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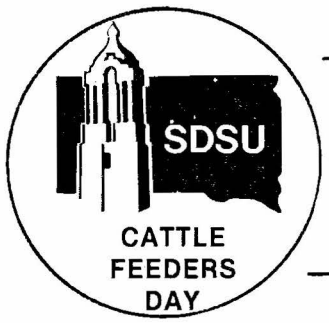

EFFECTS OF AVOPARCIN ON PERFORMANCE OF FEEDLOT HEIFERS

L.B. Embry, L.F. Bush and M.J. Goetz
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Summary

This study was conducted to evaluate the effects of avoparcin at 30, 45 and 60 grams per ton of feed and compared to a control and to monensin at 30 grams per ton of feed. One hundred sixty yearling, nonpregnant heifers (572 lb.) were used in the 140-day experiment. The dry rations were 78.6% rolled corn grain, 18.9% alfalfa-bromegrass haylage (60.22% DM) and 2.5% supplement which carried the appropriate levels of avoparcin and monensin.

Daily gains were higher ($P>.05$) than for controls with each level of avoparcin and monensin. Feed consumption was reduced ($P<.05$) with avoparcin and monensin and feed efficiency was improved ($P<.01$). Avoparcin and monensin at equal levels (30 g/ton feed) gave similar performance with 5 and 6% reductions in feed intake and 9% less feed/gain for each than for controls. Higher levels of avoparcin resulted in greater reductions in feed consumption (11 and 10%) and feed/gain (14 and 17%) in comparison to controls.

Avoparcin and monensin treatments did not appear to affect dressing percent, degree of marbling, quality grade, yield grade, kidney-heart-pelvic (KHP) fat, rib eye area or fat thickness. Treatments had no effect on incidence or severity of abscessed livers, with 3 to 5 affected livers within each treatment group.

Introduction

Avoparcin is a glycopeptide antibiotic produced by a strain of streptomyces candidus with activity against certain gram positive organisms. It has been reported to reduce the ratio of acetate to propionate produced during rumen fermentation and to improve weight gain and feed efficiency of feedlot cattle. This study was conducted to evaluate the effects of 30, 45 and 60 grams per ton of avoparcin and 30 grams per ton of monensin in the feed on weight gain, feed utilization and carcass quality of finishing heifers over a 140-day feeding period.

Procedures

Yearling heifers for the experiment were trucked to Brookings on June 2 (127 head) and June 6, 1978 (67 head). They were sorted into pens of 10 to 14 head each. From arrival until the beginning of the experiment on June 22, the heifers were offered baled alfalfa-bromegrass hay in feed bunks at about 16 lb. per head daily. During this preliminary period, the cattle were eartagged, individually weighed and pregnancy tested. No heifers were diagnosed as pregnant.

The following treatments were administered to each animal during the preliminary period:

1. Warbex (13.2% solution) at 3 ounces per head as a pour-on.
2. Intramuscular injection of 2 cc vitamin product with 500,000 IU vitamin A, 75,000 IU vitamin D and 5 IU of vitamin E per cubic centimeter.
3. Intramuscular injection of clostridium bacterin (clostridium chauvoei-septicum-novyi-sordellii).
4. Injectable Tramisol (18.2%) at 10 cc per head.
5. Intramuscular injection of bovine rhinotracheitis (IBR) vaccine at 2 cc per head.

For the initial weight on experiment, feed and water were removed for a period of approximately 17 hours prior to the morning weighing. One hundred sixty of the heifers were selected for the experiment with 20 pens of eight each with five ration treatments replicated four times. They were blocked into four weight groups with each replication representing one of the weight groups. Each weight group was allotted into five pens of eight each and treatments within replications assigned at random.

The ration for all treatment groups, on a 90% dry matter basis, was calculated for 20% alfalfa-bromegrass haylage, 77.5% rolled corn grain and 2.5% supplement. Rations are described in tables 1 and 2.

Table 1. Ration Ingredients

Ingredients	Dry matter as fed, %	Percent of ration	
		Dry	As fed
Alfalfa-bromegrass haylage	60.22	18.9	25.5
Corn grain	88.35	78.6	72.2
Supplement	89.79	2.5	2.3

Table 2. Chemical Composition of Ingredients (Dry Basis)

Ingredient	Protein	Crude fiber	NFE	Ether extract	Ash	Ca	P
	%	%	%	%	%	%	%
Alfalfa-bromegrass haylage	14.38	32.25	41.47	2.54	9.36	1.30	.17
Corn grain	10.48	2.33	81.86	3.57	1.76	.05	.31
Supplement	Essentially same as corn grain						
Ration	11.22	7.99	74.21	3.38	3.20	.29	.28

Percentage of ingredients on a dry basis determined from dry matter analyses during the experiment varied slightly from the planned ratios. Rations were adequate in protein, calcium and phosphorus to meet NRC requirements without supplemental sources of these nutrients. However, trace mineral salt and dicalcium phosphate were offered free access. Other mineral elements were considered adequate during the time that would be involved and also vitamin A in view of the amount and quality of forage and the initial 1,000,000 IU injected. The supplement (ground corn) was used as a carrier for the appropriate levels of avoparcin and monensin.

The cattle were fed the rations in ratios shown (table 1) from the beginning of the experiment. The initial level of total feed was 8 lb. per head with an increase of 1.5 lb. per head daily to a full feed. Ingredients were weighed on a pen basis into a scale-mounted mixer. Ingredients were then mixed and delivered to each pen. Feeding was once daily in amounts to be nearly consumed by the next feeding once the cattle were on full feed.

