INFLUENCE OF CALCIUM PROPIONATE ON STARTER PIG PERFORMANCE[1]

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Summary

A 24-d growth study was conducted to evaluate the effects of low rates of a dietary acidifier, calcium propionate, on weanling pig growth performance. Experimental diets, fed from d 0 to 10, were a control diet with no acidifier, the control diet with 4 lb/ton of Kemgest, or the control diet with 4 or 8 lb/ton calcium propionate. From d 10 to 24, pigs were fed a common phase II diet containing no acidifier. Adding a low rate of acidifier to the diet had no influence on pig performance.

(Key Words: Acidifiers, Nursery Pigs, Calcium Propionate.)

Introduction

Recent trials have indicated that ADG and F/G can be improved when low rates of acidifiers are added to diets fed immediately after weaning. Acidifiers that have been tested include Kemgest, Syneracid, Luprosil, and Digest Acid. Other low inclusion-rate acidifiers are also available, but have not received thorough testing for their potential impact on starter pig performance. A propionic acid source being used by many producers in Kansas fits this description. Therefore, the purpose of this trial was to determine the influence of that propionic acid source (calcium propionate) on starter pig performance.

Procedures

A total of 192 pigs (initially 10.8 lb and 12 ± 2 d of age) were used in a 24-d growth assay. Pigs were blocked by weight and allotted to one of four dietary treatments. There were eight pigs per pen and six pens per treatment. Pigs were housed in an environmentally controlled nursery in 5 × 5-ft pens on a commercial farm in northeastern Kansas. All pens contained one self-feeder and a nipple waterer to provide ad libitum access to feed and water.

From d 0 to 4, pigs were fed an SEW diet formulated to contain 1.70% lysine (Table 1). A transition diet formulated to contain 1.6% lysine was fed from day 4 to 10. At day 10, pigs were switched to a common diet formulated to 1.55% lysine. The SEW and transition diets were pelleted at the Kansas State University Grain Science feed mill using a 5/32-in. diameter die. Four experimental diets were fed during each phase: a control with no added acidifier, 4 lb/ton added Kemgest, 4 lb/ton added calcium propionate, and 8 lb/ton added calcium propionate. The pigs were fed a common phase II (Table 1) diet in meal form from d 10 to 24.

Average daily gain, ADFI, and feed efficiency were determined by weighing pigs and measuring feed disappearance on day 4, 10, 17, and 24 after weaning. All data were analyzed as a randomized complete block design with pen as the experimental unit. Pigs were blocked on postweaning weight, and analysis of variance was performed using the GLM procedure of SAS.

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Results and Discussion

From d 0 to 10, no significant differences(P>.05) in ADG, ADFI, or F/G occurred among treatments (Table 2). Adding calcium propionate to the diet tended (P<.08) to increase ADFI from d 0 to 10, however, this did not significantly affect ADG or F/G. Experimental diets fed from d 0 to 10 did not influence subsequent performance from d 10 to 24. For the trial, ADG, ADFI, and F/G were similar among treatments.

Several experiments have indicated that adding acidifiers to diets for segregated early-weaned pigs increases growth performance. Young pigs 2 to 3 weeks old, which are just starting on feed, have relatively low secretions of HCl, gastrin, pancreatic lipase, amylase, and trypsin from the stomach and pancreas. These all are released in partial response to a low pH in the intestine. Lowering the pH by the use of organic acids theoretically can increase the secretion and activity of these enzymes.

Prior research at Kansas State University has shown that adding acidifiers to diets (containing 25% dried whey and 7.5% plasma) improved feed efficiency by as much as 19% during the first 7 days postweaning. Another trial demonstrated that adding fumaric acid to the diet (containing 20% dried whey and 10% plasma) resulted in tendencies to improve ADG and F/G. However, we did not see statistical improvements in growth performance with the addition of acidifiers in this trial.

The observed trends are similar to what has been seen in past trials. Calcium propionate, a relatively inexpensive source of organic acids, may be needed at higher concentrations to affect growth performance in the nursery. Further experiments are necessary to determine the value of calcium propionate in nursery diets.

Table 1. Compositions of Basal Diets

Ingredient, %	SEW	Transition	Phase II
Corn	33.07	39.72	-
Milo	-	-	48.69
Soybean meal (46.5%)	12.71	23.01	28.25
Spray-dried whey	25.00	20.00	10.00
Spray-dried animal plasma	6.70	2.50	-
Fish meal	6.00	2.50	5.00
Soybean oil	6.00	5.00	-
Choice white grease	-	-	5.00
Lactose	5.00	-	-
Spray-dried blood meal	1.65	2.50	-
Medication[a]	1.00	1.00	0.25
Monocalcium P (21% P)	0.75	1.30	1.00
Limestone	0.45	0.73	0.60
Salt	0.20	0.30	0.25
Vitamin premix	0.25	0.25	0.25
Zinc oxide	0.38	0.38	0.06
Corn starch[b]	0.40	0.40	-
Lysine HCl	0.15	0.15	0.15
DL-methionine	0.15	0.13	0.05
Trace mineral premix	0.15	0.15	0.15

[a]Provided 50 g/ton carbadox d 0 to 10, 50 g/ton tylosin d 10 to 24.
[b]Cornstarch was replaced by acidifier to achieve treatments.

Table 2. Influence of Calcium Propionate on Nursery Pig Performance[a]

			Ca Propionate			Contrast
Item	Control	Kemgest	4 lb/ton	8 lb/ton	SEM	Control vs. Acidifier
Day 0 to 10						
ADG, lb	.42	.42	.44	.45	.016	.60
ADFI, lb	.45	.44	.47	.49	.012	.08
F/G	1.09	1.06	1.08	1.10	.040	.86
Day 10 to 24						
ADG, lb	.81	.82	.82	.85	.026	.73
ADFI, lb	1.09	1.09	1.13	1.12	.030	.55
F/G	1.32	1.33	1.38	1.32	.036	.66
Day 0 to 24						
ADG, lb	.65	.65	.66	.68	.015	.41
ADFI, lb	.82	.82	.86	.86	.019	.28
F/G	1.26	1.26	1.29	1.26	.027	.76

[a]Values are means of 192 pigs (initially 11.6 lb and 15 to 21 d of age) with 8 pigs per pen and 6 replicate pens per treatment.