

1986

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Richard M. Luther  
*South Dakota State University*

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## Recommended Citation

Luther, Richard M., "Effect of Antibiotics in Adaptation of Growing Beef Calves to the Feedlot" (1986). *South Dakota Beef Report, 1986*. Paper 11.  
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## EFFECT OF ANTIBIOTICS IN ADAPTATION OF GROWING BEEF CALVES TO THE FEEDLOT

Richard M. Luther  
Department of Animal and Range Sciences

CATTLE 86-10

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### Summary

Four medication schemes for adapting stressed feeder calves to the feedlot were evaluated in a 110-day trial. A total of 160 Hereford, Angus and Hereford x Angus steers (544 lb) were fed a high-corn silage diet supplemented with the following medications: (1) nonmedicated control, (2) chlortetracycline-sulfamethazine (350 mg/steer of each compound for 28 days, (3) oxytetracycline (2 g/steer) for 10 days, then 1 g/steer for 4 days) and (4) oxytetracycline (2 g/steer for 14 days). Average daily gain, dry matter consumption and feed conversion were similar ( $P > .05$ ) for calves in all treatments. None of the steers required additional medication during the trial.

(Key Words: Antibiotics, Adaptation, Beef Calves.)

### Introduction

Stress of weaning and shipping calves is frequently followed by sickness and disease requiring extensive treatment and causing slow gains and/or death losses during adaptation to the feedlot. Such problems in adapting calves to the feedlot are costly to the feeder.

Experiments conducted at the South Dakota Experiment Station demonstrated the value of antibiotics and combinations of antibiotics and sulfa drugs in reducing incidence of disease and improving early feedlot performance of calves following weaning and shipping. Because this work was conducted several years ago and because of renewed interest or concern about the current effectiveness of antibiotics, a trial was conducted with stressed feeder calves. The experiment compared the performance of feedlot cattle fed a nonmedicated diet or diets containing chlortetracycline-sulfamethazine and oxytetracycline.

### Procedures

A shipment of 171 steer calves (Hereford, Angus, Hereford x Angus) averaging 580 lb (pay weight) was purchased at a livestock auction in western South Dakota. The cattle were in transit 5.5 hours. Upon arrival at the feedlot, they were held an additional 8 hours without feed or water and weighed early the following morning. The calves averaged 544 lb, resulting in a 6.2% shrink based on pay weight. A total of 160 steers were selected from the shipment on weight and allotted to 20 pens of eight steers each.

The calves were identified, implanted with Ralgro<sup>1</sup> (36 mg/steer) and vaccinated for 4-way Clostridia spp., Bovine Virus Diarrhea (BVD), Bovine Rhinotracheitis (IBR) and para-influenza prior to allotment.

Corn silage fed in the trial was harvested from well-eared corn forage (1983 crop) and stored in two concrete stave silos (18 x 50 ft). One silo contained untreated silage and the other was treated with a silage additive. Four supplemental treatments were fed with each silage. The supplement and days of adaptation feeding were:

<u>Treatment no.</u>	<u>Medication, feeding level and days fed</u>
1	Nonmedicated control for 110 days
2	AS-700 <sup>2</sup> , 350 mg chlortetracycline and 350 mg sulfamethazine per steer for 28 days
3	Terramycin <sup>3</sup> , 2 g oxytetracycline per steer for 10 days, then 1 g oxytetracycline for 4 days
4	Terramycin, 2 g oxytetracycline per steer for 14 days

Composition of the supplements is presented in table 1. Each supplement was formulated to contain approximately 35% crude protein (dry basis) and was fed at a rate of 2 lb per steer daily. The nonmedicated control supplement was fed from the completion of the medication treatments to the end of the trial. Silage was fed according to appetite.

Initial weights were those of the cattle upon arrival at the feedlot. Final weights were recorded after an overnight stand without feed or water. The cattle were individually weighed without shrink at intervals of 15, 30, 58, 86 and 110 days. Silage and supplement were batch mixed and delivered to a fence-line feed bunk. Weight gain, feed consumption and feed conversion were computed at the end of each interval.

