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Effect of Zinc Bacitracin on Performance of
Growing-Finishing Pigs

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The recent FDA (Food and Drug Administration) Task Force report on the use of antibiotics in animal feeds recommended that all antimicrobial agents used in human clinical medicine that fail to meet guidelines established by the Task Force in regard to safety be prohibited from use in animal feeds by December 31, 1973. It is not the purpose of this report to question the conclusions and recommendations of the Task Force. It has, however, necessitated that additional research be conducted to justify the efficacy and safety of antibiotics in swine feeds.

One antibiotic that is not used orally or as an injectable antibiotic in human medicine is zinc bacitracin. The experiment reported herein was conducted to evaluate the effectiveness of zinc bacitracin, to determine the effective dose range in growing-finishing pigs and to compare it with an antibiotic (tylosin) that has been used successfully as a swine feed additive.

Experimental Procedure

One hundred twenty crossbred pigs averaging 38 lb. were assigned to 24 lots of five pigs (three barrows and two gilts) from within groups based on weight, litter and sex. Groups of five pigs were randomly assigned to each of six treatments within four replicates. The pigs were housed in portable wood frame houses with concrete floors and a connecting 6 x 12 ft. concrete outside pen where feeders and waterers were located.

The compositions of the diets fed are shown in table 1. Diets were changed in level of protein from 16 to 13% when the pigs averaged about 110 pounds. The experiment was terminated when each pen averaged approximately 210 pounds.

Antibiotic treatments were as follows:

1. None
2. 10 grams of zinc bacitracin per ton
3. 20 grams of zinc bacitracin per ton
4. 40 grams of zinc bacitracin per ton
5. 80 grams of zinc bacitracin per ton
6. 20 grams of tylosin per ton

Results

Average daily gain, daily feed and feed per gain data are summarized in table 2.

Pigs fed antibiotics gained approximately 3 to 7% faster than the control pigs during the period from 38 to 112 pounds. These differences were not statistically significant. However, there were significant differences in feed efficiency

during this early growth period. Requiring the most feed per lb. of gain were pigs fed the control diet which did not contain any antibiotic. Performance of pigs fed the various levels of zinc bacitracin was similar, indicating that 10 grams of zinc bacitracin per ton of feed was as effective as higher levels.

During the finishing phase, 112 to 211 lb., gains and feed per lb. of gain were similar except for pigs fed tylosin. These pigs required about 25 lb. less feed per hundredweight of gain than the average of the other treatment groups. Combining the data over the entire feeding period showed only very small, nonsignificant differences in daily gains among treatments. Feed efficiency was also similar between control and zinc bacitracin-fed pigs but was improved about 7% when tylosin was fed. Daily feed consumption was also less when pigs were fed tylosin with other lots consuming similar amounts of feed daily.

There were significant differences in performance of replicate lots. Barrows gained significantly faster than gilts during all three periods.

Summary

The results of this experiment indicated no difference in performance of pigs fed 10, 20, 40 or 80 grams of zinc bacitracin per ton of diet. Pigs fed each of the antibiotic levels grew slightly faster and more efficiently than pigs not receiving antibiotic during the early growth period, 38 to 112 pounds. There were no advantages of feeding the antibiotic during the finishing period.

Pigs fed 20 grams of tylosin per ton of diet grew similarly to those pigs fed zinc bacitracin but were more efficient during the finishing and overall periods.

Table 1. Composition of Basal Diets (Percent)

	To 110 lb.	110 to 210 lb.
Ground yellow corn	76.9	84.0
Soybean meal (44%)	20.2	12.1
Dicalcium phosphate	1.7	1.7
Ground limestone	0.5	0.5
Trace mineral salt (0.8% zinc)	0.5	0.5
Premix ^a	0.2	0.2

^aProvided 1500 I.U. vitamin A, 150 I.U. vitamin D, 1.25 mg. riboflavin, 5 mg. pantothenic acid, 10 mg. niacin, 50 mg. choline and 7.5 mcg. vitamin B₁₂ per lb. of diet.

Table 2. Performance of Growing-Finishing Pigs Fed Tylosin and Various Levels of Zinc Bacitracin

Antibiotic Level, grams/ton	None	Zinc bacitracin				Tylosin
	0	10	20	40	80	20
No. of pigs ^a	19	19	19	20	20	19
Avg. initial wt., lb.	38.0	38.0	38.5	38.3	38.4	38.4
Avg. final wt., lb.	211.0	211.7	211.8	211.9	211.0	211.9
<u>Avg. daily gain, lb.</u>						
38 to 112 lb.	1.53	1.59	1.61	1.63	1.57	1.63
112 to 211 lb.	1.73	1.69	1.72	1.78	1.76	1.73
38 to 211 lb.	1.64	1.65	1.68	1.71	1.69	1.69
<u>Avg. daily feed, lb.</u>						
38 to 112 lb.	4.23	4.18	4.25	4.36	4.18	4.05
112 to 211 lb.	6.40	6.55	6.59	6.70	6.57	6.01
38 to 211 lb.	5.41	5.50	5.53	5.66	5.47	5.15
<u>Avg. feed/lb. gain, lb.</u>						
38 to 112 lb.*	2.74	2.59	2.63	2.67	2.64	2.53
112 to 211 lb.	3.70	3.85	3.73	3.75	3.69	3.49
38 to 211 lb.	3.29	3.31	3.24	3.29	3.21	3.06

^aFour replicated lots of 5 pigs (3 barrows and 2 gilts) per treatment.

Four pigs died or were removed from the experiment.

*Significant treatment difference (P<.05).