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Abstract

A total of 180 pigs (l2.961b and 21 d of age) was used in a 28 d trial to determine the effects of substituting flash-dried poultry protein for select menhaden fish meal in the phase II diet on the performance of weanling pigs. Five dietary treatments were fed from d 7 to d 28 after weaning (phase II). Select menhaden fish meal (2.5 and 5%) and flash-dried poultry protein (2.85 and 5.70/0) replaced soybean meal in the control diet on a lysine basis. Pigs fed the diets containing select menhaden fish meal and flash-dried poultry protein had similar ADG and ADFI; however, neither protein source improved performance when compared to the control diet. Further research must be conducted in a field environment in order to determine if fish meal and poultry protein will express a greater response compared to the control diet.; Swine Day, Manhattan, KS, November 19, 1998

Keywords

Swine day, 1998; Kansas Agricultural Experiment Station contribution; no. 99-120-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 819; Swine; Poultry protein; Fish meal

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EFFECTS OF FLASH-DRIED POULTRY PROTEIN AND SELECT MENHADEN FISH MEAL ON GROWTH PERFORMANCE OF WEANLING PIGS[1]

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Summary

A total of 180 pigs (12.96 lb and 21 d of age) was used in a 28 d trial to determine the effects of substituting flash-dried poultry protein for select menhaden fish meal in the phase II diet on the performance of weanling pigs. Five dietary treatments were fed from d 7 to d 28 after weaning (phase II). Select menhaden fish meal (2.5 and 5%) and flash-dried poultry protein (2.85 and 5.7%) replaced soybean meal in the control diet on a lysine basis. Pigs fed the diets containing select menhaden fish meal and flash-dried poultry protein had similar ADG and ADFI; however, neither protein source improved performance when compared to the control diet. Further research must be conducted in a field environment in order to determine if fish meal and poultry protein will express a greater response compared to the control diet.

(Key Words: Poultry Protein, Fish Meal.)

Introduction

The development of a complex nursery diet with highly digestible nutrients has created a demand for specialty proteins such as select menhaden fish meal. However, recent weather events (El Nino) have been blamed for a decrease in the menhaden fish catch and a reduced supply of high quality fish meal for the feed industry. Flash-dried poultry protein is high in protein with an amino acid profile comparable to that of select menhaden fish meal (Table 1). The objective of this experiment was to compare flash-dried poultry protein to select menhaden fish meal in phase II nursery diets.

Procedures

A total of 180 pigs (initially 12.96 lb and 21 d of age) was used in a 28-day growth trial. Pigs were blocked by weight, equalized for gender and ancestry, and allotted randomly to one of five dietary treatments with a total of six pigs per pen and six pens per treatment. Pigs were housed in an environmentally controlled nursery in 5 × 5 ft pens with one self-feeder and nipple waterer to allow ad libitum access to feed and water. Pigs were weighed and feed disappearance was determined on d 0, 7, 14, 21 and 28 to calculate ADG, ADFI, and F/G.

Table 1. Compositions of Flash-Dried Poultry Protein and Menhaden Fish Meal[a]

Item, %	Poultry Protein	Fish Meal
Protein	65.0	61.2
Calcium	3.10	5.19
Phosphorus	3.00	2.88
Lysine	4.17	4.74
Isoleucine	2.61	2.85
Leucine	4.80	4.48
Methionine	0.84	1.75
Met. & Cys.	1.45	2.33
Threonine	3.00	2.51
Tryptophan	0.53	0.65
Valine	3.25	3.19

[a]Values expressed on an as-fed basis.

[1]The authors thank Griffin Industries for providing the flash-dried poultry protein and partial financial support.

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The trial had two phases with experimental diets being fed from d 7 to 28. The phase I diet was a pelleted corn-soybean based diet containing 5% spray-dried animal plasma, 1.65% spray dried blood meal, 2.5% select menhaden fish meal, and 20% dried whey (Table 2). This diet was fed to all pigs from d 0 to d 7 and was formulated to contain 1.5% lysine, .42% methionine, .9% Ca, and .8% P. The phase II diets consisted of a control, two levels of select menhaden fish meal (2.5 and 5%), and two levels of flash-dried poultry protein (2.85 and 5.7%). The fish meal and poultry protein replaced soybean meal on a lysine basis. All phase II diets contained 10% dried whey and were formulated to contain 1.25% lysine.

