OPTIMAL DIETARY SEQUENCE IN A NURSERY-PHASE FEEDING PROGRAM FOR SEGREGATED EARLY-WEANED (9±1 D OF AGE) PIGS[1]

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Summary

Two hundred forty weanling pigs (initially 7.2 lb BW and 9 ± 1 d of age) were used to compare four dietary sequences of three diets in a 21-d growth trial. Diet A was formulated to contain 1.7% lysine and contained 7.5% spray-dried porcine plasma and 1.75% spray-dried blood meal. Diet B was formulated to contain 1.4% lysine and contained 2.5% spray-dried porcine plasma and 2.5% spray-dried blood meal. Diet C was formulated to contain 1.25 % lysine and contained 2.5% spray-dried blood meal. The four dietary sequences were as follows AAB, AAC, ABB, and ABC, with each letter indicating the diet fed from d 0 to 7, d 7 to 14, and d 14 to 21 postweaning, respectively. Pigs fed diet B from d 7 to 14 postweaning had numerically lower average daily gain (ADG) than pigs remaining on diet A. However, pigs fed diet B from d 14 to 21 postweaning had higher ADG compared to pigs fed diet C. Pigs fed dietary sequences AAB or ABB were 11% heavier on d 21 postweaning than pigs fed dietary sequences AAC or ABC. In conclusion, dietary sequences AAB and ABB provided identical performance from d 0 to 21 postweaning; however, utilization of a transition diet (B) from d 7 to 14 postweaning substantially reduced feed cost per lb of gain for pigs weaned at 9 d of age.

(Key Words: Starter, Performance, Diet Sequence.)

Introduction

Utilization of early weaning (< 14 d of age) in disease elimination procedures and to increase production efficiency is becoming common place in the swine industry. These procedures include modified, medicated, early weaning and multiple-site production. Keeping nursery feed costs to a minimum while maintaining performance will be critical for making early-weaning disease elimination programs economical. Early weaning provides new challenges in the development of nursery phase feeding programs to minimize feed cost and maximize performance. Thus, our objective was to develop an optimal dietary sequence for early weaned pigs. The objective was accomplished by feeding four dietary sequences of three diets in a nursery-phase feeding program.

Procedures

Two hundred forty weanling pigs (initially 7.2 lb BW and 9 ± 1 d of age) were used in a 21-d growth trial to evaluate the influence of four dietary sequences on growth performance. The experiment was designed as a split plot with five replicates per dietary sequence. The whole plot was dietary sequence, and the subplot was time period. Pigs were blocked by weight. Three diets (Table 1) were used to form the four dietary sequences. Diet A was formulated to contain 1.7% lysine, 7.5% spray-dried porcine plasma, 1.75% spray-dried

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blood meal, 3% spray-dried egg protein, 20% dried whey, and 10% dried skim milk. Diet B was formulated to contain 1.4% lysine, 2.5% spray-dried porcine plasma, 2.5% spray-dried blood meal, and 20% dried whey. Diet C was formulated to contain 1.25% lysine, 2.5% spray-dried blood meal, and 10% dried whey. All diets were pelleted. The three diets were combined in four sequences to mimic four nursery-phase feeding programs. The four dietary sequences were as follows AAB, AAC, ABB, and ABC with each letter indicating diet fed from d 0 to 7, d 7 to 14, and d 14 to 21 postweaning, respectively. As indicated, all pigs were fed the A diet from d 0 to 7 postweaning. Pigs were housed (12 pigs/pen) in an environmentally controlled nursery with ad libitum access to feed and water. Pigs were weighed and feed disappearance was measured on d 7, 14, and 21 to evaluate ADG, average daily feed intake (ADFI), and feed efficiency (F/G). Data were analyzed using a repeated measures analysis of variance. A Satterthwaite degree of freedom correction was utilized to make the comparison across dietary sequence for each time period.

