

55 REPLACEMENT
0.347

op. 2



Two Methods of Antibiotic Supplementation During the Growing Period and Their Subsequent Effect Upon Steer Performance

(Special Report) 347

Agricultural Experiment Station
Oregon State University, Corvallis

Two Methods of Antibiotic Supplementation
During the Growing Period and Their Subsequent
Effect Upon Steer Performance

A. T. Ralston and T. P. Davidson

Summary

One hundred steer calves averaging 470 pounds were used to evaluate two methods of antibiotic supplementation for post-weaning growth. The use of 350 mg. of chlortetracycline + 350 mg. of sulfamethazine per head daily for 28 days, followed by 70 mg. of chlortetracycline per head daily, resulted in significantly greater gains than 250 mg. of zinc bacitracin per head daily for alternate two-week intervals ($P < .10$). There were fewer health problems requiring treatment in the chlortetracycline-supplemented calves. However, the finishing gains were greater for calves started on zinc bacitracin, with the overall feeding period results being quite comparable for the two systems. There were only slight differences in marbling scores and back fat thickness and no difference in carcass grade.

Introduction

The use of low-level (ca 70 mg. per head daily) antibiotic supplementation for young calves during the post weaning conditioning period prior to finishing has proven beneficial from a health and performance standpoint. Burroughs et al (1959) reported in 31 comparisons that chlortetracycline improved average daily gains on low-gaining diets by 7%. When diets of greater energy concentrations were used the improvement due to antibiotic supplementation was about 4%. Similar results with zinc bacitracin have been reported by Ralston and Taylor (1963). The use of higher levels of antibiotics during

at least a portion of the conditioning period was shown to be beneficial by Beeson et al (1966). Furthermore they found the benefit of higher levels of antibiotics could be further enhanced by the initial addition of sulfamethazine. Ralston and Davidson (1970) reported greater gains from this combination occurred when calves were conditioned for 150 days and then finished, than when used on yearling steers going directly to a finish ration. Gill (1970) reported that Oklahoma has shown undulating levels of antibiotics tended to stimulate greater appetite late in the finishing period. Since several approaches to the successful use of antibiotics have been reported, the following trials were conducted to compare two methods of antibiotic supplementation as recommended by the respective producers of the antibiotics used.

Materials and Methods

One hundred steer calves weighing approximately 470 pounds were stratified as to weight and randomly allotted to ten pens of ten head each. All pens received the same ration consisting of corn silage fed ad libitum and a concentrate mixture consisting of 85% steam rolled barley, 5% molasses, and 10% of a standard 40% OSU protein supplement (Ralston and Taylor, 1965) fed at 1% of their body weight. Five pens received 250 mg. of zinc bacitracin per head daily during alternate two-week intervals throughout the growing period. The remaining five pens received 350 mg. of chlortetracycline and 350 mg. of sulfamethazine per head daily for the first 28 days, and 70 mg. of the chlortetracycline per head daily for the remainder of the conditioning period. The calves

were on their treatments for 84 days, after which a pen from each antibiotic treatment was changed to one of five finishing rations.

The calves weighed approximately 650 pounds when they were changed to the finishing rations. The finishing rations were as follows:

1. 72% steam rolled barley, 25% beet pulp, 3% molasses
2. 82% steam rolled barley, 15% corn silage (wet basis), 3% molasses
3. 80% potatoes (wet basis), 20% grain as in treatment 5
4. 82% steam rolled barley, 15% screenings, 3% molasses
5. 97% steam rolled barley, 3% molasses

All pens received one pound per head daily of OSU supplement containing 20,000 IU of vitamin A per pound. During the first 28 days on the finishing ration the antibiotic treatment was continued.

Periodic weights were taken and all deviations from normal health were noted. Health problems are reported herein by the number of treatments necessary rather than the number of animals treated. Gains, feed efficiency, and feed cost of gain were calculated from 4% shrunk weights.

Results

The calves on the chlortetracycline-sulfamethazine treatment gained more rapidly during the conditioning period than those on alternating zinc bacitracin ($P < .10$). The extra growth was not due to additional intake but might be accounted for by a reduction in health problems (Table 1).

Table 1. Summary of the Number of Treatments for Health Problems

Problem treated	Zinc Bacitracin	Chlortetracycline + Sulfamethazine
Footrot	11	4
Runny nose	20	18
Fever	4	--
Diarrhea	2	--
Off Feed	<u>5</u>	<u>2</u>
Total	42	24

The extra gain was reflected in greater feed efficiency and lower cost of feed per unit of gain. The antibiotics were not figured in the cost of gain.