The cattle were weighed for intermediate weights at 56 days and at 28-day intervals thereafter. All weights were taken following an overnight stand without feed and water. On weigh days, the amount of feed offered was reduced to 80% normal consumption for the past few days. One-third of this was provided immediately after weighing and the remainder in late afternoon. Thereafter, feeding was according to appetite for each pen.

The feedlot performance phase of the experiment was terminated after 140 days. Slaughter of the cattle was scheduled 9 days later and carcass data were obtained.

Results and Discussion

Feedlot performance data are shown in table 3. It will be noted from the table that four losses occurred during the experiment. One heifer died in the control group after 8 days. Cause of death was diagnosed as acidosis. Near the end of the first week of the experiment, it appeared that the increase in feed intake may have been at a level to cause some stress on the cattle. There was some scouring and refusal of feed at the rate of increase. Cattle receiving avoparcin at 60 grams per ton and monensin refused feed at lower levels than the other treatment groups. The condition was only a temporary one and the cattle were consuming feed at levels considered typical for their weight by the end of the second week.

One heifer was removed from the 45 grams per ton avoparcin treatment after 94 days because of severe breathing difficulty. Another loss diagnosed as bovine polio occurred in this treatment after 101 days.

One loss occurred in the 30 grams per ton avoparcin treatment group after 120 days. The cause of death was diagnosed as feedlot bloat.

Feedlot performance data shown are for the cattle finishing the experiment. In pens where losses occurred, feed data were adjusted by subtracting feed for time on experiment in proportion to weight of the animal in relation to the total pen weight.

Table 3. Feedlot Performance for Feedlot Heifers Fed Avoparcin and Monensin (June 22 to November 9, 1978--140 days)

	Control	Avoparcin (g/ton) 30	45	60	Monensin
Number of animals[a]	31	31	30	32	32
Init. shrunk wt., lb.	584	581	584	582	583
Final shrunk wt., lb.	958	976	974	989	974
Avg. daily gain, lb.	2.68	2.81	2.79	2.91	2.79
Percent of control		105	104	109	104
Avg. daily ration, lb.					
As fed					
Alfalfa-brome haylage	5.95	5.69	5.31	5.39	5.62
Rolled corn grain	16.86	16.07	15.03	15.23	15.92
Supplement	0.54	0.52	0.48	0.49	0.51
Total	23.35	22.28	20.82	21.11	22.05
Dry[b]					
Alfalfa-brome haylage	3.58	3.43	3.20	3.25	3.38
Rolled corn grain	14.90	14.20	13.28	13.46	14.07
Supplement	0.48	0.47	0.43	0.44	0.46
Total	18.96	18.10	16.91	17.15	17.91
Percent of control		95	89	90	94
Feed/100 lb. gain, lb.					
As fed					
Alfalfa-brome haylage	222	203	191	185	201
Rolled corn grain	631	573	541	524	571
Supplement	20	18	17	17	18
Total	873	794	749	726	790
Dry					
Alfalfa-brome haylage	134	122	115	112	121
Rolled corn grain	556	505	476	463	504
Supplement	18	17	15	15	16
Total	708	644	606	590	641
Percent of control		91	86	83	91

[a] Initially 32 head per treatment group. See text regarding losses and data calculations.

[b] Dry matter values given in table 1.

The control group gained 2.68 lb. per head daily. Those fed each level of avoparcin and the one level of monensin gained at faster but nonsignificant rates ($P>.05$) in comparison to controls.

There were differences ($P<.05$) in feed intake. Reductions for 30, 45 and 60 grams per ton of avoparcin and 30 grams per ton of monensin amounted to 5, 11, 10 and 6%, respectively, less than for the control group.

There were also significant ($P<.01$) differences in feed efficiency. Improvements in comparison to controls amounted to 9, 14, 17 and 9%, respectively, for avoparcin at 30, 45 and 60 grams per ton of feed and monensin at 30 grams per ton of feed.

The feedlot performance indicates similar results from avoparcin and monensin when fed at equal levels (30 grams per ton of feed). Higher levels of avoparcin resulted in further reductions in feed consumption with greater improvements in feed efficiency.

Avoparcin or monensin had no effect on the carcass characteristics measured in the experiment (table 4).

Table 4. Carcass Data for Feedlot Heifers Fed Avoparcin and Monensin (June 22 to November 9, 1978--140 days)

		Avoparcin (g/ton)			
	Control	30	45	60	Monensin
Number of animals[a]	31	31	30	32	32
Carcass wt., lb.	605	610	599	608	597
Dressing percent	63.2	62.6	63.0	61.5	61.3
Marbling score[b]	5.54	5.55	5.42	5.40	5.68
Maturity score[c]	22.9	23.0	23.0	23.0	23.0
Quality grade[d]	19.4	19.5	19.3	19.3	19.5
Calculated yield grade	3.22	3.56	3.04	3.27	3.31
Percent KHP fat	3.26	3.40	3.39	3.23	3.40
Rib eye area, sq. in.	11.14	10.88	11.18	11.26	11.08
Fat thickness, in.	0.54	0.62	0.52	0.56	0.57
No. abscessed livers	4	3	5	3	3

[a] Initially 32 head per treatment.
[b] Small amount = 5, modest amount = 6.
[c] A+ maturity = 22, A maturity = 23.
[d] Low choice = 19, average choice = 20.