

A COMPARISON OF MONENSIN, NARASIN, SALINOMYCIN AND TYLOSIN ON FEEDLOT PERFORMANCE OF STEERS

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Story in Brief

One hundred sixty Hereford X Simmental yearling steers from a single ranch, weighing an average of 712 lb, were used to compare the effects of different ionophores. Steers were fed dry rolled corn diets (1) with monensin (28 g/ton dry matter), (2) with monensin plus tylosin (28 g/ton dry matter), (3) with narasin (11 g/ton dry matter), (4) with narasin plus tylosin or (5) with salinomycin (11 g/ton dry matter). Narasin plus tylosin improved average daily gain on a carcass basis by 7.4% and improved feed conversion by 5.3% over monensin alone. The incidence of liver abscesses was reduced substantially in the treatments containing tylosin (47.5 vs 3.1%).

(Key Words: Tylosin, Feedlot, Cattle, Monensin, Salinomycin, Narasin.)

Introduction

A class of feed additives called ionophores has proven to increase efficiency of feed use by feedlot cattle. Since monensin was the first ionophore introduced to the industry and is widely fed, it is the standard to which new compounds are compared. Narasin, which is being tested by Lilly Research Laboratories, appears to be a potent ionophore which may improve performance. It is not yet cleared by the FDA for commercial use in feedlot cattle. Previous research at OSU with salinomycin has shown it to be a promising ionophore. Antibiotics are commonly fed to feedlot cattle to reduce the incidence of liver abscesses. The combination feeding of an ionophore with an antibiotic requires extensive proof of effectiveness and safety to obtain FDA clearance. Monensin plus tylosin has received FDA clearance. The objectives of this research were to compare the response of three ionophores--monensin, narasin and salinomycin--and the combinations of monensin-tylosin and narasin-tylosin in feedlot steers fed a high concentrate ration.

Materials and Methods

One hundred sixty Hereford X Simmental crossbred yearling steers were purchased from a single herd in New Mexico and trucked to Goodwell, Oklahoma on November 6, 1985. On arrival at the trial site, all cattle were ear tagged, implanted with compudose, injected with ivermectin and received IBR, BVD, PI-3, Leptospira pomona and 4-way blackleg vaccines. Initial individual weights were recorded at arrival, and a second weight was taken on November 8 but was not used due to variation in fill re-

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lated to a pneumonia outbreak. The steers were divided into four weight groups of 40 head each (5 pens) and the five treatments were randomly assigned to each pen of eight steers in each block. The trial was initiated on November 8, 1985.

Seven ration formulations were used during the first 28 days to bring the cattle up to the final finishing ration (Tables 1 and 2). Three of these changes were due to alterations in the source of roughage due to a pneumonia problem that developed during the first 14 days. Corn silage was removed from the diet and replaced with cottonseed hulls to improve palatability. Drug assays agreed well with proposed drug concentrations (Table 3).

Steers were weighed full on days 28, 56, 84, 112 and 122. Implant retention was checked on days 84 and 112. Three animals were found to be missing implants. There was a seven day withdrawal period from medicated feed prior to slaughter. Steers were trucked 70 miles to Booker, Texas on day 129 of the trial for slaughter and carcass evaluation. Three steers were removed from the trial for causes not related to the experimental treatments. Weights are reported on a full basis while

Table 1. Diet composition, dry matter basis.^a

Ingredient	Ration Sequence						
	1	2	3	4	5	6	7 ^a
Corn, dry rolled	53.67	53.67	63.67	63.67	63.67	73.67	81.67
Corn silage	20.00	10.00	7.50	10.00	15.00	10.00	8.00
Alfalfa pellets	20.00	20.00	15.00	15.00	15.00	10.00	4.00
Cottonseed hulls	-----	10.00	7.50	5.00	-----	-----	-----
Pelleted supplement	6.33	6.33	6.33	6.33	6.33	6.33	6.33

^aTo provide 12.11% protein, .54% calcium, .75% potassium, .33% phosphorus, 94.89 mcal NEm/100 lb and 61.58 mcal NEg/100 lb.

Table 2. Pellet composition, dry matter basis.

Ingredient	Percent
Soybean meal	3.72
Calcium carbonate	1.00
Urea	.45
Cane molasses	.23
Dicalcium phosphate	.20
Potassium chloride	.40
Salt	.30
Drug premix ^a	.03
Total	6.33

^aPremix for specific treatments contained 60 g monensin/lb, 70 g monensin/lb plus 40 g tylosin/lb, 24 g narasin/lb, 24 g narasin/lb plus 40 g tylosin/lb, or 30 g salinomycin/lb.

