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A.S. Leaflet R255

EVALUATION OF COBALT DEXTRO-LACTATE AS A FEED ADDITIVE FOR BEEF CATTLE: PROGRESS REPORT

This study is being conducted to determine the value of cobalt dextro-lactate (CDL) as a feed additive for young beef cattle. The first experiment was reported in A.S. Leaflet R234. A summary of the 1976 experiment along with the results from the first phase of the 1977 test are reported here.

Experimental Procedure

1976 Experiment

Animals and rations for the growing phase of the 1976 experiment were presented in A.S. Leaflet R234. The ration composition and analysis of the finishing phase of that test along with the growing phase of the 1977 test are presented in table 1.

The complete mixed rations shown in table 1 were fed free-choice in both trials.

From the 1976 test, two groups of 32 calves each were slaughtered after 70 days and 112 days on the finishing rations, respectively, to achieve a more constant slaughter weight for the two weight blocks. Average daily gain and feed conversion were computed for the first 70-day period while all the animals were in the feedlot. All animals were weighed every 14 days before the morning feeding.

1977 Experiment

Similar to the previous experiment, a total of 64 crossbred calves from the Beef Nutrition Herd were used in this study. They were weaned in early November 1976 at an average age of 6 months. All steers and heifers were used in a 42-day post-weaning test and then carried on a cob-molasses basal diet for about 10 weeks prior to this study.

The 64 calves (32 steers, 32 heifers) were divided into two weight groups by sex. They were randomly allotted within each of the weight by sex groups for a total of 16 pens of four calves each to provide four pen replicates for each sex per treatment. All animals started on test on March 1, 1977. They were weighed every 14 days in the morning before feeding with water withheld overnight.

Results and Discussion

The results are summarized in tables 2, 3 and 4.

1. Steers fed CDL in the growing ration, which contained an average of 45 percent roughage on a dry matter basis, gained slightly faster than those fed the control ration (2.17 and 2.05 lb. per day for CDL and control, respectively). Heifers fed CDL gained slightly slower than those fed the control ration (1.93 vs. 2.00 lb. per day) during this 98-day trial (table 2). Both differences in rate of gain were not significant. CDL-treated steers had a slightly better feed conversion than control steers during this growing trial ($P<.25$).

2. Average daily gain and feed efficiency of control and treated steers were not significantly different during the 70-day finishing phase. However, there were highly significant depressions of average daily gain of heifers (2.82 and 2.41 lb. per day for control and CDL, respectively) ($P<.005$) and feed efficiency to a lesser extent (7.43 and 8.36 DM per lb. of gain for control and CDL, respectively) ($P<.05$) (table 2).

3. The thickness of fat over the rib eye was significantly increased in the CDL-treated calves ($P<.05$) while rib eye area was slightly lower ($P<.15$). The statistical analysis showed a difference in average yield grade for both sexes (2.22 and 2.03 for CDL and control, respectively) at $P<.10$ level (table 3). Yield, quality grade and kidney fat were not significantly changed by the addition of CDL to the control diet. The significant depression in weight gains for the CDL treated heifers may have been a result of the apparent differences in fattening characteristics.

4. Table 4 shows that the average daily gain of steers, unlike heifers, was increased significantly (2.96 vs. 2.76 lb.) by the addition of CDL to the control ration ($P<.07$) during the 84-day growing trial. The difference in feed efficiency was not significant for both sexes.

Conclusions

CDL-treated steers had a tendency to gain weight slightly faster than the control steers during the growing period of both years.

Heifers did not show the same effect. This interaction of the additive with sex has been present during all phases of this study. More data from growth trials and carcass measurements are needed to fully evaluate this additive.

