Effect of a New Antibiotic (MK747) on Feedlot Performance of Yearling Steers

Special Report 526
January 1979

Agricultural Experiment Station
Oregon State University, Corvallis

Authors: A. T. Ralston is Professor of Animal Nutrition, Oregon State University, and T. P. Davidson is Superintendent of the Umatilla Experiment Station.

This work has been supported in part by Merck & Co., Inc., Rahway, NJ.

Effect of a New Antibiotic (MK747) on Feedlot Performance of Yearling Steers

A. T. Ralston and T. P. Davidson

The speed at which an animal may be placed on a high concentrate diet without foundering, becoming acidotic or going off feed is an important contributor to average daily gain, feed efficiency and total profit. Generally, when rapid changes are made, there is a population explosion of Streptococcis bovis that greatly drops the rumen pH to the point where many animals go off feed. This can be modified by a more gradual change, the use of an oral buffer or high levels of antibiotics and sulfa drugs to control proliferation of certain bacteria. The antibiotic used in this trial (MK747)* is somewhat specific for Streptococcis bovis. The experiment was designed to determine the effectiveness of MK747 in bringing yearling steers on to two levels of energy with two different adjustment periods.

Experimental Procedure

Two hundred-forty yearling steers were allotted by weight to three replicates (heavy, medium and light weight). They were then stratified by weight and randomly allotted to one of eight treatments within each replicate. The experimental design was a 2 x 2 x 2 factorial with three replicates (table 1).

Table 1. Treatment Design within Replication

Treatment no.	Ration sequence % roughage	Days between ration change	MK747, ppm
1	80-40-15	6	0
2	80-40-15	12	0
3	80-40-15	6	11
4	80-40-15	12	11
5	80-40-5	6	0
6	80-40-5	12	0
7	80-40-5	6	11
8	80-40-5	12	11

*Product of Merck & Co., Inc., Rahway, NJ.

The final rations fed are shown in table 2. During the adjustment periods the percent of alfalfa was varied to obtain the required amount of roughage for each period.

Table 2. Final Rations Fed

% ingredient	NEg Mcal/kg	% crude protein	% Ca	% P
5 alfalfa	.0240	.75	.07	.01
5 cottonseed meal (41%)	.0600	2.05	.01	.06
15 beet pulp	.2010	1.49	.09	.02
74 steam-rolled barley	.9546	8.07	.05	.33
1 limestone	-----	----	.38	---
Total	1.2396	12.36	.60	.42
15 alfalfa	.0720	2.25	.20	.03
3 cottonseed meal (41%)	.0360	1.23	.01	.04
15 beet pulp	.2010	1.49	.09	.02
66.5 steam-rolled barley	.8579	7.25	.05	.30
.5 limestone	-----	----	.19	---
Total	1.1669	12.22	.54	.39

The initial steer weights were taken after 24 hours off feed and water. The final weights were calculated from the warm carcass weights divided by a 60 percent yield.

The MK747 was removed from the ration two weeks prior to slaughter. In addition to carcass weight, data on USDA quality grades, estimated yield of trimmed retail cuts and liver condemnations were collected at slaughter.

Results and Discussion

The use of MK747 at the 11 ppm level failed to improve gains, feed efficiency or carcass quality (table 3). There were more abscessed livers than have usually been experienced at this station. Of the 53 total abscessed livers condemned, 32 were in the control groups and 21 on the MK747.

Although differences were not statistically significant, the trends were as would be expected. Steers going on feed in a shorter time gained more rapidly on somewhat less feed, graded slightly higher but yielded less estimated trimmed retail cuts. The same was true of steers fed a ration of greater energy concentration. One might expect animals going on feed more rapidly would have a greater incidence of liver abscess, but this was not the case in this trial.

Steers fed a ration of .56 Mcal of NEg per lb. gained more rapidly, required less feed per unit of gain and graded slightly higher than steers receiving a ration of .53 Mcal of NEg per lb. Generally, the higher concentration of energy would increase the number of liver abscesses, but this was not the case.

As one would predict, heavier steers gained more rapidly but used more feed per unit of gain. Since they were on feed for a shorter period of time, they graded slightly less but yielded a higher percent of trimmed retail cuts.

Steer performance by treatment and pen is summarized in table 4.

