Effects of Feeding Cobalt Dextro Lac (CDL) on Feedlot Performance and Carcass Value of Finishing Steers Fed Wet Corn Gluten Feed

A.S. Leaflet R1741

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Summary

A 192-day experiment involving 144 young Angus steers fed growing and finishing diets containing 20% corn gluten feed was conducted to evaluate feeding a soluble source of readily available cobalt. No benefits were observed in rate of gain, feed intake or carcass value by feeding the available source of cobalt.

Introduction

Cobalt Dextro Lac (CDL) is a solubilized form of cobalt that is a complex of elemental cobalt, dextrose and lactose that increases the availability of cobalt to the rumen microorganisms. Cobalt is an essential element required for synthesis of vitamin B_{12} by microorganisms in the rumen. Improvements in performance of growing cattle fed greater quantities of roughage and of finishing cattle fed lesser quantities of roughage have been observed. The purpose of this experiment was to evaluate feeding CDL to growing and finishing steers fed rations containing wet corn gluten feed.

Materials and Methods

One hundred forty-four Angus steers with an average age of 190 days, a weight of 385 lbs and a frame score of 3.8 were purchased from one ranch. The calves had been preconditioned and weaned 30 days prior to purchase. One week later the calves were weighed and randomly allotted to twenty-four pens with six steers per pen. Prior to purchase the steers had been stepped up to a 49 NEg Mcal/cwt diet and were started on diet 1 (Table 1) at the beginning of the experiment. The steers were fed diet 1 for 28 days, diet 2 for 56 days, diet 3 for 35 days and diet 4 until sold. The steers were implanted with Component E-S at the beginning of the experiment and reimplanted with Component ET-S 118 days later.

The concentrate portion of the diet was prepared as a mix and weighed separately from the wet corn gluten feed and chopped hay. The three were mixed in a mixer wagon prior to delivery to the cattle. The two treatments compared in this experiment were no addition and addition of CDL. CDL was fed twice per day at the rate of 1 lb per 213 head or 2.13 gm per steer per day for the first 84 days. After 84 days CDL was fed at the rate of l lb per 197 head or 2.30 gm per steer per day. The CDL premix was diluted 1 to 10 in soybean meal, and the appropriate quantity of the dilution was weighed and spread on top of the feed in the mixer wagon and mixed into the total mixed diet before feeding the cattle. The control cattle were fed an equal amount of additional soybean meal without CDL. 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, chopped hay and wet corn gluten feed, were periodically sampled for chemical analysis.

The steers were sold in two groups to one commercial beef packer three days apart to facilitate collection of carcass data. Equal numbers of steers were sold from each of the two 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 196 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 12^{th} and 13^{th} 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 diets (dry basis).

	Diets			
Ingredient	1	2	3	4
Cracked corn	43.4	48.4	58.2	66.1
Wet corn gluten feed	20.0	20.0	20.0	20.0
Chopped hay	30.0	25.0	15.0	7.0
Soybean meal	5.0	5.0	5.0	5.0
Limestone	1.13	1.22	1.39	1.52
Trace mineral premix	0.024	0.024	0.024	0.024
Salt	0.30	0.30	0.30	0.30
Rumensin premix[a]	0.0195	0.0195	0.0195	0.0195
Vitamin A premix[b]	0.08	0.08	0.08	0.08
NEg, Mcal/100 lbs	54.6	56.9	61.5	65.2
Crude protein, %	13.3	13.2	13.0	13.0

[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.

Results and Discussion

Overall there were no differences in average feed intake and daily gain of steers fed the control ration or the ration containing CDL (Table 2). Summarizing performance by period when rations containing different quantities of roughage were fed also indicated there were no differences in feed intake or gain of steers fed the rations with or without CDL (Table 3). No differences in carcass measurements or calculated value of the carcasses were observed in this experiment (Table 4).

The gain and feed efficiency of the steers used in this experiment were excellent considering that they were young and small to medium framed. The carcasses graded 68% Choice and 82% yield grades 1 and 2. Under these conditions no benefits were obtained by supplementing the rations with a source of soluble readily available cobalt.

Table 2. Feedlot performance of steers fed CDL.

	Treatment			
Item	Control	CDL	SEM[a]	LSD[b]
Pens of cattle	12	12		
Starting weight, lbs	386	385	7.7	23.7
Ending weight, lbs	1116	1118	11.2	34.6
Days fed	196	196		
Gain, lbs/d	3.73	3.74	0.04	0.14
Feed intake, lbs DM/d	18.9	18.9	0.15	0.47
Feed/gain	5.08	5.06	0.06	0.20

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

Table 3. Feedlot performance of steers by ration period.

Item	Treatment		SEM[a]	LSD[b]
	Control	CDL		
Ration 1				
Days fed	28	28		
Gain, lbs/d	3.32	3.32	0.08	0.24
Feed intake, lbs DM/d	11.5	11.5	0.03	0.09
Feed/gain	3.47	3.47	0.07	0.23
Ration 2				
Days fed	56	56		
Gain, lbs/d	3.87	3.78	0.06	0.17
Feed intake, lbs DM/d	17.0	17.0	0.14	0.43
Feed/gain	4.40	4.50	0.07	0.22
Ration 3				
Days fed	35	35		
Gain, lbs/d	3.61	3.74	0.10	0.32
Feed intake, lbs DM/d	19.9	19.9	0.25	0.76
Feed/gain	5.58	5.38	0.16	0.51
Ration 4				
Days fed	77	77		
Gain, lbs/d	3.83	3.87	0.07	0.21
Feed intake, lbs DM/d	22.4	22.2	0.22	0.69
Feed/gain	5.86	5.76	0.10	0.32

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

Table 4. Carcass data.

Item	Treatment		SEM[a]	LSD[b]
	Control	CDL		
Carcass wt, lbs	688.2	687.1	7.02	21.64
Dressing %	61.6	61.5	0.24	0.75
REA, sq in.	12.5	12.7	0.18	0.56
Back fat, in.	0.40	0.42	0.02	0.06
KPH, %	2.23	2.20	0.07	0.20
Marbling score[c]	404	409	8.2	28.3
Quality grade				
Certified Angus Beef	4	5		
Choice	41	45		
Select	25	18		
Standard		1		
Calculated yield grade				
1	8	13		
2	52	41		
3	10	15		
Avg yield grade	2.59	2.51	0.10	0.29
Carcass value[d], $/head				
Based on called YG	795.28	797.66	8.26	25.46
Based on calculated YG	800.27	801.68	7.42	22.86

[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

In this experiment young steers fed 20 % of their dry matter intake as wet corn gluten feed during the growing and finishing period were not benefited by the addition of a soluble source of readily available cobalt to the ration.

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