

## COMPARISON OF SALINOMYCIN TO OTHER IONOPHORES FOR FEEDLOT STEERS

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### Story in Brief

One hundred thirty-seven yearling steers were fed whole shelled corn diets (1) without additives, (2) with salinomycin (10 g/ton of feed), (3) with lasalocid (30 g/ton of feed) or (4) with monensin (25 g/ton of feed) plus tylosin (10 g/ton of feed). Feed intake was reduced by 4.2% with salinomycin, 1.3% with lasalocid and 6.0% with monensin-tylosin. Rate of gain was increased with salinomycin (5.0%) and with lasalocid (5.3%), and monensin-tylosin decreased gains 2.5% on a carcass basis. Efficiency of gain was increased by salinomycin (8.7%), lasalocid (5.4%) and monensin-tylosin (2.4%) on a carcass basis. Dressing percentages were higher for those steers fed salinomycin. Fat thickness tended to be lower with an ionophore in the diet and cutability higher.

(Key Words: Feedlot Steers, Salinomycin, Lasalocid, Monensin, Tylosin.)

### Introduction

Feed additives of a class called ionophores have proven to increase efficiency of feed use by feedlot cattle. Monensin, lasalocid and salinomycin are three ionophores. Monensin is widely fed today. Salinomycin appears promising based on earlier studies (Owens and Gill, 1982; Ferrell et al., 1983; Martin et al., 1984) and approval by the FDA for feeding to feedlot cattle is expected shortly. In these studies, salinomycin improved gains from 7 to 18.6% and feed efficiencies from 5.2 to 9.6%. This trial was conducted to further evaluate salinomycin and to compare the effects of salinomycin, lasalocid and monensin-tylosin on the performance of finishing cattle.

### Materials and Methods

One hundred forty yearling crossbred steers were purchased from Oklahoma auction barns and assembled at a backgrounding operation in Purcell, Oklahoma. On arrival at this facility, the steers were ear tagged and received IBR, PI<sub>3</sub>, BVD, Lepto, clostridial, and pasturella haemolytica (live) vaccines. After assembly the cattle were trucked to Stillwater, Oklahoma on December 9, 1983. On arrival they were held in drylot for two weeks. On December 26, the steers were weighed and divided into five weight groups (average initial weight of 723 lb). Steers within each weight group were allocated to one of four pens (seven head per pen) and the four feed treatments were randomly allotted to pens within a weight group. Cottonseed hulls, alfalfa pellets and whole corn comprised 92.9% of the ration with the percentage hulls and alfalfa pellets in the ration decreasing sequentially from 40 to 30 to 20 to 10 and 6% over a three week period (Tables 1 and 2). Drug assays agreed well with proposed drug concentrations (Table 3). Steers received the 40%

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roughage diet for three days, 30% for five days, 20% for 7 days, 10% for 6 days, and 6% for the remainder of the trial. Steers were weighed full at the start of the trial and on days 28, 56, 84 and 112. The steers were switched to an additive-free diet on day 112 of the trial and fed this ration for nine days. The steers were trucked to Emporia, Kansas

Table 1. Diet composition, dry matter basis<sup>a</sup>.

| Ingredient            | Ration Sequence |       |       |       |       |
|-----------------------|-----------------|-------|-------|-------|-------|
|                       | 1               | 2     | 3     | 4     | 5     |
|                       | %               |       |       |       |       |
| Corn, whole shelled   | 52.88           | 62.88 | 72.88 | 82.88 | 86.88 |
| Cottonseed hulls      | 15.00           | 10.00 | 10.00 | 5.00  | 4.00  |
| Alfalfa, dehy-pellets | 25.00           | 20.00 | 10.00 | 5.00  | 2.00  |
| Pelleted supplement   | 7.12            | 7.12  | 7.12  | 7.12  | 7.12  |

<sup>a</sup>To provide 11.94% protein, .46% calcium, .33% phosphorus, .52% potassium and 1500 I.U. vitamin A per pound of ration dry matter.

on day 121 of the trial for slaughter and carcass evaluation. Two steers died during the trial and one steer was removed from the trial for causes not related to the experimental treatments. Weights are reported on a full basis while the total trial gain and efficiency (day 112) were calculated using a 4% pencil shrink. Gains and feed efficiencies for the total 121 day trial were calculated from hot carcass weights assuming a dressing percentage of 62.