Results and Discussion

From d 0 to 7 postweaning, pigs fed the common diet A gained .25 lb/d, consumed .30 lb/d, and had a feed efficiency of 1.20. No differences occurred in performance for this time period. No differences were seen in feed efficiency between dietary sequences for any time period of the experiment. Pigs fed Diet B from d 7 to 14 postweaning had numerically lower ADG than pigs that remained on diet A. However, pigs fed diet B from d 14 to 21 postweaning had higher ADG ($P<.05$) compared to pigs fed diet C. Pigs fed sequence ABB had higher ADFI ($P<.05$) compared to pigs fed sequences AAB, AAC, or ABC. Pigs fed dietary sequences AAB or ABB were 11% heavier on d 21 postweaning ($P<.05$) than pigs fed dietary sequences AAC or ABC. Comparing different sequences on the basis of performance and feed cost per lb of gain showed that sequence ABB had a lower feed cost per lb of gain from d 0 to 21 postweaning and produced pigs that weighed 1.3 lb more on d 21 postweaning compared to sequence AAC. Pigs fed sequence AAB and ABB had identical average weights on d 21 postweaning, but sequence ABB had a substantially lower cost per lb of gain. The lower feed cost per lb of gain would result in a savings in feed cost of approximately $.58 per pig. When comparing sequence ABC to ABB, pigs receiving sequence ABB were 1.3 lb heavier on d 21 postweaning. However, pigs receiving sequence ABC had a lower feed cost per lb of gain. This trial illustrates the large impact nursery phase feeding programs have on feed cost per lb of gain. In conclusion, dietary sequences AAB and ABB provided identical performance from d 0 to 21 postweaning; however, utilization of a transition diet (B) from d 7 to 14 postweaning substantially reduced feed cost per lb of gain for pigs weaned at 9 d of age.

Table 1. Diet Composition[a]

	Diet		
Item, %	A	B	C
Corn	41.05	45.60	58.29
Soybean meal, (48% CP)	7.90	20.27	21.90
Dried whey, edible grade	20.00	20.00	10.00
Dried skim milk	10.00	--	--
Spray-dried porcine plasma	7.50	2.50	--
Spray-dried egg protein	3.00	--	--
Spray-dried blood meal	1.75	2.50	2.50
Soybean oil	5.00	5.00	3.00
Monocalcium phosphate	1.67	1.80	1.96
Limestone	.55	.70	.82
Antibiotic[b]	1.00	1.00	1.00
Trace mineral premix	.15	.15	.15
Vitamin premix	.25	.25	.25
DL-methionine	--	.05	.05
L-lysine HCl	.10	.10	.15
Copper sulfate	.075	.075	.075
Total	100	100	100

[a]Diets were formulated to contain 1.7% lysine (Diet A), 1.4% lysine (Diet B), or 1.25% lysine (Diet C) and .9% Ca and .8% phosphorus.
[b]Provided 50 g/ton carbadox.

Table 2. Growth Performance of Pigs Fed Four Dietary Sequences in a Nursery-Phase Feeding Program[a]

	Dietary Sequence				
Item	AAB	AAC	ABB	ABC	CV
d 7 to 14					
ADG, lb[b]	.61	.62	.56	.49	14.0
ADFI, lb	.66	.65	.66	.63	7.7
F/G	1.09	1.06	1.20	1.29	18.9
d 14 to 21					
ADG, lb[c]	.75	.59	.80	.64	14.0
ADFI, lb[d]	.82	.74	.96	.83	7.7
F/G	1.09	1.26	1.20	1.30	18.9
d 21					
Wt, lb[c]	18.5	17.2	18.5	17.2	9.4
d 0 to 21					
Cost/lb gain, $[e]	.332	.316	.280	.230	----

[a]Two hundred forty weanling pigs were used (initially 7.2 lb and 9 d of age), 12 pigs/pen, 5 pens per sequence.
[b]AAB or AAC vs ABC (P<.05).
[c]AAB or ABB vs AAC or ABC (P<.05).
[d]ABB vs AAB, AAC, or ABC (P<.05) ABC vs AAC (P<.09).
[e]Diet costs: A, $.40/lb; B, $.20/lb; C, $.10/lb.