The Effects of Feeding a Live Microbial Product on Feedlot Performance and Carcass Value of Finishing Steers Fed Wet Corn Gluten Feed

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Summary

This experiment was conducted to evaluate the efficacy of daily feeding a live microbial preparation containing two live organisms to finishing cattle. One organism was a lactobacillus, and the other was a propionibacterium, thought to work in concert to improve fermentation in the rumen and overall digestion. The study was conducted with Angus steers with an average initial weight of 550 lbs that were fed a finishing ration containing 50% wet corn gluten feed on a dry basis for 184 days. Feeding the microbial product improved daily gain and feed efficiency 1.7% and 2.4%, respectively, but the differences were not statistically significant. The microbial preparation increased carcass weights 1% but had no effects on quality or yield grades. It is concluded that potential benefits of this product are more likely to be greater when cattle are fed high grain rations rather than diets containing high concentrations of corn gluten feed.

Introduction

Direct fed microbial products have been developed for dairy cows and finishing cattle. The potential benefits for finishing cattle are more consistent intake of high-grain rations, increased gain, and improved feed efficiency. One product that is being marketed to beef feedlots is Bovamine® Rumen Culture, which contains live, naturally occurring organisms, *Lactobacillus acidophilus* and *Propionibacterium freudeneichii*. Lactobacillus organisms normally inhabit the small intestine and can aid in stabilization of digestive processes. *Propionibacterium freudeneichii* can thrive in the rumen and has the ability to convert lactic acid to propionic acid that can be used as a source of energy by the animal. In studies to determine efficacy of the product cattle have been fed rations containing grain, which is typical of many feedyards. No data have been obtained with cattle fed diets containing corn gluten feed replacing a major portion of the corn grain. The objective of this study was to evaluate Bovamine® in steers fed a ration containing 50% wet corn gluten feed on a dry basis.

Materials and Methods

One hundred eighty Angus steers were purchased predominantly from one ranch as newly weaned calves in late October. After arrival the calves were adjusted to being fed in pens, were given booster immunizations, were treated for internal and external parasites, and had grain and wet corn gluten feed introduced into their diet. Twenty-one days after arrival at the feedyard the calves were weighed and assigned to pens based on weight and were started on the experimental diets. Forty-eight steers in eight pens were randomly assigned to each of three treatments. The average starting weight of the steers was 550 lbs. They were implanted with Synovex S 28 days after the trial was started and reimplanted with Revalor S fifty-seven days later.

The steers were fed the finishing diet shown in Table 1. The concentrate portion of the diet was prepared as a mix and weighed separately from the wet corn gluten feed and corn silage. The three were mixed in a mixer wagon prior to delivery to the cattle. The three treatments compared in this experiment were no addition and two levels of Bovamine® Rumen Culture. At each morning feeding the preweighed dry rumen culture was activated by suspension in one gallon of water and sprinkled on top of the feed in the mixer wagon and mixed into the total ration. The quantity of the culture fed was a constant amount per head per day throughout the experiment. The cattle were fed twice per day, and the amount of feed offered the cattle was gradually increased until their appetite was satisfied. And then they were fed according to appetite. If the amount of feed consumed decreased, they were offered less feed, and feed accumulated in the bunks was removed and sampled for determination of dry matter. The mixed concentrate portion of the diet, corn silage and wet corn gluten feed, were periodically sampled for chemical analysis.

The steers were sold in two groups to one commercial beef packer two weeks apart to facilitate collection of carcass data. Equal numbers of steers were sold from each of the three dietary treatments within a sale date so that time of selling would not affect the dietary comparisons within the experiment. Steers were fed an average of 184 days. Weights of hot carcasses were taken after slaughter, and measurements on the carcasses were obtained after a 24-hr postmortem chill. The federal graders in the plant called marbling score, percentage of kidney, pelvic and heart fat

(KPH) and yield grade. Area and fat thickness over the ribeye between the 12th and 13th ribs on the left side of each carcass were measured. Yield grade of each carcass was calculated from carcass measurements using the standard yield grade equation.

Five steers were removed from the experiment for reasons not related to diet or treatments. Average feed intake was calculated from the feed consumed by a pen of steers divided by the number of steer days in the pen. Daily gain was calculated by deleting all weights of the steers removed from the study. Pen means were used as the experimental unit in the statistical analysis. Data were analyzed by analysis of variance. Treatment means and probabilities of difference due to ration treatment are presented.