Table 2. Pellet composition, dry matter basis<sup>a</sup>.

| Ingredient        | Percent |
|-------------------|---------|
| Soybean meal      | 3.15    |
| Cottonseed meal   | 2.00    |
| Calcium carbonate | 1.00    |
| Urea              | .40     |
| Cane molasses     | .25     |
| Salt              | .30     |
| Trace mineral     | .01     |
| Vitamin A - 30    | .01     |
| Drug premix       |         |
| Total             | 7.12    |

<sup>a</sup>Pellet supplement for specific treatments contained .2367% Salinomycin 30, .3140% Bovatec 68, or .3017% Rumensin 60 plus .1775% Tylan 40.

### Results and Discussion

Daily gains were influenced little by the addition of ionophores to the diet (Table 4). During the first half of the trial, gains tended to be higher with added ionophores, whereas in the latter half of the feeding period the control steers had the highest gains. Changes in



gains adjusted to an equal carcass basis with these additives were: +5, +5.3 and -2.5% for salinomycin, lasalocid and monensin-tylosin, respectively. Feed intakes generally decreased with an added ionophore. Salinomycin decreased feed intake 3.9%. This is in contrast with previous studies at OSU (Owens and Gill, 1982; Ferrell et al., 1983; Martin et al., 1984) in which it increased feed intakes by 2.0, 1.4 and 7.4%. Feed intake did not increase with time on feed but was similar for the first and second half of the trial despite the increase in body weight.

The presence of an ionophore in the diet slightly improved feed efficiencies on a carcass weight adjusted basis (8.7, 5.4 and 2.4% for salinomycin, lasalocid and monensin-tylosin, respectively). Those steers fed salinomycin were significantly more efficient than the control steers ( $P < 0.05$ ) but other differences were not significant

Table 3. Drug assay results<sup>a</sup>.

| Diet        | Theory Level, g/ton | Assayed, g/ton |
|-------------|---------------------|----------------|
| Salinomycin | 142                 | 143.7          |
| Lasalocid   | 427                 | 447.5          |
| Monensin    | 362                 | 373.1          |
| Tylosin     | 142                 | 122.4          |

<sup>a</sup>Assayed for A.H. Robbins Company.

Table 4. Performance data.

| Item                     | Control           | Salinomycin       | Lasalocid          | Monensin-Tylosin   |
|--------------------------|-------------------|-------------------|--------------------|--------------------|
| Weight, lb               |                   |                   |                    |                    |
| Initial                  | 731               | 729               | 715                | 716                |
| 28 days                  | 855               | 859               | 858                | 838                |
| 56 days                  | 959               | 972               | 962                | 945                |
| 84 days                  | 1055              | 1062              | 1056               | 1045               |
| 112 days                 | 1127              | 1130              | 1118               | 1107               |
| Daily gains, lb          |                   |                   |                    |                    |
| 0-56 days                | 4.07              | 4.34              | 4.40               | 4.10               |
| 57-112 days              | 3.00              | 2.81              | 2.80               | 2.88               |
| 0-112 days               | 3.13              | 3.18              | 3.20               | 3.10               |
| 0-slaughter <sup>c</sup> | 3.23              | 3.39              | 3.40               | 3.15               |
| Daily feed, lb           |                   |                   |                    |                    |
| 0-56 days                | 20.6              | 20.0              | 20.7               | 19.4               |
| 57-112 days              | 21.1              | 19.7              | 20.4               | 19.8               |
| 0-112 days               | 20.8              | 20.0              | 20.6               | 19.6               |
| 0-slaughter              | 20.5              | 19.7              | 20.4               | 19.4               |
| Feed/gain                |                   |                   |                    |                    |
| 0-56 days                | 6.11              | 5.50              | 5.60               | 5.81               |
| 57-112 days              | 7.34              | 7.31              | 7.69               | 7.31               |
| 0-112 days               | 6.66              | 6.29              | 6.44               | 6.33               |
| 0-slaughter <sup>c</sup> | 6.35 <sup>a</sup> | 5.80 <sup>b</sup> | 6.01 <sup>ab</sup> | 6.20 <sup>ab</sup> |

<sup>a, b</sup>Means in a row with different superscripts differ ( $P < 0.05$ ).