Summary

The use of MK747 failed to improve steer performance on two levels of net energy for gain (.56 Mcal or .53 Mcal/lb.). The antibiotic had no effect upon the time taken to adjust animals to the final ration. The higher the concentration of energy and the more rapidly steers were placed on feed, the greater and more efficient the gains. Heavy steers gained more rapidly but were less efficient than lighter steers. The longer steers were on feed, the higher they graded with a corresponding reduction in yield of trimmed retail cuts. Liver abscesses were not affected by treatment.

Table 3. Summary of Steer Performance by Treatment and Replicate

Treatment	Initial wt. lb.	Final wt. lb.	ADG lb.	Warm carcass wt. lb.	USDA[a] grade	Yield trim cut %	No. of fluke	No. of Abscess	lb. feed/ lb. gain
Control	591	1008	3.27	605	16.6	50.4	7	32	7.79
MK747	590	1001	3.25	601	16.4	50.7	9	21	7.82
6 day adjustment	590	1010	3.29	606	16.6	50.4	12	23	7.73
12 day adjustment	591	1000	3.23	600	16.3	50.7	4	30	7.88
NEg .56 Mcal/lb.	591	1009	3.31	606	16.6	50.5	8	22	7.64
NEg .53 Mcal/lb.	591	1001	3.22	601	16.3	50.6	8	31	7.97
Replicate 1	655	1045	3.45	627	16.2	50.9	9	17	8.20
Replicate 2	586	1000	3.26	600	16.4	50.5	3	20	7.65
Replicate 3	532	970	3.07	582	16.8	50.2	4	16	7.57
Overall average	591	1005	3.26	603	16.5	50.5	16	53	7.81

Table 4. Summary of Steer Performance by Treatment and Pen

Pen no.	Initial wt. lb.	Final wt. lb.	ADG lb.	Warm carcass wt.	USDA[a] grade	yield trim cut %	No. of fluke	No. of abscess	lb. feed/ lb. gain
Treatment 1									
1	659	1056	3.51	633	16.7	51.2	2	4	8.36
15	585	987	3.17	592	15.8	49.8	1	3	8.34
21	533	981	2.85	589	17.3	50.3	1	3	7.37
Average	592	1008	3.18	605	16.6	50.4	4	10	8.02
Treatment 2									
5	655	1034	3.35	620	16.1	51.4	2	2	8.56
12	587	998	3.24	599	16.4	50.3	-	4	7.75
19	533	956	3.01	574	16.7	50.5	-	2	7.53
Average	592	996	3.20	598	16.4	50.7	2	8	7.95
Treatment 3									
3	654	1049	3.50	629	15.8	50.7	1	2	8.23
10	586	985	3.14	591	16.4	51.0	-	5	7.14
17	530	979	3.19	587	16.7	50.0	1	-	7.64
Average	590	1004	3.28	602	16.3	50.6	2	7	7.67
Treatment 4									
8	654	1029	3.32	617	15.8	51.4	-	2	8.52
16	584	996	3.24	597	15.8	50.5	-	1	8.26
23	532	960	3.03	576	16.4	50.0	-	3	7.95
Average	590	995	3.20	597	16.0	50.6	0	6	8.24
Treatment 5									
2	653	1050	3.51	630	16.4	50.3	-	1	8.25
14	584	1020	3.43	612	16.7	50.0	1	3	7.22
20	531	989	3.25	593	17.0	50.0	-	-	7.46
Average	589	1020	3.40	612	16.7	50.1	1	4	7.64
Treatment 6									
4	656	1058	3.56	635	16.4	50.5	-	5	7.91
9	585	996	3.24	598	16.7	50.7	-	1	7.12
18	534	975	3.13	585	16.7	50.3	-	4	7.56
Average	592	1010	3.31	606	16.6	50.5	0	10	7.53
Treatment 7									
7	655	1050	3.50	630	16.8	51.2	2	-	7.87
11	586	1011	3.35	607	17.0	50.5	1	1	7.50
24	529	965	3.09	579	17.0	50.0	2	1	7.40
Average	590	1008	3.31	605	16.9	50.6	5	2	7.59
Treatment 8									
6	655	1032	3.33	619	15.8	51.0	2	1	7.86
13	587	1006	3.30	604	16.4	51.0	-	2	7.89
22	530	957	3.03	574	16.4	50.3	-	3	7.63
Average	591	998	3.22	599	16.2	50.8	2	6	7.79

[a]USDA grade - 14 = average good, 17 = average choice