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Table 1. Ration Composition and Analysis

Feed	1976 Finishing rations DM basis %	DM basis %	1977 Growing ration DM basis %	Analysis of components DM %	Crude protein % (DM basis)
Whole plant corn silage	47.65	—	—	40.3	7.2
Corn stover silage	—	25.76	—	40.6	4.6
Air-dry ground corn stover	—	—	22.02	78.6	4.5
Ground corn grain	44.38	66.32	62.54	87.5	9.7
Sugarcane molasses	—	—	7.15	—	—
Soybean meal	5.70	5.67	4.29	89.7	49.1
Alfalfa, dehydrated	.58	.58	1.79	91.8	20.5
Urea, 282% C.P.	.63	.63	0.79		
Dicalcium phosphate	.31	.31	0.21		
Limestone	.63	.63	1.07		
Trace minerals (c.c.c.)	.028	.028	.031		
Vitamin A (5000 IU/g)	.069 (25,000 IU/day)	.069	.063 (20,000 IU/day)		
Vitamin E (125 IU/g)	.001 (12.5 IU/day)	.001	.016 (125 IU/day)		
Cobalt Dextro-Lactate	— (14.5 g/day)	—	— (14.5 g/day)		

Table 2. Feedlot Performance of Calves Fed Cobalt Dextro-Lactate, 1976 Experiment.

	Steers Control	Steers CDL-treated	Heifers Control	Heifers CDL-treated
	Growing Phase			
No. calves	16	16	16	16
Initial weight, lb.	536	533	538	533
0-56 days				
Average daily gain, lb.	1.75	1.86	1.73	1.67
Feed efficiency, DM	8.15	7.63	8.21	8.36
0-98 days				
Average daily gain, lb.	2.05	2.17	2.00	1.93
Feed efficiency, DM	7.69	7.05	7.75	7.57
	Finishing Phase			
0-70 days				
Average daily gain, lb.	3.11	3.12	2.82	2.41**
Feed efficiency, DM	6.94	7.06	7.43	8.36*

** Significantly different from control heifers ($P<.005$).

* Significantly different from control heifers ($P<.05$).

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Table 3. Effect of Cobalt Dextro-Lactate on Carcass Characteristics[a], 1976 Experiment.

	Steers		Heifers	
	Control	CDL treated	Control	CDL treated
No. calves	16	16	16	16
Feedlot weight, lb.	1029	1049	963	920
Carcass weight, lb.	616	627	583	563
Yield[b], %	61.1	61.0	61.8	62.6
Quality grade[c]	9.7	9.6	10.0	10.8
Choice, %	50.0	43.8	81.3	81.2
Yield grade	2.00	2.13	2.06	2.31**
Rib-eye area, sq. in.	11.64	11.15	11.45	10.99
Backfat, in.	0.39	0.47*	0.43	0.50*
Kidney fat, %	2.50	2.44	2.59	2.69

[a]Weighted means of calves slaughtered after 168 and 210 days on feed.

[b]Yield based on feedlot weights shrunk 2% and warm carcass weights.

[c]Low choice = 10 and average choice = 11.

**Significantly different from control (P<.10).

*Significantly different from control (P<.05).

Table 4. Feedlot Performance of Calves Fed Cobalt Dextro-Lactate, 1977 Experiment.

	Control			CDL-treated		
	Heavy	Light	Avg.	Heavy	Light	Avg.
	Steers					
No. calves	8	8	16	8	8	16
Initial weight, lb.	690	619	654	686	624	655
0-42 days						
Avg. daily gain, lb.	2.67	2.23	2.45	2.66	2.36	2.51
Feed efficiency, DM	6.84	6.59	6.71	6.57	6.25	6.41
0-84 days						
Avg. daily gain, lb.	2.90	2.63	2.76	3.00	2.92	2.96*
Feed efficiency, DM	6.92	6.76	6.84	6.81	6.64	6.72
	Heifers					
No. calves	8	8	16	8	8	16
Initial weight, lb.	652	576 577	614 614.67	665	557 570	611 617.5
0-42 days						
Avg. daily gain, lb.	2.46	2.16	2.31	2.25	2.15	2.20
Feed efficiency, DM	7.70	7.45	7.57	7.71	7.11	7.41
0-84 days						
Avg. daily gain, lb.	2.60	2.36	2.48	2.60	2.22	2.41
Feed efficiency, DM	7.81	7.39	7.60	7.45	7.69	7.57

*Significantly different from control (P<.07).