NARASIN, ACTAPLANIN AND TYLOSIN FOR FEEDLOT STEERS

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Story in Brief

To test the effects of narasin, actaplanin and tylosin on performance of feedlot cattle, two hundred twenty steers (607 lb initial weight) were fed a high concentrate whole shelled corn grain based diet for 168 days. Tylosin supplementation had no effect on rate or efficiency of gain. Addition of narasin together with actaplanin increased rate of gain slightly (5 percent) and decreased the amount of feed needed per unit of gain by up to 9.2 percent and increased the apparent ME of the feed by up to 6 percent. The lowest levels of both narasin and actaplanin gave benefits equal to that of higher levels.

Introduction

Ionophores and agents which increase the proportion of propionic acid in ruminal fluid generally increase efficiency of growth of ruminant animals. Two ionophores, monensin and lasalocid, when fed at the recommended levels, in high concentrate diets, have increased efficiency of feed use by 5 to 8 percent in Oklahoma trials (Owens and Gill, 1982). Two newer ionophores not yet cleared for commercial feeding of cattle, salinomycin and its close cousin narasin, have received limited research attention to date. Lower levels, probably 10 to 20 g per ton, appear to be effective with these compounds.

The propionate-enhancing drug, Avoparcin, has improved efficiency of gain in feedlot cattle by 5 percent (Owens and Gill, 1981). Actaplanin, a compound similar to Avoparcin, is currently being tested as an additive to increase level and efficiency of milk production by dairy cows (McGuffey et. al., 1983a,b). Since both ionophores and propionate-enhancing drugs reduce methane loss and alter fermentation in the rumen, they may act antagonistically or synergistically. No propionate-enhancement drug is yet approved for use in the US although Avoparcin is widely fed in Europe.

A third additive often fed to feedlot cattle is one of the antibiotics which inhibit the ruminal bacteria Fusobacterium necrophorum, an organism responsible for most abscesses of the liver in cattle. Dietary Tylan (tylosin), Aureomycin (chlortetracycline) and Terramycin (oxytetracycline) usually reduce the incidence of liver abscesses in feedlot cattle. Only one antibiotic-ionophore combination (monensin plus tylosin) is currently approved by the FDA in the US for simultaneous feeding to cattle.

This trial was designed to determine the effects of narasin, actaplanin and tylosin on growth and efficiency of feedlot steers and provide information concerning the efficacy of these compounds for FDA clearance of these drugs for feeding to feedlot cattle.

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Materials and Methods

Two hundred twenty six-steers purchased in NM were trucked to Kiowa, KS and vaccinated for leptospira pomona, bovine rhinotracheitis, bovine virus diarrhea, parainfluenza 3, and blackleg. They were trucked from Kansas to Stillwater on November 29, 1982 and on arrival were weighed, ear tagged, and assigned to pens. Six steers were removed from the group due to health problems or light weights, leaving 220 steers. These were subdivided by weight into two groups (140 heavy steers and 80 lighter steers) and stratified by weight into pens within two feeding barns. The first barn held 20 pens with 7 steers per pen and had self-feeders. The other barn held 16 pens with 5 steers per pen and steers were hand-fed twice per day in bunk-line feeders. Shipping fever proved to be a problem especially with the lighter steers. Rectal temperatures were taken from all steers appearing sick and treated following the normal antibiotic procedures (OSU RP-9104).

The five different diets fed to bring cattle onto feed are described in Table 1. The first four were higher in roughage to adapt the steers to a high concentrate diet and were fed for 7 days each. All diets had the drugs (tylosin, actaplanin, narasin in various combinations) added at the specified levels. The final diet (diet 5) was fed for the remaining 140 days of the trial and diet 5 with drugs removed was fed for another 10 days at which time (May 26, 1983) cattle fed treatments AR and BR (control and tylosin) were trucked to Booker, TX. These cattle were slaughtered and slaughter and carcass data were obtained. Cattle receiving the other drugs (actaplanin and narasin) were trucked to a feedlot on the same day for a drug withdrawal period prior to slaughter.

