EFFECTS OF WEEKLY OR BI-WEEKLY ROTATIONAL FEEDING OF LASALOCID AND MONENSIN ON PERFORMANCE OF FEEDLOT STEERS

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Story in Brief

One hundred sixty crossbred yearling steers, weighing an average of 782 lb, were used to determine the effects of lasalocid, monensin/tylosin and their weekly and bi-weekly rotational feeding on performance of feedlot steers. Weekly or bi-weekly rotational feeding of ionophores did not statistically alter rate of live gain, carcass adjusted daily gain, feed intake, or feed efficiency on either a live basis or carcass weight basis. None of the treatments statistically altered carcass characteristics except that ionophore rotation at 14-d intervals decreased dressing percentage compared to lasalocid fed continuously (65.8 vs 64.8). The results of this experiment showed no effect of weekly or bi-weekly rotational feeding of monensin/tylosin and lasalocid on animal performance.

(Key Words: Feedlot Steers, Ionophore Rotation, Lasalocid, Monensin)

Introduction

Ionophores are routinely fed to feedlot cattle to improve efficiency of feed use. Rotation among non-ionophore antibiotics on a seasonal or yearly basis has proven beneficial and is currently a routine practice in the poultry and swine industry. Some microbiological research indicates that resistance to monensin also renders a microbe resistant to lasalocid in vitro (Dawson, 1985), yet these two ionophores differ in their chemical affinity for minerals and in their effects on feed intake. In a previous trial (Martin et al., 1984) in which ionophores were switched on day 56 of a feeding trial, gain and feed efficiency were increased by approximately 5 to 11% compared to feeding either ionophore singly over the trial. Results of a recent New Mexico trial (Hubbert et al., 1987) has indicated that rotation of the two ionophores, lasalocid and monensin/tylosin, at 7-day intervals resulted in greater gains and feed intakes than when either ionophore was fed continuously. Though scheduling a rotation of ionophores (and tylosin) might result in fluctuations in feed intake and reduced protection against liver abscesses, such an ionophore rotation program would be mechanically simple to implement in a feedyard.

Materials and Methods

One hundred sixty crossbred (primarily British crosses) yearling steers which had been wintered on wheat pasture near Dalhart, Texas were trucked to Goodwell, Oklahoma on June 3, 1987. On arrival, all cattle were individually weighed, ear tagged, implanted with Synovex-S, and injected with ivermectin and a BRSV vaccine. The steers were divided

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into five weight groups of 32 head each (4 pens) and four treatments were randomly assigned to each pen of eight steers in each block. The dietary treatments were: 1) lasalocid (30 g/ton) fed continuously, 2) monensin (26 g/ton) plus tylosin (10 g/ton) fed continuously, 3) treatments 1 and 2 rotated weekly and 4) treatments 1 and 2 rotated bi-weekly (every 14 days).

Steers were fed a cracked corn high concentrate ration twice daily (0700 and 1600) for the 95 day trial (Table 1). Chopped alfalfa hay was used to dilute the ration to 60 percent concentrate to start the cattle on feed. Roughage content of the diet was decreased sequentially in three steps until the cattle were on their final ration by 28 days on feed. Cattle on the rotation treatments were started on the supplement containing lasalocid. Monensin was fed at 13 g/ton for the first two weeks of the trial.

Cattle weights were off truck weights (shrunk) at the start of the trial but were taken on full-feed on days 28, 56, 84 and 95. For calculation purposes, all full weights were shrunk by 4% to compensate for digestive tract fill. Steers were trucked to Holcomb, Kansas on day 97 of the trial (September 9, 1987) for slaughter, and carcass data were obtained. This trial was analyzed as a randomized complete block design with five replications per treatment. Statistical comparisons included continuously fed lasalocid or monensin/tylosin vs. rotation, monensin/tylosin vs. lasalocid and weekly vs. bi-weekly rotation.

Results and Discussion

Effects of rotational feeding of ionophores on cattle performance are presented in Table 2. Daily gains of steers were generally lower ($P=.17$) with ionophore rotation during the first 56 days of the trial (3.49 vs 3.30 lb/day for continuous vs rotation). However, daily gains of rotation fed cattle tended to be greater ($P<.10$) during the second half of the trial than those fed a single ionophore continuously (2.71 vs 2.92 lb/day). Over the entire trial, neither daily live gain or carcass adjusted daily gain were statistically altered by rotational feeding of ionophores. Likewise, feed intake was not altered by any of the treatments. Feed efficiency tended ($P<.10$) to be reduced with rotational feeding of ionophores during the first half of the trial (5.84 vs 6.11 lb DM/lb gain for controls and rotation), but was improved ($P<.01$) during the second half of the trial (7.54 vs 6.72). During days

Table 1. Diet composition, dry matter basis.[a]

	Ration Sequence			
Ingredient	1	2	3	4[a]
Corn, cracked	52.70	62.28	71.87	80.02
Chopped alfalfa	38.36	28.78	19.19	11.04
Cane molasses	3.88	3.88	3.88	3.88
Pelleted supplement[b]	5.06	5.06	5.06	5.06

[a]To provide 12.25% protein, .53% calcium, .78% potassium, .33% phosphorus, 94.7 Mcal NEm/cwt and 61.1 Mcal NEg/cwt.
[b]Provided either 26 g monensin/ton plus 10 g tylosin/ton or 30 g lasalocid/ton.