Table 1. Composition of the basal diet (dry matter basis).

Ingredient	% of dry matter
Wet corn gluten feed[a]	50.00
Cracked corn	42.78
Corn silage	5.00
Limestone	1.80
Salt	0.30
Vitamin A premix[b]	0.08
Trace mineral premix	0.024
Rumensin premix[c]	0.0195

[a]Provided 1,400 IU of vitamin A activity per pound of dry matter.
[b]Provided 15.6 mg sodium monensin per pound of dry matter.
[c]Wet corn gluten feed averaged 59.8% dry matter.

Results and Discussion

Feedlot performance of the steers is summarized in Table 2. Overall performance of the steers was excellent, averaging over 3.5 lbs per day gain with feed conversions of less than 5.5 lbs of feed DM per pound of gain. Adding the microbial product to the feed numerically improved gain and feed conversion 1.7% and 2.4%, respectively, but these differences were not statistically significant (P > .05). There was a trend for feed intake to be numerically reduced by the addition of the microbial preparation. Carcass data are given in Table 3. Feeding the microbial preparation increased carcass weight approximately 8 lbs (not significant, P > .05) and had no significant effect on quality or yield grades. Carcasses from steers fed the lower and higher concentrations of the microbial product had increased carcass values of $17.38 and $11.67, respectively, using the grid given in the footnote of Table 3. This increased carcass value was the result of increased weight and fewer discounts for quality and yield grade.

The lack of a significant response to feeding the microbial preparation may have been caused by the amount of corn gluten feed in the ration. Replacing corn grain with corn gluten feed generally results in less acid produced in the rumen because of the replacement of starch in corn grain with fiber in corn gluten feed. One expected benefit from feeding the microbial preparation was conversion of lactic acid to propionic acid in the rumen. The low number of liver abscesses, however, suggests these cattle were not subjected to extended periods of ruminal acidosis. There were two abscessed livers in the control steers and one in the steers fed Bovamine®.

Table 2. Effects of feeding Bovamine® Rumen Culture on feedlot performance of finishing steers.

	Diet				
Item	Control	Lo	Hi	SEM[a]	LSD[b]
Initial wt, lbs	548	552	549	8.6	28.0
Final wt, lbs	1205	1212	1221	17.8	58.0
Days fed	184	184	184		
Gain, lbs/d	3.56	3.58	3.62	0.06	0.20
Feed intake, lbs DM/d	19.1	19.0	18.9	0.26	0.85
Feed/gain	5.37	5.32	5.24	0.06	0.21
Liver abscess	2	0	1		

[a]Standard error of the mean.
[b]Least significant difference (P < .05).

Table 3. Effects of feeding Bovamine® Rumen Culture on carcass measurements of finishing steers.

	Diet				
Item	Control	Lo	Hi	SEM[a]	LSD[b]
Carcass wt, lbs	748.9	757.5	755.2	9.85	32.14
Dressing %	62.2	62.5	61.9	0.23	0.76
KPH, %	2.3	2.4	2.2	0.09	0.29
REA, sq in.	12.4	12.3	12.6	0.18	0.59
Back fat, in.	0.48	0.50	0.46	0.02	0.08
Marbling score[c]	424	450	427	7.6	24.7
Quality grade					
Certified Angus Beef	7	10	7		
Choice	29	31	30		
Select	11	5	9		
Calculated yield grade					
1	2				
2	19	15	25		
3	23	30	21		
4	3	1			
Avg yield grade	3.03	3.17	2.95	0.07	0.24
Carcass value[d], $/head					
Based on called YG	866.52	883.90	878.19	12.30	40.11
Based on calculated YG	863.11	881.88	878.46	11.50	37.49

[a]Standard error of the mean.
[b]Least significant difference (P < .05).
[c]300 = slight^0, 400 = small^0, 500 = modest^0, 600 = Moderate^0.
[d]Grid was: $/cwt of carcass. Choice YG 3 was $116; Select, -$7; Certified Angus Beef, +$2;YG 2 (Choice and Select), +$2.50; YG 1 (Choice and Select), +$6.50; YG 4, -$10; and Standard, -$13.

Implications

The results of this study suggest that the addition of a live microbial preparation to cattle finishing diets containing high concentrations of corn gluten feed are likely to result in less improvement in performance than cattle fed high grain rations.

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