Table 1. Diet compositions.[a]

	Diet				
	1	2	3	4	5
Ingredient	Percentage of Dry Matter				
Corn, whole shelled	52.5	62.5	72.5	82.5	87.5
Cottonseed hulls	15.0	10.0	7.5	5.0	5.0
Alfalfa, dehydrated	25.0	20.0	12.5	5.0	0.0
Pelleted supplement	7.5	7.5	7.5	7.5	7.5
	Pellet Composition				
Soybean meal	2.90				
Cottonseed meal	1.40				
Limestone	.95				
Urea	.40				
Dicalcium phosphate	.34				
Salt	.25				
Potassium chloride	.22				
Premix[b]	1.04				

[a] Calculated to contain 11.78% crude protein, .6% K, .41% Ca, .34% P and have an ME of 3.15 Mcal/kg of dry matter.
[b] Contained additives.

Five steers were removed from the experiment. Estimated feed intakes of the removed cattle were subtracted from their pens to compensate for intake of these cattle.

Treatment means were compared by Duncan's Multiple Range testing following analysis of variance by SAS. In addition, specific contrasts (actaplanin plus narasin level; actaplanin level; tylosin level) were statistically evaluated by means comparison or fitting to linear, quadratic and cubic treatment effects.

Results and Discussion

Weight gain, intake and efficiency responses to added drugs are presented in Table 2. Treatments were further subdivided to examine the effect of a combination of actaplanin and narasin at 4 different levels all with tylosin present (Table 3).

Table 2. Weight gains, feed intakes and feed efficiencies of steers.

	Diet Designation							
	AR	BR	CR	DR	ER	GR	HR	IR
Narasin, g/ton	0	0	5	7.5	10	10	10	10
Actaplanin, g/ton	0	0	8	12	16	16	8	12
Tylosin, g/ton	0	10	10	10	10	0	10	10
Pens	4	4	5	5	4	5	5	4
Cattle	23[a]	24	29[a]	31	24	29[a]	31	24
Weights, lb								
Initial[b]	597	603	613	612	603	607	614	601
168 days[b]	997	986	1018	1031	995	994	1034	1014
Daily gains, lb:								
0-56 dys[c]	2.09[de]	2.08[e]	1.99[de]	2.10[d]	2.03[de]	1.91[de]	2.15[d]	2.17[de]
57-168 dys[c]	2.53[de]	2.39[e]	2.62[de]	2.70[d]	2.49[de]	2.50[de]	2.68[d]	2.61[de]
0-168 day	2.38	2.28	2.41	2.50	2.34	2.30	2.50	2.46
Daily feed, lb								
0-56 days	14.1	13.8	13.9	13.6	12.7	13.0	13.7	13.5
57-168 days	15.3	15.1	15.1	15.6	14.8	14.1	15.5	14.7
0-168 days	14.9	14.6	14.7	15.0	14.1	13.8	14.9	14.3
Feed/gain								
0-56 days[c]	6.77[de]	6.70[d]	8.20[de]	6.50[de]	6.27[de]	7.16[e]	6.40[de]	6.33[e]
57-168 days	6.06[de]	6.33[d]	5.75[de]	5.79[de]	5.90[de]	5.64[e]	5.77[e]	5.66[e]
0-168 days	6.26[de]	6.42[d]	6.08[de]	5.98[e]	6.00[e]	5.96[e]	5.96[e]	5.83[e]
Calculated ME								
0-168 days	3.19[ef]	3.16[f]	3.28[def]	3.30[def]	3.31[de]	3.34[d]	3.32[de]	3.35[d]

[a] Animals removed due to death (respiratory disease, acidosis) and chronic respiratory disease. Intended numbers were 2 pens of 7 head each plus 2 or 3 pens of 5 head each.

[b] Shrunk weight.

[c] Based on full weight.

[d,e,f] Means in a row with different superscripts differ ($P<.05$).

Table 3. Weight gains, feed intakes and feed efficiencies of steers fed various levels of narasin and actaplanin.

