VIRGINIAMYCIN AND MONENSIN EFFECTS ON PERFORMANCE AND CARCASS CHARACTERISTICS OF FEEDLOT STEERS: A THREE TRIAL SUMMARY

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Story in Brief

Effects of three levels of virginiamycin (10, 17.5 and 25 g/ton) on cattle performance and carcass characteristics were tested by comparison of diets with either no ionophore (control) or those containing monensin. Seven hundred and forty four steers, initially weighing 735 pound were fed approximately 123 days. Virginiamycin at the highest level slightly increased daily gains (2.4%) and feed conversion (3.2%). Feed intake was not different from controls, but it was higher with added virginiamycin than with added monensin. During the second period and over the entire trial, feed conversion increased linearly as virginiamycin was added. Increasing levels of virginiamycin also increased linearly the calculated energy content of the diet (2.9% at 25 g/ton). The percentage of cattle obtaining a yield grade of 4 or greater also increased linearly with virginiamycin supplementation. Virginiamycin appears to ease adaptation to feed, reduce liver abscess incidence, and improve feed efficiency of feedlot steers.

(Key Words: Virginiamycin, Monensin, Antibiotic, Steers.)

Introduction

The addition of certain feed additives, including antimicrobial agents like virginiamycin, to domestic livestock diets may enhance rate and efficiency of gain. Virginiamycin was tested recently by SmithKline Beecham Animal Health (SBAH) to obtain an FDA clearance for use in feedlot cattle. As part of this protocol, three feedlot trials were conducted with virginiamycin to determine the proper feeding level, its effect on gain, feed efficiency, and the incidence of liver abscesses, and to compare it to the established feed additive, monensin.

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Materials and Methods

Three previous trials involving a total of 744 yearling feedlot steers initially weighing 735 lb have been summarized (Gill et al., 1990; Gill et al., 1989; Smith et al., 1989). Steers were selected from larger groups of cattle for uniformity in type, size, and weight. All cattle were blocked by weight and randomly allotted to pens following routine feedlot processing with vaccinations of IBR-PI_3-Lepto and 4-way clostridial and dewormed with Ivermectin. In two of the studies, steers received anabolic implants; in the third, anabolic implants were not used.

Steers had ad libitum access to a high concentrate diet (Table 1) for the entire feeding period. Additional alfalfa hay and cottonseed hulls were

Table 1. Composition of diets on a dry matter basis.

Ingredient	Ration sequence 1	2	3	4	Final
	(%)				
Corn, steam flaked	39.52	49.52	59.52	69.52	81.52
Alfalfa hay	25.00	20.00	15.00	10.00	5.00
Cottonseed hulls	25.00	20.00	15.00	10.00	3.00
Cane molasses	3.75	3.75	3.75	3.75	3.75
Supplement[a]	6.73	6.73	6.73	6.73	6.73

Calculated composition of the final ration:

Nutrients	Ration composition DM %	Ration composition As Fed %	Supplement composition DM %	Supplement composition As Fed %
NEm, Mcal/cwt	95.04	80.39	67.55	62.39
NEg, Mcal/cwt	61.56	52.07	44.85	41.42
Crude protein, %	12.25	10.36	51.33	47.41
Crude fiber, %	5.46	4.62	9.55	8.82
K, %	.69	.58	1.03	.95
Ca, %	.45	.38	4.73	4.37
P, %	.33	.28	1.11	1.02
Dry matter, %	100.00	85.00	100.00	92.26

[a] Supplement composition: Cottonseed meal 77.04%, calcium carbonate 11.03%, urea 5.60%, salt 4.24%, dicalcium phosphate .92%, trace mineral .18%, vitamin E .14%, vitamin A 30,000 IU .17% and virginiamycin premix (Stafac-10) or monensin (Rumensin 60) as required.

added to the initial rations to facilitate diet adaptation (Rations 1-4, Table 1). In all trials, virginiamycin was compared to diets containing no ionophore (control) and, in two studies, to diets containing monensin. Virginiamycin was fed at concentrations of 10, 17.5 and 25 g/ton whereas monensin was fed at 25 g/ton of feed.

