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A combination of spray-dided porcine plasma and spray-dried blood meal optimizes starter pig performance

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Abstract

A total of 298 weanling pigs (initially 12.11b and 19 d of age) was used in a 25-<1 growth trial to examine the influence of various combinations of spray-dried porcine plasma>(SDPP) and spray-dried blood meal (SDBM) in a high nutrient density diet on starter pig performance. Pigs were allotted by weight to eight replicates of five treatments with seven to eight pigs per pen. Pigs were assigned to one of five dietary treatments with 0, 25, 50, 75, or 100% of the SDPP replaced with SDBM on an equal lysine basis. Therefore, diets contained 10, 7.5,5.0, 2.5, or 0% SDPP combined with 0, 1.63, 3.25, 4.8, or 6.5% SDBM, respectively. All phase I diets were formulated to contain 20% dried whey, 1.50% lysine, .81% isoleucine, and .37% methionine. These diets were fed from d 0 to 14 postweaning. On d 14, all pigs were switched to a common phase II diet containing 10% dried whey and 2.5% SDBM and was formulated to 1.25% lysine. Pigs were fed this diet for the remainder of the trial (d 14 to 25 postweaning). A quadratic response occurred for average daily gain and feed efficiency during phase I, with pigs fed a combination of spray-dried porcine plasma and spray-dried blood meal having superior performance compared to pigs fed diets containing only spray-dried plasma or spray-dried blood. Maximum performance was seen with the combination of 7.5% spray-dried porcine plasma and 1.63% spray-dried blood meal. Therefore, the results of this trial show that phase I diet cost can be reduced and performance improved by formulating the diet with a combination of spray-dried porcine plasma and spray-dried blood meal rather than spray-dried plasma alone.; Swine Day, Manhattan, KS, November 19, 1992

Keywords

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A COMBINATION OF SPRAY-DRIED PORCINE PLASMA AND SPRAY-DRIED BLOOD MEAL OPTIMIZES STARTER PIG PERFORMANCE[1]

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Summary

A total of 298 weanling pigs (initially 12.1 lb and 19 d of age) was used in a 25-d growth trial to examine the influence of various combinations of spray-dried porcine plasma (SDPP) and spray-dried blood meal (SDBM) in a high nutrient density diet on starter pig performance. Pigs were allotted by weight to eight replicates of five treatments with seven to eight pigs per pen. Pigs were assigned to one of five dietary treatments with 0, 25, 50, 75, or 100% of the SDPP replaced with SDBM on an equal lysine basis. Therefore, diets contained 10, 7.5, 5.0, 2.5, or 0% SDPP combined with 0, 1.63, 3.25, 4.8, or 6.5% SDBM, respectively. All phase I diets were formulated to contain 20% dried whey, 1.50% lysine, .81% isoleucine, and .37% methionine. These diets were fed from d 0 to 14 postweaning. On d 14, all pigs were switched to a common phase II diet containing 10% dried whey and 2.5% SDBM and was formulated to 1.25% lysine. Pigs were fed this diet for the remainder of the trial (d 14 to 25 postweaning). A quadratic response occurred for average daily gain and feed efficiency during phase I, with pigs fed a combination of spray-dried porcine plasma and spray-dried blood meal having superior performance compared to pigs fed diets containing only spray-dried plasma or spray-dried blood. Maximum performance was seen with the combination of 7.5% spray-dried porcine plasma and 1.63% spray-dried blood meal. Therefore, the results of this trial show that phase I diet cost can be reduced and performance improved by formulating the diet with a combination of spray-dried porcine plasma and spray-dried blood meal rather than spray-dried plasma alone.

(Key Words: Starter, Porcine Plasma, Blood Meal.)

Introduction

Previous research at Kansas State University has compared spray-dried porcine plasma, spray-dried blood meal, and dried skim milk as protein sources in the phase I high nutrient density diet for the early weaned pig. Results of these trials indicated that spray-dried porcine plasma (SDPP) was superior to spray-dried blood meal (SDBM) and dried skim milk in average daily gain (ADG) and average daily feed intake (ADFI). However, in those trials, each protein source was a total substitution for dried skim milk on an equal lysine basis. Combinations of SDPP and SDBM have not been investigated. Because SDBM is approximately 25% of the cost of SDPP, a combination of SDPP and SDBM would dramatically reduce the cost of the phase I diet. Therefore, the objective of this experiment was to evaluate the effectiveness of various combinations of SDPP and SDBM in the phase I diet on starter pig performance.

[1]The authors wish to thank Steve Eichman and Eichman Farms, St. George, KS for use of facilities and animals for this experiment.