Data were analyzed as a randomized complete block design using general linear model procedures. Initial weight was used to establish blocks. Pig weight on d 7 was used as a covariate for the phase II analysis, and the data were tested for linear and quadratic responses within each protein source.

Results and Discussion

No differences were observed in ADG, ADFI, and F/G when pigs were fed a common phase I diet (d 0 to 7 postweaning). From d 7 to 28 (phase II), ADG and ADFI were similar among pigs fed the fish meal and poultry protein diets (Table 3). However, the pigs on the control diet had higher ADG ($P<.05$) and ADFI ($P<.05$). Increasing levels of both fish meal and poultry protein in phase II diets resulted in linear reductions ($P<.05$) in ADG and ADFI. Feed efficiency was similar across all treatments.

For the cumulative study (d 0 to 28), ADG and F/G were not influenced by protein source. However, increasing fish meal in the diet linearly reduced ($P<.05$) ADFI.

These results suggest that little difference in growth performance occurs between pigs fed select menhaden fish meal and flash-dried poultry protein. In addition, pigs fed the control diet tended to have higher ADG and ADFI, suggesting that the use of dried whey with no other specialty proteins provided adequate growth for pigs in this particular research environment. This situation demands further research in a field study to determine if nursery pigs fed the previously discussed phase II diets will respond in a similar manner or not.

Table 2. Experimental Diets

Ingredient, %	Phase I	Control	Select Menhaden Fish Meal 2.50%	Select Menhaden Fish Meal 5.00%	Flash-Dried Poultry Protein 2.85%	Flash-Dried Poultry Protein 5.70%
Corn	45.75	52.93	55.21	57.50	54.68	56.40
Soybean meal, 46.5%	15.78	29.13	24.82	20.49	24.83	20.50
Choice white grease		3	3	3	3	3
Monocalcium phos., 21% P	1.28	1.85	1.60	1.35	1.70	1.55
Limestone	.79	1	.80	.60	.85	.75
Salt	.1	.25	.25	.25	.25	.25
Vitamin premix	.25	.25	.25	.25	.25	.25
Trace mineral premix	.15	.15	.15	.15	.15	.15
Antibiotic	1	1	1	1	1	1
Zinc oxide	.38	.25	.25	.25	.25	.25
Lysine HCl	.15	.15	.15	.15	.15	.15
DL-methionine	.125	.045	.025	.01	.045	.05
Select menhaden fishmeal	2.5		2.5	5		
Flash-dried poultry protein					2.85	5.7
Spray dried whey	20	10	10	10	10	10
Spray-dried animal plasma	5					
Spray-dried blood meal	1.75					
Soybean oil	5					
Total	100.0	100.0	100.0	100.0	100.0	100.0
Calculated analysis, %						
Lysine	1.5	1.25	1.25	1.25	1.25	1.25
Crude protein	21.14	19.4	19.1	18.8	19.4	19.4
Ca	0.90	0.90	0.90	0.89	0.89	0.90
P	0.80	0.80	0.80	0.80	0.80	0.80

Table 3. Evaluation of Flash-Dried Poultry Protein and Select Menhaden Fish Meal in Phase II Diets[a]

Item	Control	Fish Meal, % 2.5	Fish Meal, % 5.0	Poultry Protein, % 2.85	Poultry Protein, % 5.7	CV
Day 0 to7						
ADG	.71	.72	.75	.73	.75	9.18
ADFI	.71	.70	.78	.70	.71	8.43
F/G	1.01	.98	1.04	.96	.96	9.91
Day 7 to 28[b]						
ADG[e,f]	1.09[c]	1.03[d]	.98[d]	1.01[d]	1.00[d]	4.98
ADFI[e,f]	1.78[c]	1.74[c,d]	1.64[d]	1.67[d]	1.65[d]	5.17
F/G	1.64	1.69	1.66	1.64	1.63	5.46
Day 0 to 28						
ADG	.99	.95	.94	.93	.95	6.53
ADFI[e]	1.51	1.47	1.43	1.42	1.42	5.47
F/G	1.53	1.57	1.53	1.52	1.50	5.42

[a]A total of 180 weanling pigs, initially 12.96 lb and 21 days of age, with six pigs per pen and six pens per treatment.
[b]d 7 weight was used as a covariate.
[c,d] Means on the same row within control or protein source with different superscripts differ (P<.05).
[e]Linear effect for select menhaden fish meal (P<.05).
[f]Linear effect for flash-dried poultry protein (P<.05).