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Effects of increasing oregano oil on nursery pig performance

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EFFECTS OF INCREASING OREGANO OIL ON NURSERY PIG PERFORMANCE

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Summary

A total of 210 nursery pigs (PIC L327 × L42), with an initial weight of 11.9 lb and 21 d of age, were used in a 28-d growth study. The objective was to evaluate the effects of increasing oregano oil in diets for nursery pigs. Oregano oil is an extract derived from the Greek herb, *Origanum vulgare*, and has been speculated to have antimicrobial-like activity. Previous research at Kansas State University showed no improvement in growth performance in nursery pigs fed oregano oil (0.10% in the Phase 1 diet, and 0.05% in Phase 2). The present study evaluated growth performance of pigs fed diets containing either 0.05%, 0.10%, or 0.20% oregano oil for the entire 28-d study. There was no improvement in ADG, ADFI, F/G, or d-28 weights of pigs fed diets containing oregano oil, compared with performance of pigs fed the control diets. Also, there was no effect ($P>0.15$) of increasing the amount of oregano oil in the diet. But pigs fed neomycin-oxytetracycline had improved ADG, ADFI, and F/G ($P<0.03$), compared with those of pigs fed the control and oregano oil treatments, from d 0 to 14. Overall, (d 0 to 28), pigs fed neomycin-oxytetracycline had better ADG and ADFI ($P<0.006$) than the pigs fed the control diet had, and better ADG, ADFI, F/G, and final body weight ($P<0.04$) than pigs fed the oregano oil treatment had.

(Key Words: Antibiotics, Nursery, Oregano Oil, Pigs.)

Introduction

With more strict regulations on antibiotics in Europe, many swine producers in the United States are concerned about the potential of new restrictions banning feed-grade antibiotics. Several alternative ingredients have been proposed to partly or fully replace antibiotics in swine diets, such as egg immunoglobulins, mannan oligosaccharide, probiotics, fructo-oligosaccharide, spices, botanicals, essential oils, and herbs. But there is either limited or highly variable data to suggest that any of them can successfully replace antibiotics for growth performance. Oregano oil is a plant extract derived from the Greek herb, *Origanum vulgare*. Oregano is a perennial herb that is located in many countries, primarily Greece. Studies in Europe have observed that pigs had improved growth performance, compared with those fed the control diet without antimicrobials, when oregano oil was added to the diet. In a previous study conducted at Kansas State University, no improvement in nursery pig growth performance with oregano oil was found. In that study, pigs were fed oregano oil at 0.10% of the diet in Phase 1 (d 0 to 14) and 0.05% for Phase 2 (d 14 to 28). Oregano oil (5%) is mixed with an

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inert carrier (95%) to form the premix that is added to the diet. Because we observed no response at this dosage, we speculated that different dosages may be needed to achieve a growth response. Therefore, our objective was to determine the effects of increasing amounts of oregano oil in nursery pig diets.

Procedures

A total of 210 nursery pigs (PIC L327 × L42), with an initial weight of 11.9 lb and 21 d of age, were used in a 28-d growth study. Pigs were blocked by initial weight and sex, and were randomly allotted to one of five dietary treatments in a randomized complete-block design. Each pen contained seven pigs, with either four barrows and three gilts or three barrows and four gilts. There were six replications (pens) per treatment, with a total of 30 pens. Each pen (4 ft × 5 ft) had one water nipple and a self feeder, with woven wire flooring. This study was conducted at the Kansas State University Swine Research and Teaching Center in an environmentally regulated nursery.

Dietary treatments consisted of a negative control (no antimicrobials or oregano oil), positive control (neomycin sulfate, 140 g/ton and oxytetracycline, 140 g/ton), and three rates of oregano oil (0.05, 0.10, and 0.20%). Experimental diets were fed in meal form and in two phases (Table 1). Phase 1 diets were fed from d 0 to 14; Phase 2 was fed from d 14 to 28. Diets were formulated to contain 1.55% total dietary lysine, 15% whey, and 3.75% fish meal in Phase 1. In the Phase 2 diets, the lysine concentration was formulated to contain 1.45% total dietary lysine, with no specialty protein sources.