<sup>c</sup>Based on carcass weight divided by .62, an assumed dressing percentage.

statistically. The improvement in efficiency with salinomycin compares favorably with those observed in earlier trials at OSU (5.5, 5.2, and 9.6% improvements).

Carcass weights (Table 5) were higher for those steers that had higher rates of gain. Dressing percentages were significantly higher for those steers fed salinomycin or lasalocid as compared to the monensin-tylosin cattle ( $P < 0.05$ ). About 14% of the steers had liver abscesses and one steer had liver flukes. None of the steers fed monensin-tylan had liver abscesses, suggesting that tylan prevented this disorder. Steers receiving ionophores had greater cutability and a more desirable yield grade.

Results of this trial correspond well with previous benefits noted with salinomycin in earlier trials at OSU (Table 6). Averaged across these trials, rate of gain increased 10% and efficiency of feed use increased 7.7% with the addition of salinomycin to the diet.

Table 5. Carcass characteristics.

| Item                        | Control            | Salinomycin        | Lasalocid          | Monensin-Tylosin  |
|-----------------------------|--------------------|--------------------|--------------------|-------------------|
| Carcass wt, lb              | 695                | 706                | 698                | 680               |
| Dressing percent            | 61.7 <sup>ab</sup> | 62.5 <sup>a</sup>  | 62.5 <sup>a</sup>  | 61.4 <sup>b</sup> |
| Liver abscesses             |                    |                    |                    |                   |
| Incidence, %                | 22.9 <sup>a</sup>  | 12.4 <sup>ab</sup> | 20.0 <sup>ab</sup> | 0.0 <sup>b</sup>  |
| Severity                    | 0.48               | 0.25               | 0.40               | 0.00              |
| Rib eye area                | 12.5               | 13.0               | 12.8               | 12.9              |
| KHP, %                      | 1.41 <sup>b</sup>  | 1.55 <sup>ab</sup> | 1.65 <sup>ab</sup> | 1.76 <sup>a</sup> |
| Fat thickness, in.          | 0.47 <sup>a</sup>  | 0.44 <sup>ab</sup> | 0.39 <sup>b</sup>  | 0.39 <sup>b</sup> |
| Marbling score <sup>e</sup> | 12.4               | 12.0               | 12.5               | 12.0              |
| Cutability, %               | 50.6               | 51.1               | 51.3               | 51.4              |
| Yield                       | 2.6                | 2.4                | 2.4                | 2.3               |
| Percent choice              | 534                | 48                 | 52                 | 40                |

<sup>a, b, c</sup> Means in a row with different superscript differ ( $P < 0.05$ ).

<sup>d</sup> 1=abscess of small size; 2=many abscesses or one of moderately large size.

<sup>e</sup> 11=average slight; 12=slight plus.

Table 6. Effects of Salinomycin feeding in trials at Oklahoma State.

| Reference            | Daily Gain | Effects (%) |           |                  |
|----------------------|------------|-------------|-----------|------------------|
|                      |            | Feed Intake | Feed/Gain | Steers/Treatment |
| Owens and Gill, 1982 | 8.0        | 2.0         | 5.5       | 28               |
| Ferrell et al., 1983 | 7.0        | 1.4         | 5.2       | 14               |
| Martin et al., 1984  | 18.6       | 7.4         | 9.6       | 32               |
| This trial           | 5.0        | -3.9        | 8.7       | 35               |
| Weighted average     | 10.0       | 1.6         | 7.7       |                  |



## Literature Cited

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