Initial weights were obtained off the truck; other weights were taken without feed or water withdrawal. Gains and feed efficiency (Table 2) were calculated based on shrunk weights (96% of full weight). Cattle were fed for an average of 123 days (Period 1), after which all cattle were fed the control nonmedicated ration for six days prior to slaughter (Period 2). All cattle were trucked 60 miles to Booker, Texas for slaughter. Livers were examined for the presence of liver abscesses and flukes. Carcass data were collected (Table 3) 24 hours postmortem and yield and quality grades were determined (USDA, 1987).

The trials were combined and analyzed with the main effect of treatment, divided into four orthoginal contrasts consisting of monensin vs the average of the 3 virginiamycin levels, and linear, quadratic and cubic effects of virginiamycin.

Results and Discussion

Virginiamycin at the highest level (25 g/ton) slightly increased ADG (2.4%) and feed efficiency (3.2%). Feed intake with virginiamycin did not differ from the control diet but remained higher ($P<.01$) than with the monensin diet during all periods of the trial. Feed efficiency increased linearly during the second period ($P<.08$) and over the entire trial ($P<.07$) with added virginiamycin. Increasing levels of virginiamycin also linearly increased ($P<.05$) the calculated NEg of the diet (by 2.9% at 25 g/ton) demonstrating that the cattle utilized the dietary nutrients more efficiently. The percentage of yield grade 4 (YG4) cattle increased linearly ($P<.05$) with supplementation of virginiamycin suggesting that improvements in efficiency may have been greater had the cattle been killed at an equal body composition. Virginiamycin supplemented at the highest concentrations (17.5 g and 25 g/ton) tended to reduce the incidence of liver abscesses. No other carcass characteristics were changed by treatment.

Table 2. Effect of virginiamycin on steer performance.

		Virginiamycin			Monensin	Sig.[a]
	Control	10 g/ton	17.5 g/ton	25 g/ton	25 g/ton	Prob.
No. of head	174	216	134	80	135	
Pens	21	25	17	8	17	
Weight, lb						
Initial	736	735	735	735	736	
Final	1187	1189	1176	1203	1187	
Daily gains, lb						
Carcass basis[b]	3.63	3.66	3.67	3.73	3.62	
Daily feed, lb DM						
First period	21.83	21.78	21.64	22.01	21.24	M vs V (.05)
Second period	22.07	21.78	21.94	21.86	21.00	M vs V (.01)
0-Slaughter	21.83	21.69	21.73	21.79	21.03	M vs V (.01)
Feed/gain						
First period	5.72	5.65	5.67	5.61	5.62	
Second period	7.13	6.95	6.98	6.75	6.91	VL (.08)
0-Slaughter	6.01	5.92	5.91	5.82	5.80	VL (.07)

Table 2. (Continued)

	Control	Virginiamycin 10 g/ton	Virginiamycin 17.5 g/ton	Virginiamycin 25 g/ton	Monensin 25 g/ton	Sig.[a] Prob.
Metabolizable energy, Mcal/kg	3.16	3.19	3.19	3.23	3.24	VL (.06)
Net energy, Mcal/lb						
Maintenance	96.6	98.2	98.5	100.4	100.6	VL (.05)
Gain	63.5	64.3	64.5	65.4	65.6	VL (.06)

[a]M vs V: Monensin compared to the average of the three virginiamycin treatments. VL: virginiamycin linear effect.
[b]Final weight calculated as carcass weight/.64.

Table 3. Effect of virginiamycin on carcass characteristics

	Control	Virginiamycin 10 g/ton	Virginiamycin 17.5 g/ton	Virginiamycin 25 g/ton	Monensin 25 g/ton
Carcass wt, lb	749	751	753	758	749
Dressing %[a]	62.73	62.64	62.73	62.72	62.92
Rib eye area, sq in	12.84	12.68	12.87	12.91	12.69
KPH, %	1.99	2.04	2.05	2.04	2.04
Fat thickness, in	.49	.49	.49	.49	.53
Marbling score[b]	429	424	426	424	414
Percent choice	67.47	66.58	64.70	62.20	63.55
Percent YG 4[c]	1.62	9.83	10.10	10.10	8.57
Liver abscess:					
Incidence, %	18.89	19.56	14.76	14.76	20.99

[a] Calculated by dividing hot carcass weight by the gross final weight.
[b] 300-399 = slight; 400-499 = small (USDA, 1987).
[c] Linear effect of virginiamycin ($P < .05$).

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