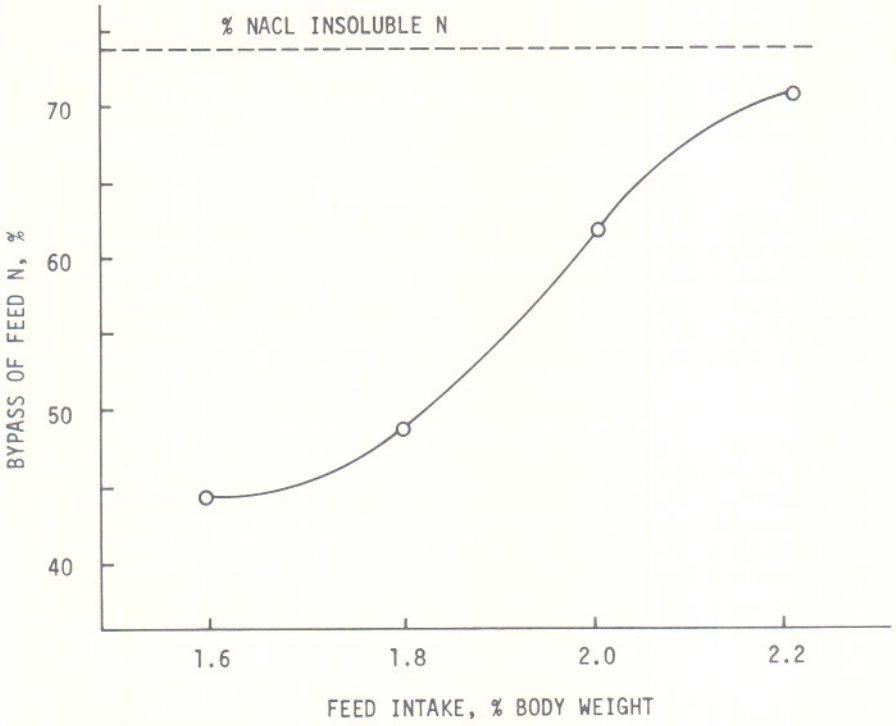

Figure 1. Feed intake versus bypass of feed N.

This and previous studies also suggest that for feedlot cattle consuming predominantly corn-based high concentrate diets, optimal performance should occur (particularly early in the finishing period) with diets containing .6 to .65 percent soluble or otherwise readily available N.

Literature Cited

Zinn, R. A. and F. N. Owens. 1980. Okla. Agr. Exp. Sta. Res. Rep. MP-107:150.
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Captan and Ruminal Metabolism

R. G. Teeter and F. N. Owens

Story in Brief

Four ruminally and abomasally cannulated growing steers, each weighing 783 lb, were fed four different dietary concentrations (0, 160, 320, and 640 ppm) of Captan mixed in an 85-percent concentrate ration. The purpose was to determine the influence of Captan on ruminal and total-tract digestibility of dry matter, starch and protein and on the retention of nitrogen. Captan tended to linearly increase ruminal starch and dry

matter digestibility (4.4 percent, 9.8 percent), decrease abomasal passage of starch and dry matter (37.2 percent, 27.2 percent), decrease abomasal passage of non-ammonia nitrogen (13.1 percent) and increase nitrogen retention (8.5 percent). No differences in total-tract digestibility of nitrogen of dry matter were detected. Results suggest that this compound may enhance ruminal fermentation of concentrate diets.

Introduction

Feeding trials with steers fed concentrate rations in Colorado and ruminants fed forage in Minnesota have shown increased digestibility, rate of gain or feed efficiency with Captan, a new feed additive being tested for use in cattle feeding. It has been used in the past as a fungicide for seed corn. The purpose of this study was to determine if increased ruminal outflow of protein is responsible for the increased performance observed with animals fed low levels of Captan.