Each of the four treatments was replicated twice with each silage. A third partial replication included only treatments 2 and 3 with each silage for a total of 20 pens of 8 calves each.

Samples of silage and supplement were collected twice weekly, oven dried and prepared for chemical analysis.

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<sup>1</sup>International Minerals and Chemical Corporation, Terre Haute, IN, 47808.

<sup>2</sup>American Cyanamid Co., Princeton, NJ, 08540.

<sup>3</sup>Pfizer, Inc., Lee's Summit, MO, 64063.

## Results and Discussion

Statistical analyses of the feedlot performance data showed that no interaction ( $P > .05$ ) existed between medication and silage treatments. The data were therefore averaged across silage treatments and presented as four medication treatments.

Feed Consumption. Dry matter intakes are presented in table 2. Feeding therapeutic levels of chlortetracycline-sulfamethazine or oxytetracycline the first 14 or 28 days of adaptation of cattle to the feedlot had no effect ( $P > .05$ ) on feed consumption. Calves in each medication group consumed amounts of dry diet comparable to calves fed the nonmedicated diet.

Growth Performance. Body weight gain responses to short-term medication are shown in table 3. Recovery of shrink through increased gut content contributed to high steer gains in all treatment groups after 15 days. Steers fed chlortetracycline-sulfamethazine (350 mg each compound/steer daily) gained the fastest (4.90 lb/day), while the slowest gains (4.28 lb/day) were made by steers fed oxytetracycline at 2 g per steer for 10 days followed by 1 g per steer for 4 days. Gains for the control and oxytetracycline fed at 2 g per steer for 14 days were intermediate. These weight gains were not different ( $P > .05$ ).

After an additional 2 weeks, gut content (fill) appeared to have stabilized and weight gains generally diminished for all treatment groups. Cumulative gains were higher (2.93 lb/day) for steers fed the chlortetracycline-sulfamethazine combination than those fed either of the oxytetracycline treatments (2.53 and 2.58 lb/day) or the controls (2.51 lb/day).

As the experiment progressed through the 58-, 86- and 110-day intervals, gains for steers that received medicated feed during the initial 14 or 28 days were similar to those for steers in the nonmedicated group. While cumulative gains at 110 days were higher (2.42 lb/day) for the chlortetracycline-sulfamethazine treatment, differences in growth observed between nonmedicated (2.33 lb/day) and medicated treatments (2.32 and 2.33 lb/day) were not statistically significant.

Feed Conversion. Feed efficiency data reported by weight periods and cumulatively are shown in table 4. Since there were no major or consistent differences in feed consumption between treatments, feed conversion data were primarily a reflection of rate of growth. Steers fed the chlortetracycline-sulfamethazine combination tended to be the most efficient. However, none of the measures of feed efficiency were different ( $P > .05$ ).

The calves available for this study had been weaned and appeared to be accustomed to eating from a bunk prior to shipment. The animals were somewhat stressed from shipment and handling upon arrival at the feedlot but were allowed to rest initially under good environmental conditions and carefully monitored at all times for sickness and comfort. None of the steers required additional medication during the trial. The apparent lack of response to medication early in adapting calves to the feedlot may have been due to the good condition of the calves, their early high feed intakes and rather ideal conditions under which the experiment was conducted.

TABLE 1. PERCENTAGE COMPOSITION OF THE SUPPLEMENTS

Ingredient	Supplement mixtures			
	Non-medicated control	Chlortetracycline-sulfamethazine (350 mg each compound daily)	Oxytetracycline	
			2 g/day	1 g/day
Soybean meal (44% P)	69.96	69.46	67.91	68.93
Ground corn	19.78	19.78	19.78	19.78
Ground limestone	2.80	2.80	2.80	2.80
Dicalcium phosphate	4.38	4.38	4.38	4.38
Trace mineral salt	2.99	2.99	2.99	2.99
Vitamin a premix <sup>a</sup>	.09	.09	.09	.09
Aureo S-700 <sup>b</sup>	--	.50	--	--
Terramycin-50 <sup>c</sup>	--	--	2.05	1.03

<sup>a</sup> Contains 30,000 IU of vitamin A per gram of premix (Hoffman-LaRoche, Nutley, NJ, 07110).

