EFFECT OF TETRONASIN ON THE RATE AND EFFICIENCY OF GAIN OF FEEDLOT STEERS

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Story in Brief

Tetronasin, a potent new ionophore, increased feed efficiency in feedlot steers by 5.4 percent in a 112 day feeding trial. Tetronasin was fed at 0, 3, 6, 9, and 12 grams per ton of feedlot diet. Feed intake was reduced in a manner similar to that of monensin with the greatest intake reduction at the 12 gram level. It appears that the optimum level of this compound based on this trial is between 6 and 12 grams per ton. One advantage of Tetronasin is that only 6 to 12 grams per ton gave responses competitive with 25 to 30 grams of either monensin or lasalocid. Additional testing of this compound is being conducted at other locations which will help determine the optimum feeding level. This new ionophore may offer a performance response superior to some of the older ionophores.

(Key Words: Tetronasin, Feedlot Cattle.)

Introduction

Scientists in recent years have developed several new compounds which improve the efficiency of cattle feeding. Introduction of the first ionophore, monensin, was a milestone in improving nutritional efficiency. To replace or compete with monensin, new compounds must meet certain criteria. These include low cost, larger improvements in rate or efficiency of gain, less depression of feed intake, a wider safety margin, or additional health or management benefits. Tetronasin, being tested by Coopers Animal Health, Inc, appears to be a potent ionophore which may improve performance. It is not yet cleared by the FDA for commercial use in feedlot cattle and optimal feeding levels remain to be determined.

Materials and Methods

Yearling steers (140 head) averaging 669 lb were assembled from a common background near Purcell, Oklahoma. Cattle were processed at this location and given Ivermectin, IBR-PI_3 (MLV) intramuscularly, Leptosprira pomona bacterin, and Clostridium chauvoei, septicum, novi, and sordellii bacterin. Cattle were then trucked to Stillwater for feeding. On arrival, the cattle were individually weighed and allocated to one of 20 pens and 5 experimental treatments. The cattle were blocked into 4 weight blocks and the 5 experimental treatments were applied, one to each pen in each block, for the total of 20 pens. Cattle were housed seven per pen in partially covered, partially slatted

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concrete floor pens equipped with self feeders. During the first 28 days, which was designated as the adaptation period, the cattle were fed a series of adaptation rations (Table 1) which contained decoquinate. The five test diets consisted of control (0 Tetronasin) and Tetronasin added at 3, 6, 9, and 12 grams per ton of 90% dry matter feed. The supplement compositions are given in Table 2. Three animals were removed from the trial after the adaptation period due to poor performance or health. These animals were not replaced. The cattle were weighed full on days 27 and 28 of the adaptation period and the average of these weights was the trial starting weight. Feed containing decoquinate was removed and weighed back on day 28 and the experimental feeds were introduced at this time. The cattle were weighed full at 28 day intervals during the 112 day trial. Cattle were weighed full two successive days (111 and 112) to determine their final trial weights. Feed was added to the self-feeders weekly or as necessary and feed was weighed back at each 28 day period to determine period feed intakes. The rations containing the test compounds were removed from the feeders on day 112 and the cattle were fed a drug-free feed for seven days before slaughter.

The cattle were trucked to Booker, Texas for slaughter, where individual carcass data were obtained and pen gains were calculated both on a live basis (gains for the 112 day period) and on a carcass adjusted basis (carcass weight/0.62) for the 112 day period plus the 7-day withdrawal period. One animal from pen 10 (12 g Tetronasin/ton) died on test and was autopsied at the Oklahoma Animal Disease Diagnostic Laboratory. Cause of death was determined to be frothy bloat and was believed to be unrelated to treatment. At slaughter, flukes were discovered in the livers of 26 head: 7 controls, 2 from the 3 gram, 5 from the 6 gram, 5 from the 9 gram, and 7 from the 12 gram treatments. Rumen samples from two animals in each pen were obtained by stomach tube near the end of the trial for the determination of rumen volatile fatty acids and rumen pH.

Table 1. Diet dry matter ingredients and composition.

	Ration (Percent Concentrate)					
Ingredient	50	60	70	80	90	Final
Corn, whole	43.59	53.62	63.58	73.45	83.21	88.05
Cottonseed hulls	19.81	14.80	9.83	4.89	4.87	4.86
Alfalfa pellets	24.39	19.43	14.52	4.82	4.82	----
Supplement pellets	7.22	7.19	7.16	7.14	7.10	7.09
Calculated composition:						
Dry matter	89.13	88.77	88.43	88.08	87.69	87.50
NEm, mcal/cwt DM[a]	74.88	79.73	84.58	89.34	93.63	95.73
NEg, mcal/cwt DM	42.50	47.15	51.80	56.45	60.05	61.85
Crude protein, % of DM	14.00	13.75	13.50	13.24	12.24	11.74
Crude fiber, % of DM	19.81	16.18	12.56	8.93	6.44	5.20
Potassium, % of DM	1.43	1.29	1.14	1.00	.77	.65
Calcium, % of DM	.94	.86	.79	.71	.57	.50
Phosphorus, % of DM	.30	.31	.33	.34	.34	.34

[a]Final ration ME = 3.10 mcal/kg.

Table 2. Supplement composition.