Procedures

A total of 298 weanling pigs (initially 12.1 lb and 19 d of age) was used in a 25 d growth trial to examine the influence of varying combinations of SDPP and SDBM on starter pig performance. Pigs were allotted by weight to eight replicates of five treatments with seven to eight pigs per pen. Pigs were assigned to one of five dietary treatments with 0, 25, 50, 75, or 100% of the SDPP replaced with SDBM on an equal lysine basis (Table 1). Therefore, diets contained 10, 7.5, 5.0, 2.5, or 0% SDPP and 0, 1.63, 3.25, 4.8, or 6.5% SDBM, respectively. All phase I diets were formulated to contain 20% dried whey, 1.50% lysine, .81% isoleucine, and .37% methionine. These diets were fed from d 0 to 14 postweaning. On day 14, all pigs were switched to a common phase II diet containing 10% dried whey and 2.5% SDBM and was formulated to 1.25% lysine. Pigs were fed this diet for the remainder of the trial (d 14 to 25 postweaning). Pigs were housed in an environmentally controlled nursery and were allowed ad libitum access to feed and water. Pigs were weighed and feed disappearance was measured on days 7, 14, and 25 postweaning to determine average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency (F/G).

Results and Discussion

Quadratic responses occurred for ADG ($P<.06$) and F/G ($P<.09$) during phase I (Table 2), with pigs fed combinations of SDPP and SDBM having superior performance compared to pigs fed diets containing SDPP and SDBM alone. Maximum performance was achieved when the diet contained 7.5% SDPP and 1.63% SDBM. Phase I treatment had no influence on phase II and overall performance, with similar pig performance on all treatments for the 25-d trial. However, a numeric improvement occurred in phase II performance for pigs that received a diet containing some blood meal in phase I. Therefore, if SDBM is used in the phase II diet, it may be beneficial to include blood meal in the phase I diet. In addition, decreasing the amount of SDPP in the phase I diet from 10% to 7.5% with SDBM results in a $60/ton reduction in diet cost. In conclusion, diet cost can be decreased in phase I and performance increased by replacing a portion of the SDPP with SDBM. Optimum performance in this trial was achieved with 7.5% SDPP and 1.63% SDBM.

Table 1. Diet Composition[a]

	Plasma:blood combinations					
Item, %	100:0	75:25	50:50	25:75	0:100	Phase II
Corn	43.88	44.86	45.80	46.79	47.73	58.92
Soybean meal (48% CP)	18.98	18.89	18.84	18.76	18.67	21.03
Dried whey,edible grade	20.00	20.00	20.00	20.00	20.00	10.00
Porcine plasma, spray-dried	10.00	7.50	5.00	2.50	-	-
Blood meal, spray-dried	-	1.63	3.25	4.88	6.51	2.50
Soybean oil	3.00	3.00	3.00	3.00	3.00	3.00
Monocalcium phosphate (21% P)	1.85	1.83	1.81	1.79	1.77	1.97
Limestone	.69	.69	.69	.69	.69	.83
Antibiotic[b]	1.00	1.00	1.00	1.00	1.00	1.00
Vitamin premix	.25	.25	.25	.25	.25	.25
Trace mineral premix	.15	.15	.15	.15	.15	.15
Copper sulfate	.075	.075	.075	.075	.075	.075
DL-Methionine	.061	.057	.052	.048	.045	.061
Selenium premix	.05	.05	.05	.05	.05	.05
Isoleucine	-	-	-	.005	.04	-
L-Lysine HCl	-	-	-	-	-	.15
Total	100.00	100.00	100.00	100.00	100.00	100.00

[a]Diets were formulated to contain 1.50% lysine, .81% isoleucine, and .37% methionine in phase I and 1.25% lysine in phase II.
[b]Provided 150 g/ton Apramycin in phase I and 50 g/ton Carbadox in phase II.

Table 2. Growth Performance of Pigs Fed Various Combinations of Spray-dried Porcine Plasma and Spray-dried Blood Meal[a]

	Plasma:blood meal combinations					
Item	100:0	75:25	50:50	25:75	0:100	CV
d 0 - 14						
ADG, lb[b]	.51	.57	.53	.54	.51	8.8
ADFI, lb	.63	.67	.64	.62	.62	6.9
F/G[c]	1.23	1.16	1.20	1.15	1.22	6.6
d 0 - 25						
ADG, lb	.72	.76	.74	.75	.73	5.5
ADFI, lb[c]	1.01	1.08	1.06	1.04	1.04	5.1
F/G	1.41	1.41	1.43	1.39	1.39	3.2

[a]298 weanling pigs were used (initially 12.1 lb and 19 d of age), 14-15 pigs per pen with 4 pens per treatment.
[b]Quadratic response ($P < .06$).
[c]Quadratic response ($P < .09$).