<sup>b</sup> Contains 35 g of chlortetracycline and 35 g of sulfamethazine per pound of product.

<sup>c</sup> Contains 50 g oxytetracycline per pound of product.

TABLE 2. DRY FEED INTAKE BY WEIGH PERIOD AND CUMULATIVELY

Treatment	1	2	3	4
Item	Non-medicated control	Chlortetracycline-sulfamethazine <sup>a</sup> (350 mg each compound daily for 28 days)	Oxytetracycline <sup>b</sup>	
			(2 g/steer/day for 10 days, 1 g for 4 days)	(2 g/steer/day for 14 days)
Dry feed intake, 1b <sup>c</sup>				
15 days	12.4	12.5	12.3	12.5
15 days (30)	14.6 (13.5)	15.5 (14.0)	14.6 (13.4)	15.1 (13.5)
28 days (58)	17.0 (15.2)	17.5 (15.7)	17.6 (15.4)	17.7 (15.7)
28 days (86)	18.6 (16.3)	18.7 (16.7)	18.9 (16.6)	18.6 (16.6)
24 days	19.0	19.2	19.2	18.9
Overall, 110 days	(16.9)	(17.2)	(17.1)	(17.1)

<sup>a</sup> Contains 35 g chlortetracycline and 35 g sulfamethazine per pound.

<sup>b</sup> Contains 50 g oxytetracycline per pound.

<sup>c</sup> Values in parenthesis are cumulative.

TABLE 3. FEEDLOT GAINS BY WEIGH PERIODS AND CUMULATIVELY

Treatment	1	2	3	4
Item	Non-medicated control	Chlortetracycline-sulfamethazine <sup>a</sup> (350 mg each compound daily for 28 days)	Oxytetracycline <sup>b</sup> (2 g/steer/day for 10 days, (2 g/steer/day 1 g for 4 days) for 14 days)	
Number of animals	32	48	48	32
Init. wt., lb	546.5	543.2	543.4	543.4
Final wt., lb	802.8	809.1	798.6	800.1
Avg daily gain, lb <sup>c</sup>				
15 days	4.50	4.90	4.28	4.55
15 days (30)	.52 (2.51)	.81 (2.93)	.78 (2.53)	.60 (2.58)
28 days (58)	3.08 (2.79)	2.99 (2.92)	3.15 (2.83)	3.12 (2.84)
28 days (86)	2.03 (2.54)	2.01 (2.62)	1.85 (2.51)	2.05 (2.58)
24 days	1.57	1.68	1.63	1.44
Overall, 110 days	(2.33)	(2.42)	(2.32)	(2.33)

<sup>a</sup> Contains 35 g chlortetracycline and 35 g sulfamethazine per pound.

<sup>b</sup> Contains 50 g oxytetracycline per pound.

<sup>c</sup> Values in parenthesis are cumulative.

TABLE 4. FEED EFFICIENCY BY WEIGH PERIOD AND CUMULATIVELY

Treatment	1	2	3	4
Item	Non-medicated control	Chlortetracycline-sulfamethazine <sup>a</sup> (350 mg each compound daily for 28 days)	Oxytetracycline <sup>b</sup> (2 g/steer/day for 10 days, (2 g/steer/day 1 g for 4 days) for 14 days)	
Feed per cwt. gain <sup>c</sup>				
15 days	279	259	289	276
15 days (30)	2155 (538)	2140 (478)	2234 (531)	3113 (536)
28 days (58)	557 (545)	589 (537)	558 (545)	569 (553)
28 days (86)	936 (641)	952 (635)	1033 (660)	915 (644)
24 days	1244	1171	1189	1325
Overall, 110 days	(725)	(713)	(739)	(734)

<sup>a</sup> Contains 35 g chlortetracycline and 35 g sulfamethazine per pound.

<sup>b</sup> Contains 50 g oxytetracycline per pound.

<sup>c</sup> Values in parenthesis are cumulative.