Supplement Composition, %	Tetronasin Level, Gram/Ton					
	Deccox	0	3	6	9	12
Cottonseed meal	39.45	39.44	39.44	39.44	39.44	39.44
Soybean meal, 44% protein	23.50	23.50	23.50	23.50	23.50	23.50
Calcium carbonate	14.77	14.77	14.77	14.77	14.77	14.77
Urea	6.04	6.04	6.04	6.04	6.04	6.04
Potassium chloride	4.97	4.97	4.97	4.97	4.97	4.97
Salt	4.03	4.03	4.03	4.03	4.03	4.03
Cane molasses	3.76	3.76	3.76	3.76	3.76	3.76
Dicalcium phosphate	2.69	2.69	2.69	2.69	2.69	2.69
Vitamin A, 30,000 IU/g	.30	.30	.30	.30	.30	.30
Trace mineral mix	.17	.17	.17	.17	.17	.17
Decoquinate, 6%	.34	----	----	----	----	----
Rice hulls	----	.35	.26	.17	.08	.00
Tetronasin (ICI139603)	----	----	.09	.17	.27	.35

Table 3. The effect of Tetronasin on cattle performance.

	Tetronasin Level (Grams/Air Dry Ton)				
	0	3	6	9	12
Steers, number	28	27	27	28	26
Weights:					
Starting	767	773	779	770	769
56 days	1009	1008	1028	1015	1003
112 days	1162	1124	1176	1164	1141
Carcass (119 days)	714	687	721	714	702
Gain, lb/day:					
0-56 days	4.34	4.20	4.45	4.37	4.18
56-112 days	2.73	2.08	2.64	2.66	2.47
0-112 days$_d$	3.53	3.14	3.54	3.51	3.32
0-119 days$_d$	3.26	2.84	3.26	3.23	3.08
Dry matter intake, lbs/day:					
0-56 days	20.78_{L}	19.75_{b}	20.45_{ab}	19.71_{ab}	19.27_{b}
56-112 days$_L$	19.89^{a}	17.93^{b}	19.42^{ab}	18.77^{ab}	18.12^{b}
0-112 days$_L$	20.34^{a}	18.84^{b}	19.94^{ab}	19.24^{ab}	18.70^{b}
0-119 days$_L$	20.17^{a}	18.79^{ab}	19.94^{ab}	19.20^{a}	18.65^{b}
Feed/gain:					
0-56 days	4.85	4.72	4.60	4.53	4.61
56-112 days	7.35^{ab}	8.76^{a}	7.36^{ab}	7.14^{b}	7.71^{ab}
0-112 days$_d$	5.78^{ab}	6.02^{a}	5.63^{ab}	5.47^{b}	5.65^{ab}
0-119 days$_d$	6.21	6.64	6.14	5.94	6.09
Calculated ME,$_L$:					
mcal/kg	3.18	3.10	3.24	3.29	3.26

^{abc}Means with different superscripts differ (P<.05)
^{d}Based on carcass weight divided by .62.
^{L}Linear effect (P<.10).

Results and Discussion

As Tetronasin was added to the diet, feed intake tended to decrease (Table 3). This decrease in feed intake showed a significant linear trend ($P<.10$) during the second half of the trial and over the entire trial. The 12 gram level reduced feed intake during the latter periods ($P<.05$). Daily gains were not statistically altered by treatments. Adding 6 to 12 g Tetronasin increased feed efficiency (carcass basis) by about 1 to 4 percent while this increase was 4.3 percent at the 9 gram level. On a live weight basis, percent improvements in feed efficiency were: 3 gram, -4.2%; 6 gram, 2.6%; 9 gram, 5.4%; and 12 gram, 2.2%. No explanation for the reduced feed intake and consequent reduction in rate and efficiency of gain with 3 g Tetronasin per ton is apparent. In general, the ME content of the diet increased as the level of Tetronasin increased ($P<.10$). Carcass characteristics were not altered by Tetronasin addition to the diet (Table 4). The presence of liver flukes reduced ($P<.05$) daily gains, with the gains in the early periods ($P<.01$) showing the largest reduction (See "The Effect of Liver Flukes on the Performance of Feedlot Steers" elsewhere in this publication). The analysis of rumen fluid for volatile fatty acids showed a trend for acetate percentage to increase with increasing levels of Tetronasin with the only significant difference being between the control (41.2%) and the 9 gram treatment level (52.7%). No differences were detected with the other acids. Rumen pH at the time of sampling ranged from 6.2 to 6.4.

Table 4. The effect of Tetronasin on carcass parameters.

	Tetronasin Level (Grams/Air Dry Ton)				
	0	3	6	9	12
Dressing percentage	61.39	61.06	61.38	61.33	61.48
Rib eye area, sq inches	13.64	12.83	13.15	13.61	12.79
Fat thickness, inches	.32	.32	.32	.32	.32
KHP fat, %	2.44	2.48	2.52	2.55	2.37
Marbling score[a]	12.46	12.06	12.42	12.75	11.70
Percent choice	53.6	45.2	54.8	53.6	31.5
Yield grade	2.14	2.30	2.33	2.16	2.35
Liver abscess					
Score[b]	1.00	1.38	1.98	1.80	1.50
Incidence, %	10.7	31.5	10.7	17.0	22.0

[a]Slight plus=12; small minus=13.
[b]Mean score; none=0; one or several small abscesses=1.0; moderate abscesses=2.0; severe=3.0.