In the experimental diets, the antibiotic or the oregano oil was added at the expense of corn starch. Pigs were weighed weekly to de-

termine ADG, ADFI, and F/G. Data were analyzed by using the MIXED procedures of SAS v. 8.1 in a randomized complete-block design. Linear and quadratic polynomial contrasts were performed to determine the effects of increasing oregano oil.

Table 1. Diet Composition (As-fed Basis)

Item	Phase 1 ^a	Phase 2
Ingredient, %		
Corn	48.10	59.97
Soybean meal (46.5% CP)	29.00	34.98
Spray dried whey	15.00	---
Select menhaden fish meal	3.75	---
Monocalcium P (21% P)	1.15	1.60
Limestone	0.70	1.10
Salt	0.33	0.35
Vitamin premix	0.25	0.25
Trace mineral premix	0.15	0.15
L-threonine	0.13	0.15
L-lysine HCl	0.30	0.30
DL-methionine	0.15	0.15
Corn starch ^b	1.00	1.00
Calculated analysis		
Lysine, %	1.55	1.45
ME, kcal/lb	1,478	1,506
Crude protein, %	26.4	21.4
Ca, %	1.09	0.85
Available P, %	0.63	0.42

^aPhase 1 diets were fed in meal form from d 0 to 14 after weaning. Phase 2 diets were fed in meal form from d 14 to 28 after weaning.

^bOregano oil (0.05, 0.10, or 0.20%) or neomycin sulfate (140 g/ton) and oxytetracycline (140 g/ton) was added at the expense of corn starch to provide the experimental diets.

Results and Discussion

From d 0 to 14 (Table 2), pigs fed neomycin-oxytetracycline had improved ADG, ADFI, and F/G, ($P<0.03$), compared with those of pigs fed the oregano oil or the negative control diet. Overall (d 0 to 28), pigs fed the diet containing neomycin-oxytetracycline

had greater ADG and ADFI ($P<0.006$) than pigs fed the control diet had. Also, pigs fed neomycin-oxytetracycline had improved ADG, ADFI, F/G, and final body weight, compared with those of pigs fed oregano oil. Increasing amounts of oregano oil did not influence growth performance ($P>0.15$). Also, pigs fed oregano oil did not differ in performance ($P>0.13$) from pigs fed the control diet.

In conclusion, when oregano oil was added to the diet at 0.05, 0.10, or 0.20%, there were no improvements in growth performance of nursery pigs. These results, along with the previous research, suggest that oregano oil is not an effective growth-promoting feed additive in nursery pig diets.

Table 2. Effects of Increasing Oregano Oil on Nursery Pig Performance^a

Item	Control ^c	Neo-Terra ^d	Oregano Oil, %			SED	Probability, $P <^b$	
			0.05	0.10	0.20		Control vs. Neo-Terra	Neo-Terra vs. Oregano
Initial wt., lb	11.8	11.9	11.9	11.9	11.9	1.252	0.98	0.99
d 0 to 14								
ADG, lb	0.52	0.68	0.50	0.50	0.52	0.036	0.0001	0.0001
ADFI, lb	0.58	0.71	0.55	0.59	0.60	0.038	0.002	0.0003
F/G	1.12	1.04	1.11	1.18	1.16	0.035	0.03	0.001
d 0 to 28								
ADG, lb	0.79	0.92	0.79	0.78	0.79	0.038	0.002	0.0002
ADFI, lb	0.99	1.15	1.00	1.01	1.02	0.051	0.006	0.003
F/G	1.26	1.24	1.28	1.30	1.29	0.020	0.35	0.01
Final wt., lb	33.9	37.7	33.9	33.7	34.0	2.175	0.09	0.04

^aA total of 210 nursery pigs (PIC L327 × L42) initially 11.9 lb and 21 d of age with seven pigs/pen and six replications (pens)/treatment. A total of 30 pens with either four barrows and three gilts or three barrows and four gilts/pen.

^bNo linear or quadratic oregano oil effects ($P > 0.15$) or control versus oregano oil effects ($P > 0.13$).

^cContained no in-feed antimicrobial or oregano oil.

^dContained neomycin sulfate (140 g/ton) and oxytetracycline (140 g/ton).