	Diet Designation			
	BR	CR	DR	ER
Narasin, g/ton	0	5	7.5	10
Actaplanin, g/ton	0	8	12	16
Tylosin, g/ton	10	10	10	10
Pens	4	5	5	4
Cattle	24	22[a]	31	24
Weights, lb[b]				
Initial[b]	603	613	612	603
168 days[b]	986[b]	1018[de]	1031[d]	995[e]
Daily gains, lb				
0-56 days	2.08	1.99	2.10	2.03
57-168 days	2.39[e]	2.62[de]	2.70[d]	2.49[de]
0-168 days	2.28[e]	2.41[de]	2.50[d]	2.34[de]
Daily feed, lb[h]				
0-56 days	13.8[d]	13.8[d]	13.6[de]	12.7[e]
57-168 days	15.1	15.1	15.6	14.8
0-168 days	14.6	14.7	15.0	14.1
Feed/gain				
0-56 days[hi]	6.70	8.20	6.50	6.27
57-168 days	6.33	5.75	5.79	5.90
0-168 days	6.42[d]	6.08[de]	5.98[e]	6.01[e]
Calculated ME				
0-168 days[j]	3.16	3.28	3.30	3.31

[a] Animals removed due to death respiratory disease, acidosis) and chronic respiratory disease.
[b] Shrunk weight.
[c] Full weight.
[d,e,f] Means in a row with different superscripts differ (P<.05).
[g] Quadratic effect (P<.05)
[h] Linear effect (P<.05)
[i] Quadratic effect (P<.10).
[j] Linear effect (P<.10)

Addition of the combination of narasin and actaplanin at the intermediate levels tended to increase rate of gain with rate of gain being greatest with 7.5 g narasin and 12 g actaplanin per ton of feed (Table 3). Feed intake also was greater with this treatment. Feed efficiency was increased (P<.05) by addition of drugs at the two higher levels by about 7 percent. Calculated ME value of the diet was increased by addition of drugs by about 5 percent.

Tylosin supplementation with or without added drugs tended to decrease rate and efficiency of gain (Table 4). Carcass data were not changed with tylosin addition to the diet of cattle receiving no other drugs (Table 5). The incidence of liver abscesses was low for cattle slaughtered from this experiment.

Slaughter data were not obtained except for the AR and BR treatments because of a greatly extended withdrawal time required where actaplanin was present.

Table 4. Weight gains, feed intakes and feed efficiencies of steers fed diets with or without added tylan.

	Diet Designation	
	AR+GR	BR+HR
Tylosin, g/ton	0	10
Pens	9	9
Cattle	52[a]	55
Weights, lb		
Initial[a]	613	603
168 days[a]	1034	995
Daily gains, lb		
0-56 days	2.15	2.03
57-168 days[b]	2.68	2.49
0-168 days	2.50	2.34
Daily feed, lb		
0-56 days	13.7[c]	12.7[d]
57-168 days	15.4	14.8
0-168 days	14.9	14.1
Feed/gain		
0-56 days	6.41	6.27
57-168 days[b]	5.77	5.90
0-168 days	5.96	6.01
Calculated ME		
0-168 days	3.32	3.31

[a] Shrunk weight.
[b] Based on Full weight.
[c,d] Means in a row with different superscripts differ ($P<.05$).

Table 5. Slaughter and carcass information for steers fed diets with or without added tylan.

	Diet Designation	
	AR+GR	BR+HR
Tylosin, g/ton	0	10
Pens	9	9
Cattle	52[a]	55
Carcass weight	640	636
Daily gain, based on carcass weight[a]	2.44	2.38
Dressing percent	62.7	63.0
Liver abscesses		
Incidence, percent	5	3.6
Severity	1	1
Rib eye area		
Square inches	11.78	11.76
Sq in per cwt	1.85	1.86
Fat thickness, in.	.39	.42
KHP, percent	2.63	2.60
Marbling score[b]	12.3	12.5
Federal grade[c]	12.1	12.0
Yield grade	2.35	2.43

[a] Assuming a dressing percent of 62.
[b] Slight plus equals 12; Small minus equals 13.
[c] Good plus equals 12; Choice minus equals 13.

Literature Cited

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