During the finishing phase the cattle started on zinc bacitracin out-gained those started on chlortetracycline-sulfamethazine even though their average daily feed consumption was slightly less. This resulted in more efficient use of feed and lower feed costs per unit of gain. Whether this was due to compensatory gain or an antibiotic carry-over effect was not determined.

Because of the differences in gains from one phase to another, the overall performance was quite similar, as shown in Table 2.

Table 2. Conditioning, Finishing and Overall Gains, Feed Intake, Feed Efficiencies, and Cost of Gains

Treatment	Conditioning				Finishing				Overall			
	ADG	Av. daily intake	Feed lb. gain	Cost/cwt. gain	ADG	Av. daily intake	Feed lb. gain	Cost/cwt. gain	ADG	Av. daily intake	Feed lb. gain	Cost/cwt. gain
lb.	lb.	lb.	\$	lb.	lb.	lb.	\$	lb.	lb.	lb.	\$	lb.
1	1.92	13.5	7.04	15.39	3.30	22.6	6.83	19.10	2.73	18.8	6.89	18.02
2	1.90	13.0	6.84	15.05	3.42	22.6	6.48	17.94	2.55	18.8	6.70	17.31
3	2.02	13.5	6.71	14.68	3.19	20.0	6.24	14.58	2.72	17.3	6.38	14.61
4	2.00	14.0	7.00	15.20	3.07	22.3	7.27	19.40	2.55	18.9	7.27	17.83
5	1.85	13.3	7.17	15.72	3.48	21.9	6.37	17.86	2.77	18.3	6.61	17.26
Average	1.94	13.5	6.95	15.21	3.29	21.9	6.63	17.78	2.66	18.4	6.77	17.01
ZINC BACITRACIN												
CHLORTETRACYCLINE												
1	2.18	13.4	6.15	13.47	3.27	22.4	6.86	19.01	2.82	18.7	6.64	17.34
2	2.23	14.3	6.42	13.89	3.21	22.6	7.02	19.42	2.82	19.2	6.82	17.64
3	2.09	13.5	6.43	14.06	3.32	20.2	6.11	14.32	2.82	17.5	6.21	14.24
4	2.05	13.4	6.49	14.23	3.10	22.5	7.28	19.45	2.66	18.7	7.02	17.76
5	2.04	13.4	6.55	14.35	3.25	22.6	7.04	19.73	2.73	18.8	6.89	18.11
Average	2.12 ^a	13.6	6.41	14.00	3.23	22.1	6.86	18.39	2.77	18.6	6.72	17.02

^aCalves on the chlortetracycline treatment gained significantly faster (P<.10) during the conditioning period only.

Although carcass traits varied somewhat from one finishing ration to another, there was apparently no antibiotic effect upon carcass traits (Table 3).

Table 3. Average Carcass Characteristics

Treatment	Warm Carcass wt., lb.	Marbling score ¹	USDA grade ²	Back-fat, in.
ZINC BACITRACIN				
1	616	12.4	16.7	.49
2	645	13.8	16.3	.50
3	624	13.0	16.8	.46
4	605	12.4	16.9	.48
5	613	12.3	16.0	.45
Average	621	12.8	16.5	.48
CHLORTETRACYCLINE				
1	630	12.1	16.3	.47
2	640	12.6	16.5	.49
3	630	13.0	16.6	.49
4	609	13.0	16.6	.49
5	621	12.1	16.5	.48
Average	626	12.6	16.5	.48

¹12 = small, 15 = modest.

²14 - good, 17 = choice.

Literature Cited

- Beeson, W. M., T. W. Perry, and M. T. Mohler. 1966. Purdue University Ag. Exp. Sta. Research Progress Report 250.
- Burroughs, W., C. E. Summers, W. Woods, and W. Zmolek. 1959. Feed additives in beef rations. Animal Science Leaflet 805. Iowa State University, Ames.
- Gill, D. R. 1970. The use of antibiotics in finishing rations for feedlot cattle. Okla. Feeders Day.
- Ralston, A. T. and T. P. Davidson. 1970. The response of feeder cattle to chlortetracycline and sulfamethazine during conditioning and finishing. Ore. State Ag. Exp. Sta. Spec. Rpt. 317.
- Ralston, A. T. and N. O. Taylor. 1963. A study of methods for the production of acceptable heifer beef. Ore. State Exp. Sta. Spec. Rpt. 142.
- Ralston, A. T. and N. O. Taylor. 1965. The effect of a wheat gluten supplement in a steer fattening ration comprised of varying levels of wheat. Ore. State Ag. Exp. Sta. Spec. Rpt. 201.