Liquid Trace Mineral for Feedlot Steers

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Story in Brief

Liquid trace mineral (LTM) was fed to growing steers in one metabolism, two feeding and one receiving trials. A slight depression in nutrient digestibilities was observed, and fecal pH was depressed with LTM feeding. In the feeding trials, daily gain was improved by 11 percent and feed efficiency by 10 percent during the first 56 days, but by the end of the trials (129 and 154 days) the remaining advantages were only 0.7 and 2.2 percent. In a 45-day trial with newly received steers, feed efficiency was slightly increased (7.5 percent) by LTM.

Introduction

Liquid trace mineral (LTM), a product of mineral digestion by autotrophic bacteria marketed by Delst Chemical Company, Anaheim, California, is frequently used as a trace mineral supplement. It is fed at 1.5 lb per ton of ration to feedlot cattle. It contains iron, magnesium, manganese and sulfur and may serve as a fermentation stimulant. It is available as a watery, highly corrosive liquid or dried onto alfalfa meal. As a fluid (25 percent dry matter), it has a pH of 2.6 and 22 percent ash. It will readily digest concrete.

Results reported elsewhere in this publication indicated that LTM increased turnover rate of ruminal liquids and solids. Mies (1978) reported detrimental effects of LTM supplementation for finishing steers. These trials were conducted to determine potential effects of LTM on feedlot performance and steer metabolism.

Materials and Methods

Digestion Trial

Four 770 lb steers were fed a 56 percent rolled corn, 13 percent cottonseed hull, 5 percent alfalfa, 19 percent soybean meal, 4.5 percent molasses ration with or without 0.075 percent added LTM. Urine and feces were collected the final five days of each 14-day period. Steers were switched to opposite treatments for the next 14 days and again collected.

Feeding Trial 1

Twenty-seven 674 lb steers, six or seven per pen, were fed a rolled corn, high concentrate ration for 154 days (Table 1) with or without 0.075 percent LTM. No antibiotics or implants were used. Rate of gain, feed efficiency and carcass characteristics were monitored.

Feeding Trial 2

Fifty-five 662 lb steers, seven per pen, were fed for 129 days the same rolled corn, high concentrate ration as in trial 1 with or without 0.075 percent LTM for 129 days. No antibiotics or implants were used.

Receiving Trial

One hundred-twenty 350 lb steers, ten per pen, were fed the Purina Receiving Ration with or without 0.075 percent added LTM for 45 days. Steer health and performance were recorded for a total of 60 days.

Results and Discussion

Metabolism trial results are presented in Table 2. Fecal pH decreased slightly and fecal dry matter increased slightly with LTM feeding. Urine output increased by 26 percent with LTM. Digestibility of dry matter and protein decreased slightly with LTM addition; however, nitrogen retention was unchanged with LTM feeding. The slight decrease in digestibility matches that observed last year for LTM in a buffer trial (Thornton *et al.*, 1978).

Results from both feeding trials are presented in Table 3. For the total trials, LTM had little influence on rate of gain (+0.7 percent) or efficiency of feed use (+2.2 percent). Over the first two months of each feeding trial, however, rate of gain was increased an average of 11 percent and efficiency of feed use by 10 percent. This suggests that LTM may have a favorable short term effect on steer performance. Of the carcass characteristics measured, incidence and severity of liver abscesses tended to increase with LTM feeding.

In the 45-day trial with receiving cattle (Table 4), feed efficiency again was increased slightly (7.5 percent) by LTM feeding. Factors responsible for these consistent short-term benefits of LTM deserve further attention despite inconsistent results of longer trials.

Table 1. Ration composition, dry matter basis.

Item	%
Corn, rolled	73.8
Cottonseed hulls	15.0
Alfalfa meal	4.0
Molasses, cane	4.0
Cottonseed meal	4.5
Limestone	.75
Urea	.5
Dicalcium phosphate	.15
Salt	.3
Vitamin A[a]	.015
Composition	
Crude protein	11.8
NE_g, kcal/g	1.24

[a]30,000 IU/g.

Table 2. Nitrogen balance results.

Item	Treatment	
	Control	LTM
Steers, no.	4	4
Feed intake, kg/day	6.50	6.43
Feces pH	6.14	5.99
Fecal dry matter, %	26.53	28.08
Urine, L/day	8.66	10.87
Digestibility, %		
Dry matter	75.5	74.1
Nitrogen	70.2	69.6
N retention, g/day	36.5	36.1

Table 3. LTM feeding trial results.

Item	First trial Ration		Second trial Ration	
	Control	LTM	Control	LTM
Steers, no.	13	14	27	28
Pens, no.	2	2	4	4
Daily gain				
0-56	3.03	3.44	3.67[a]	3.99[b]
56-end	2.47	2.23	2.60	2.43
0-end	2.67	2.67	3.06	3.10
Daily feed				
0-56	23.3	23.8	23.2	22.5
56-end	24.9	23.4	25.2	25.5
0-end	24.3	23.6	24.4	24.2
Feed/gain				
0-56	7.95	7.06	6.32	5.65
56-end	10.08	10.49	9.81	10.53
0-end	9.07	8.83	7.97	7.84
Fecal pH	- - -	- - -	5.75	5.53
Carcass characteristics				
Dressing, %	62.0	62.6	58.2	58.3
Liver abscess				
Incidence, %	15.4	21.4	23.2	33.3
Severity	.15	.29	.31	.67
Quality grade	12.7	12.5	10.8	10.6
Yield grade	3.5	3.3	- - -	- - -

[ab]Means within a trial with different superscripts differ statistically ($P<.05$).

Table 4. LTM for receiving cattle.

Item	Treatment	
	Control	LTM
Steers, no.	60	59
Weight, initial	352	348
Daily gain, lb		
0-45	2.41	2.49
0-60	2.12	2.09
Daily feed, lb		
0-45	15.1	14.4
0-60	15.9	15.3
Feed/gain		
0-45	6.29	5.82
0-60	7.53	7.33
Medical cost, $/steer	1.93	1.78

Literature Cited

Mies, W. L. 1978. Texas Tech Beef Research Report, p. 51.

Thornton, J. H., F. N. Owens, R. W. Fent and K. Poling. 1978. Okla. Agr. Exp. Sta. Res. Rep. MP-103:72.