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Spectinomycin - A New Antibiotic

Richard C. Wahlstrom

Antibiotics have become standard ingredients in most rations for growing swine. Antibiotic feeding generally increases average daily gains, improves feed efficiency, improves uniformity of performance and may reduce death loss during the growing period.

The exact method by which antibiotics cause these beneficial effects is not known. However, they apparently do have an influence on the intestinal bacteria and there is concern that the bacteria may become resistant to an antibiotic when fed continually. Therefore, new antibiotics must be evaluated and compared with existing effective antibiotics.

Experimental Procedure

Two trials were conducted to evaluate a new antibiotic, spectinomycin, in swine rations. In trial I, 54 crossbred pigs approximately 3 weeks of age and averaging 14 lbs. in weight were weaned and placed directly on the experiment which was conducted for 35 days. The pigs were allotted into lots of six and three lots received each of the following treatments:

1. Basal ration
2. Basal ration plus 10 gm. of spectinomycin per ton
3. Basal ration plus 100 gm. of spectinomycin per ton

Water and feed were provided ad libitum in inside cement floored pens.

Trial II was conducted with pigs weighing approximately 36 lbs. initially and they were removed from the experiment at an average weight of about 200 lbs. Eighty crossbred pigs were randomly allotted into 16 lots of five pigs each. Four replicated lots received each of the following ration treatments:

1. Basal ration
2. Basal ration plus 10 gm. spectinomycin per ton
3. Basal ration plus 20 gm. spectinomycin per ton
4. Basal ration plus 20 gm. chlortetracycline per ton

The pigs were housed in temporary houses placed on a concrete slab. Feed and water were provided ad libitum in outside lots. The basal rations used in these two trials are shown in table 1.

Table 1. Composition of Basal Rations, Percent

Crude Protein, %	Trial I 20%	Trial II 16%
Ground yellow corn	38.0	79.5
Rolled oats	30.0	--
Soybean meal, 50%	24.0	17.5
Sugar	5.0	--
Dicalcium phosphate	1.6	1.7
Ground limestone	0.6	0.6
Trace mineral salt	0.5	0.5
Vitamin premix	0.3 <sup>a</sup>	0.2 <sup>b</sup>

<sup>a</sup> Provided 1135 I.U. vitamin A, 340 I.U. vitamin D, 4 mg. riboflavin, 8 mg. pantothenic acid, 18 mg. niacin, 20 mg. choline chloride and 10 mcg. vitamin B<sub>12</sub> per pound of ration.

<sup>b</sup> Provided 1135 I.U. vitamin A, 340 I.U. vitamin D, 2 mg. riboflavin, 4 mg. calcium pantothenate, 9 mg. niacin, 10 mg. choline chloride and 7 mcg. vitamin B<sub>12</sub> per pound of ration.

### Results

#### Trial I

The results of the first trial with early weaned pigs are shown in table 2. Pigs receiving either 10 or 100 gm. of spectinomycin per ton of feed gained significantly ( $P < .01$ ) faster than the pigs fed the basal ration. The pigs receiving the antibiotic got off to a much better start than did those pigs fed the basal ration. The control pigs gained very little during the first two weeks of the trial.

Feed consumption was also much greater in the lots fed spectinomycin and reflects their faster growth rate. Feed efficiency was more variable particularly in the lots fed the basal or the 10 gm. level of spectinomycin. Pigs receiving the 100 gm. level of spectinomycin consistently required less feed per unit of gain and averaged approximately 15% less feed than the pigs fed the control ration and 20% less feed than those pigs fed the low level of antibiotic.

Table 2. Performance of Early-Weaned Pigs Fed Spectinomycin

Spectinomycin (gm./ton)		0	10	100
No. of pigs <sup>a</sup>		16	16	16
Av. init. wt., lb.		14.2	13.8	13.9
Av. final wt., lb.		30.7	36.7	41.3
Av. daily gain, lb.	Rep. 1	0.48	0.68	0.84
	2	0.51	0.59	0.70
	3	0.42	0.71	0.80
	Av.	0.47	0.65 <sup>b</sup>	0.78 <sup>b,c</sup>
Av. daily feed, lb.	Rep. 1	1.11	1.56	1.76
	2	1.11	1.76	1.50
	3	1.18	1.73	1.57
	Av.	1.13	1.68	1.61
Av. feed per lb. gain, lb.	Rep. 1	2.31	2.29	2.08
	2	2.16	2.98	2.15
	3	2.79	2.44	1.96
	Av.	2.42	2.57	2.06

<sup>a</sup> Two pigs died or removed from each treatment.

<sup>b</sup> Significantly faster than control (P < .01).

<sup>c</sup> Significantly faster than 10 gm. level (P < .05).

### Trial II

The results of trial II are summarized by treatment in table 3. Data for the 4 replicated lots per treatment are pooled, except for feed efficiency data, since lot differences did not appear important.

There was no significant difference in average daily gain between treatments. In most previous experiments at this station chlortetracycline has resulted in a growth response. Feed efficiency, however, was significantly (P < .05) improved by both chlortetracycline and the 10 gm. level of spectinomycin. Pigs fed rations containing these two antibiotics required approximately 7 percent less feed than the pigs fed the basal ration. This experiment was conducted during the winter months (Nov. 8 - Feb. 20) with pigs fed outside. Under these conditions the performance of all lots was quite good.

Table 3. Performance of Growing-Finishing Pigs Fed Spectinomycin or Chlortetracycline

Antibiotic (gm./ton)	Spectinomycin		Chlortetra- cycline	
	0	10	20	20
No. of pigs <sup>a</sup>	20	19	20	20
Init. wt., lb.	36.2	36.1	36.2	36.2
Final wt., lb.	201.8	201.3	201.3	201.9
Av. daily gain, lb.	1.67	1.70	1.65	1.73
Av. daily feed, lb.	5.67	5.40	5.39	5.46
Av. feed per lb. gain, lb.				
Rep. 1	3.39	3.22	3.10	3.17
2	3.49	2.97	3.21	3.12
3	3.29	3.22	3.36	3.20
4	3.34	3.26	3.40	3.09
Av.	3.40	3.17 <sup>b</sup>	3.27	3.14 <sup>b</sup>

<sup>a</sup> Four lots of 5 pigs each per treatment. One pig died in treatment 2.

<sup>b</sup> Significantly less than control (P < .05).

#### Summary

A new antibiotic, spectinomycin, was fed to early weaned pigs at levels of 10 and 100 gm. per ton. Both levels increased gains significantly (P < .01). Pigs fed the higher level of spectinomycin also gained significantly faster than those fed the lower level. Although pigs fed the antibiotic consumed more feed and those fed the high level of antibiotic required 15% less feed per unit of gain, these differences were not significant.

In a trial with growing-finishing pigs neither spectinomycin nor chlortetracycline increased gains. However, pigs fed 10 gm. of spectinomycin per ton or 20 gm. of chlortetracycline per ton required significantly (P < .05) less feed per unit of gain.