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G. Goldy

Jack G. Riley

Ronald V. Pope

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Effect of combinations of rumen-protected methionine plus rumen-protected lysine on performance of finishing steers

Abstract

Feed efficiency for finishing steers was significantly improved (7.4%) when rumen-protected methionine and lysine were added to a finishing ration.

Keywords

Cattlemen's Day, 1986; Kansas Agricultural Experiment Station contribution; no. 86-320-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 494; Beef; Methionine; Lysine; Rumen; Finishing steers

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Effect of Combinations of Rumen-Protected
Methionine Plus Rumen-Protected Lysine on
Performance of Finishing Steers

Jack Riley, Gary Goldy,
and Ron Pope

Summary

Feed efficiency for finishing steers was significantly improved (7.4%) when rumen-protected methionine and lysine were added to a finishing ration.

Introduction

Basic ruminant nutrition research has demonstrated improved performance with postruminal infusion of amino acids. This has led to the development of rumen protected amino acids by Eastman Kodak. Research is currently limited to investigating various ratios and levels of methionine and lysine coated with a polymeric substance that survives the rumen environment, but is swollen and dispersed in the abomasum, releasing the amino acids. The polymer is not absorbed but is excreted unchanged in the feces.

Experimental Procedures

One hundred and eighty crossbred steers averaging 720 lbs. were randomly allotted to 30 pens of six steers each. All steers were vaccinated for IBR, BVD, leptospirosis and 7-way clostridium and were wormed with injectable levamisole. Individual shrunk weights were taken initially and at the end of the 122 day trial. Interum weights at 28 day intervals were taken prior to the morning feeding. All steers were implanted initially and re-implanted at 56 days. Six pens (36 steers) were fed a basal diet containing (as fed basis) 70% sorghum grain, 25% sorghum silage and 5% supplement. The diets were formulated to meet 1984 NRC recommendations (crude protein, 10.8%).

The trial was designed to test a control and four levels of rumen-protected methionine (RPMET) + rumen protected lysine (RPLys) (Table 7.1). Individual jugular blood samples were obtained from two steers within each pen on days 7 and 56 to determine level of plasma amino acids. Individual identity was maintained at slaughter and carcass weight, quality grade, yield grade, and liver abscess data collected. Composition of the basal diet is shown in Table 7.2.

Table 7.1. Supplemental Dietary Amino Acid Levels

Treatment	Methionine ¹	Lysine ¹
Control	0.00	0.00
A	0.05	0.04
B	0.10	0.08
C	0.15	0.12
D	0.20	0.16

¹Actual dosage (percent of diet dry matter) of supplemental active amino acids.

Table 7.2. Composition of Basal Diet¹

Ingredient	% (as fed basis)
Sorghum grain	72.5
Sorghum silage	25.0
Dried molasses	0.8
Urea	0.4
Calcium carbonate	0.6
Salt	0.3
Dicalcium phosphate	0.2
Potassium chloride	0.15
Trace mineral	0.02
Vitamin A (30,000 I.U./g)	0.01
Rumensin - 60	0.02

¹RPMet + RPLys were mixed at 2.5% of sorghum grain to provide dietary levels shown in Table 7.1.

Results and Discussion

Results are shown in Table 7.3. Steers consuming the control diet ate the most daily feed and gained the slowest. Even though dry matter intake did not differ significantly, all treatments with RPMet + RPLys showed lower average daily consumption. Daily gains for treatment B(3.47 lb) and D(3.48 lb) were significantly higher ($P<.10$) than for the control (3.27 lb). Feed efficiencies for all supplemental amino acid treatments were better than for the control ($P<.05$).

The average improvement in feed utilization was 7.4%, with treatment B being the most efficient. There were no significant differences for any of the carcass traits evaluated in this study.

Table 7.3 Effect of Combinations of Rumen-Protected Methionine Plus Rumen-Protected Lysine on Performance of Finishing Steers

Item	Control	A	B	C	D
		.05%RPmet .04%RPLys	.10%RPmet .08%RPLys	.15%RPmet .12%RPLys	.20%RPmet .16%RPLys
No. Steers	36.0	36.0	36.0	36.0	36.0
Initial wt, lb.	720.3	719.4	720.2	720.7	719.5
Final wt, lb.	1119.2	1139.1	1144.8	1137.9	1144.1
Gain, lb.	398.9	419.7	424.6	417.2	424.6
ADG, lb.	3.27 ^a	3.44 ^{ab}	3.48 ^b	3.42 ^{ab}	3.48 ^b
Daily intake, lb. D.M.	23.48	23.07	22.93	22.61	23.16
Feed/gain, lb. D.M.	7.17 ^c	6.72 ^d	6.59 ^d	6.62 ^d	6.66 ^d

^{a,b} Means in same row with different superscripts differ ($P<.10$).

^{c,d} Means in same row with different superscripts differ ($P<.05$).