4	12.2
	%	
Whole shelled corn	90.8	84.6
Cottonseed hulls	4.8	4.8
Pelleted supplement:		
Soybean meal	0	8.6
Cracked corn	1.7	0
Alfalfa meal	1.0	1.0
Limestone	1.0	1.0
KCl	0.3	0
Salt	.3	.3

Table 2. Rumensin effects

	0	33 ppm
Intake		
Dry matter, lb.	12.5	11.4
Energy[a]	60.2	59.6
Digestibility, %		
Dry matter	78.2	81.1
Protein	68.7	71.6
Starch	94.1	95.8
Nitrogen retained g/day	32.4	32.8

[a]Digestible dry matter, g/kg$^{3/4}$

compensated for the reduced intake, so that intake of digestible energy was unchanged. Protein and starch digestibility were also increased slightly by Rumensin, but nitrogen retention was not changed.

Protein level of the ration had little effect on feed intake (Table 3). Digestibility of dry matter and protein were higher with the higher protein ration. Protein digestibility was elevated because soybean meal protein is more digestible than corn grain protein. Starch digestion and nitrogen retention also were increased slightly by added protein.

Since Rumensin and protein effects on digestibility were similar, the effects of Rumensin at each protein level were examined (Table 4). Rumensin

Table 3. Protein effects

	9.4%	12.2%
Intake		
Dry matter, lb.	12.1	11.9
Energy[a]	58.4	61.4
Digestibility, %		
Dry matter	78.4	80.9
Protein	66.8	73.5
Starch	94.2	95.6
Nitrogen retained, g/day	30.3	34.9

[a]Digestible dry matter, g/kg$^{3/4}$

Table 4. Protein-Rumensin interactions

Protein, %	9.4		12.2	
Rumensin, ppm	0	33	0	33
Digestibility, %				
Dry matter	76.2	80.6	80.1	81.6
Starch	92.5	96.0	95.7	95.5
Starch, % of fecal weight	19.4	12.1	12.9	12.3

had its greatest impact on digestibility of dry matter and starch at the lower protein level. This suggests that Rumensin is more useful with low protein rations. One way that Rumensin may improve digestibility is by lengthening of the time period feed spends in the rumen for digestion. This change would prove more useful with forages and coarse grains than highly processed grains. Improved digestibility of the ration may explain some of the observed feedlot benefits of Rumensin feeding.

Literature Cited

Gill, D. R., F. N. Owens, J. J. Martin, D. E. Williams and J. H. Thornton. 1977. Protein levels and Rumensin for feedlot cattle. Okla. Agri. Exp. Sta. MP-101:42.

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Buffers and High Moisture Corn Digestion

J. H. Thornton, F. N. Owens, R. W. Fent and K. Poling

Story in Brief

High moisture corn (HMC) of two moisture levels, 23 and 30 percent, with added dolomitic limestone, bentonite, Liquid Trace Mineral or sodium bicarbonate were fed to 20 steers. Digestibility of the wetter HMC was higher, largely due to greater starch availability. Intakes and feed efficiencies were slightly greater with wetter HMC. One additive, dolomitic limestone, elevated fecal pH, but with a calcium level at 0.45 of the ration, no added materials improved digestibility of starch, dry matter or protein. A low calcium level, 0.36 percent, may reduce dry matter and starch digestibility. Elevating fecal pH from 6.2 to 6.9 with added buffers did not increase digestibility of starch from high moisture corn.

Introduction

The recent symposium on High Moisture Corn Research (High Moisture Corn Conference, 1976) indicated that nutritive value of high moisture corn (HMC) may vary with moisture content. A higher moisture level (26-30 percent) is generally used more efficiently by feedlot steers than drier HMC. Greater starch digestibility in the rumen and intestines may be responsible.

Work from Purdue University (Wheeler and Noller, 1976) has suggested that digestibility of starch in the intestine of cattle is inhibited by acid, and that added buffers aid in digestion of starch. Acidity of feces generally paralleled the amount of starch present in feces.

The objective of this study was to examine the influence of 5 diet additives on starch and dry matter digestibility of HMC of two moisture contents when fed to steers. Efficiency of feed use was also monitored.