Experimental Procedure

Four 783-pound Hereford steers fitted with rumen and abomasal fistulas were allotted to treatments (0, 160, 320, 640 ppm Captan) in a 4 x 4 Latin square design. Each 14-day period consisted of 5 days adaptation feeding in pens followed by 9 days in metabolism stalls (days 1-3, adaptation to stall; days 4-8, fecal and urine collection; and day 9 sampling of ruminal and abomasal contents). Steers were fed an 85-percent concentrate ration (Table 1) containing solid and liquid flow markers, twice daily in pens and every 3 hours in stalls. Fecal, abomasal and acidified rumen and urine samples were frozen until analyzed.

Results and Discussion

No significant differences were detected (Table 2), but trends suggest that ruminal fermentation of starch and dry matter may have been enhanced by Captan. Total-tract digestibility was not affected by Captan. In this study dry matter intakes were limited such that equalized intake could be achieved across treatments. Reduced intake will slow rate of passage and minimize differences in total-tract digestibility. *Ad libitum* feeding conditions could overload the intestinal digestive capacity, in which case enhanced ruminal fermentation might increase total-tract nitrogen and dry matter digestibility. Ruminal outflow of nitrogen tended to decline with the added drug. Such a decline with increased ruminal digestibility and an increased outflow rate is surprising. Whether this change is in plant microbial nitrogen is unclear.

Table 1. Ration composition

Item	As fed basis, %
Corn, rolled	76.3
Cottonseed hulls	10.0
Alfalfa meal	5.00
Molasses	4.00
Cottonseed meal	2.00
Limestone	0.75
Urea	0.50
Salt	0.30
Dical	0.15
Marker mix	1.00
	100.00

Table 2. Trial results

Item	Concentration of Captan, ppm			
	0	160	320	640
Dry matter digestibility (%)				
Ruminal	65.1	72.8	69.4	74.3
Total	82.1	81.9	82.4	82.0
Starch digestion (%)				
Ruminal	87.7	93.6	89.3	92.2
N digestibility	74.8	72.1	77.3	74.8
Non-ammonia nitrogen				
Ruminal outflow, g/day	142.1[b]	132.8[ab]	126.7[ab]	110.6[a]
Ruminal ammonia, mg/dl	3.4	3.6	4.3	2.5
Nitrogen retention, g/day	45.2	47.8	50.4	49.2
Urine volume, liter	25.2	27.7	26.8	27.4
Abomasal passage				
Liquids, liter/day	66.4	80.8	80.8	75.2
Organic matter, g/day	1316	968	1136	947
Starch, g/day	306	138	256	183

[ab]Means in a row with different superscripts differ significantly ($P<.05$).

Ruminal Availability of Phosphorus and Its Effect on Digestion

K. E. Witt and F. N. Owens

Story in Brief

The phosphorus concentration in ruminal fluid was determined for steers limit-fed rations with phosphorus concentrations ranging from .06 to .17 percent. Ruminal phosphorus concentration was increased with phosphorus intake at dietary concentrations below .12 percent for steers. This relationship was employed to estimate the ruminal availability of phosphorus from four phosphorus sources. Compared with sodium phosphate, assumed to have a ruminal phosphorus availability of 100 percent, a 21-percent phosphorus mono-dical, an 18.5-percent phosphorus mono-dical, and a defluorinated rock phosphate were found to be 59, 42 and 28 percent as available in the rumen. Phosphorus solubility in solutions buffered at pH 5, 6 and 7 paralleled the apparent availability in the rumen. Low ruminal dietary phosphorus did not reduce total tract or ruminal digestibility greatly, however, suggesting that ruminal concentrations above 210 mg per liter are adequate for microbial digestion in the rumen.

Introduction

Phosphorus in the form of some inorganic phosphorus supplement is added to most livestock rations to help meet the requirement of animals. With non-ruminant animals, the phosphorus requirement is often assessed by feeding trials and growth measurements. Ruminants require phosphorus both for growth of tissue and bone, as well as multiplication of microorganisms within the rumen. Phosphorus availability,