Table 2. Effect of ionophore rotation on steer performance.

Item	Monensin Tylosin	Lasalocid	7-d Rotation	14-d Rotation	Contrasts[d]
No. of steers	40	40	40	40	
No. of pens	5	5	5	5	
Weight, lb:					
Initial	782	788	782	776	
56 days	1015	1027	1004	1003	
95 days	1130	1131	1119	1125	
Daily gains, lb:					
0-56	3.45	3.53	3.24	3.36	
57-95	2.83	2.58	2.84	2.99	CR^{+}
0-95	3.20	3.14	3.08	3.21	
0-97[c]	3.73	3.77	3.66	3.65	
Daily feed, lb DM:					
0-56	20.08	20.57	19.93	20.27	
57-95	20.08	20.06	19.35	19.46	
0-95	20.08	20.36	19.69	19.94	
Feed/gain:					
0-56	5.85	5.82	6.16	6.05	CR^{+}
57-95	7.13^{ab}	7.94^{a}	6.90^{b}	6.54^{b}	CR**,MTL*
0-95	6.29	6.50	6.41	6.22	
0-97[c]	5.39	5.41	5.39	5.47	
Metabolizable energy, Mcal/kg	3.02	2.97	2.99	3.03	
Net energy, Mcal/cwt					
Maintenance	90.2	87.8	88.8	90.4	
Gain	59.9	58.5	59.1	60.2	

[a,b]Means in the same row with different superscripts differ (P<.05).
[c]Based on carcass weight divided by .62, an assumed dressing percent.
[d]CR=Continuous vs rotation, MTL=Monensin/Tylosin vs Lasalocid; **(P<.01), *(P<.05), $^{+}$(P<.10).

57-95, cattle fed monensin continuously were more efficient (P<.05) than those fed lasalocid continuously (7.13 vs 7.94). However, when averaged over the entire trial feed efficiency was not altered by any of the treatments. Comparison of NEg values with those expected (Tables 1 and 2) indicates that cattle gained less efficiently than expected (61.6 vs 59.4 Mcal/cwt for expected vs actual).

Effects of ionophore rotation on carcass characteristics are presented in Table 3. Dressing percentage was greater (P<.05) for steers fed lasalocid continuously than bi-weekly rotation steers (65.8 vs 64.8). In addition, weekly rotation steers tended (P<.10) to dress greater than bi-weekly rotation steers (65.6 vs 64.8). Because shrink of transported cattle has been reduced by lasalocid in some trials (Brazle et al., 1987), it is of interest that cattle fed lasalocid had a slightly higher dressing percentage. Cattle on the 14-d rotation were fed lasalocid the final 10 days before slaughter whereas cattle on the 7-d rotation were switched to monensin/tylosin 3 days before slaughter. Differences in dressing percentage were not significantly altered by ionophore being fed at slaughter in this trial. The percentage of the steers grading choice across all treatments was 77.5% and 5.6% of the steers produced USDA Yield Grade 4 carcasses. The incidence of liver abscesses was greater (P<.10) for steers fed lasalocid than those fed

Table 3. Effect of ionophore rotation on carcass characteristics.

Item	Monensin Tylosin	Lasalocid	7-d Rotation	14-d Rotation	Contrasts[e]
Carcass wt, lb	709	715	705	700	
Dressing %	65.4[ab]	65.8[a]	65.6[ab]	64.8[b]	WBW[+]
Rib eye area, sq in	12.6	12.8	12.6	12.7	
KHP, %	2.48	2.55	2.58	2.59	
Fat thickness, in	.57	.54	.53	.56	
Marbling score[c]	13.25	13.45	12.90	12.95	
Percent choice	72.5	85.0	80.0	72.5	
Percent YG 4	7.5	7.5	0.0	7.5	WBW[+]
USDA Yield Grade	3.08	2.97	3.00	3.00	
Cutability, %	49.6	49.9	49.8	49.8	
Liver abscesses:					
Incidence, %	7.5	22.5	12.5	12.5	MTL[+]
Severity[d]	1.70	2.44	2.10	2.10	

[a,b]Means in the same row with different superscripts differ (P<.05).
[c]12=slight plus, 13=small minus
[d]0=no abscesses; 1=one or two small, well organized inactive abscesses; 2=two to four well organized abscesses without inflammation; 3=one or more active abscesses with inflammation, only among cattle with abscesses.
[e]MTL=Monensin/Tylosin vs Lasalocid, WBW=Weekly vs Bi-Weekly; [+](P<.10).

monensin (22.5 vs 7.5%) with the rotational treatments being intermediate (12.5%).

In summary, the results of this trial showed no advantage for weekly or bi-weekly rotational feeding of monensin/tylosin and lasalocid. This contrasts with the results of Hubbert et al. (1987) in which weekly rotational feeding of monensin and lasalocid increased daily gains by 25.3% and improved feed efficiency by 12% compared to continuously fed monensin. However, in the New Mexico study, cattle were on feed only 56 days with only 12 head per treatment. Rotation at more frequent intervals might prove useful.

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