Table 3. Drug assay results.^a

Diet	Theory Level, Grams/Ton	Assayed, Grams/Ton
Monensin	407.4	420.0
Monensin	407.4	401.5
Tylosin	161.6	157.5
Narasin	162.96	172.5
Narasin	162.96	162.0
Tylosin	161.6	140.0
Salinomycin	161.7	166.5

^aAssayed by Lilly Research Laboratories, Greenfield, Indiana.

Table 4. Performance of steers fed different ionophores.

Item	Monensin	Monensin Tylosin	Narasin	Narasin Tylosin	Salinomycin
No. of steers	30	32	32	32	31
Weight, lb, days:					
Starting	711	715	711	712	711
56	961	979	975	973	970
122	1168	1196	1192	1196	1183
Daily gains, lb, days:					
0-56	3.77	4.02	4.02	3.96	3.93
57-122	3.02	3.16	3.15	3.26	3.10
0-122	3.37	3.55	3.55	3.58	3.48
0-129 ^C	3.63	3.83	3.88	3.90	3.80
Daily feed, lb DM, days:					
0-56	20.86	21.45	21.04	21.22	21.71
57-112	21.49	22.17	22.10	21.85	21.86
0-122	21.20	21.84	21.61	21.56	21.79
0-129 ^C	21.18	21.80	21.53	21.48	21.72
Feed/gain, days:					
0-56	5.53	5.36	5.27	5.38	5.55
57-122	7.18	7.04	7.03	6.74	7.11
0-122	6.32	6.16	6.11	6.05	6.28
0-129 ^C	5.85 ^a	5.70 ^{ab}	5.56 ^{ab}	5.54 ^b	5.72 ^{ab}
Metabolizable energy, mcal/kg	3.24	3.30	3.36	3.38	3.29

^{ab}Means in the same row with different superscripts differ ($P < .05$).

^CBased on carcass weight divided by .62, an assumed dressing percent.

gains and efficiencies were calculated using a 4% pencil shrink. Gains and feed efficiencies for the total 129 day trial were calculated from hot carcass weights assuming a dressing percentage of 62. The trial was analyzed as a randomized complete block design with four replications per treatment.

Results and Discussion

There were no statistically significant differences in average daily gains among the different treatment groups (Table 4). Gains tended to be lowest with monensin alone (3.63 lb/day). Narasin plus tylosin tended to produce the fastest gains on a carcass adjusted basis, being 7.4% faster than monensin alone (3.90 vs 3.63 lb/day). Similar trends were observed with narasin alone (3.88 lb/day) as compared to narasin plus tylosin. Average daily gains for steers fed salinomycin (3.80 lb/day) or monensin plus tylosin (3.83 lb/day) were intermediate to the other treatments. Feed intake was similar for all treatment groups and was generally greater in the second half of the trial than the first half. The lowest DM conversions were obtained with narasin and narasin plus tylosin. Those steers fed narasin plus tylosin were significantly ($P<.05$) more efficient than steers fed monensin alone (5.54 vs 5.85 lb feed/lb gain).

No treatment effects on carcass traits were observed (Table 5). Over 90% of the carcasses graded choice. On the average, about 28.5% of the steers had liver abscesses. The addition of tylosin to both narasin and monensin dramatically reduced ($P<.05$) the incidence of abscessed livers from a mean of 47.3% to 3.1% of the total carcasses. Results show a slight but consistent benefit of tylosin on gain and feed efficiency and a trend for narasin to produce faster and more efficient gains than monensin.

Table 5. Carcass characteristics of steers fed different ionophores.

Item	Monensin	Monensin Tylosin	Narasin	Narasin Tylosin	Salinomycin
Carcass wt, lb	731	749	751	753	745
Dressing percent	62.58	62.70	63.05	62.96	63.00
Rib eye area, sq in	12.14	12.25	12.44	12.16	12.37
KHP, %	1.97	2.31	2.05	2.14	2.08
Fat thickness, in	.34	.34	.35	.35	.35
Marbling score	13.99	14.75	14.59	14.63	14.61
Percent choice	87.50	93.75	93.75	90.63	90.18
Yield	2.64	2.74	2.66	2.78	2.65
Liver abscesses:					
Incidence, %	41.5 ^{ab}	3.1 ^c	59.4 ^a	3.1 ^c	41.5 ^{ab}
Severity ^e	2.07	2.72	1.94	1.09	1.89

^{abc} Means in the same row with different superscripts differ ($P<.05$).

^d 13=small minus, 14=average small, 15=small plus.

^e 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.