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OPTIMUM LEVEL OF SPRAY-DRIED BLOOD MEAL IN PHASE II DIET¹

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Summary

A total of 744 pigs (initially 12.8 lb and 22 d of age) was used in a 28 d trial to determine the effects of increasing levels of blood meal in the phase II (d 7 to 28) diet. Pigs were allotted by sex and weight and placed in pens containing 13 to 14 pigs each. A common phase I diet was fed for the first 7 days postweaning. The phase I diet contained 37.5% dried whey and 7.5% porcine plasma and was formulated to contain 1.5% lysine. After the phase I period, pigs were assigned to one of six dietary treatments that contained 10% dried whey and either 0, 1, 2, 3, 4, or 5% spray-dried blood meal. These diets were fed for the entire phase II period (d 7 to 28 postweaning). Phase II diets were formulated to contain 1.25% lysine and a minimum of .68% isoleucine and .30% methionine. During phase I (d 0 to 7), average daily gain, average daily feed intake, and feed efficiency (F/G) were .34 lb, .38 lb, and 1.28, respectively. During phase II (d 7 to 28), quadratic improvements occurred in average daily gain, average daily feed intake, and feed efficiency, with optimum performance achieved at approximately the 2% inclusion rate of spray-dried blood meal. Therefore, the results of this trial indicate that the optimal level of spray-dried blood meal in the phase II diet is approximately 2%.

(Key Words: Starter, Blood Meal, Performance.)

Introduction

The advent of spray-drying various by-products has produced many effective feed ingredients that are available for use in swine diets. Previous research conducted at Kansas State University has shown that spray-dried porcine plasma is an effective ingredient to improve starter pig performance. However, spray-dried porcine plasma is not cost effective in diets other than the high nutrient density diet (phase I). Therefore, alternative products need to be evaluated for use in diets for the later stages of the nursery phase. One such ingredient has been spray-dried blood meal, which is a by-product of the meat processing industry. This particular feedstuff has been shown to be quite effective when used in the phase II diet for nursery pigs. In previous trials, 2.5% spray-dried blood meal was a superior protein source in the phase II diet compared to soy protein concentrate, extruded soy protein concentrate, and fish meal. However, in past trials, blood meal replaced 5% select menhaden fish meal on an equal lysine basis, so the ideal inclusion rate in the diet was not known. This trial was conducted to evaluate various levels of spray-dried blood meal in the phase II diet and to determine where pig performance was maximized.

Procedures

A total of 744 pigs (initially 12.8 lb and 22 d of age) was used in a 28 d trial. Pigs

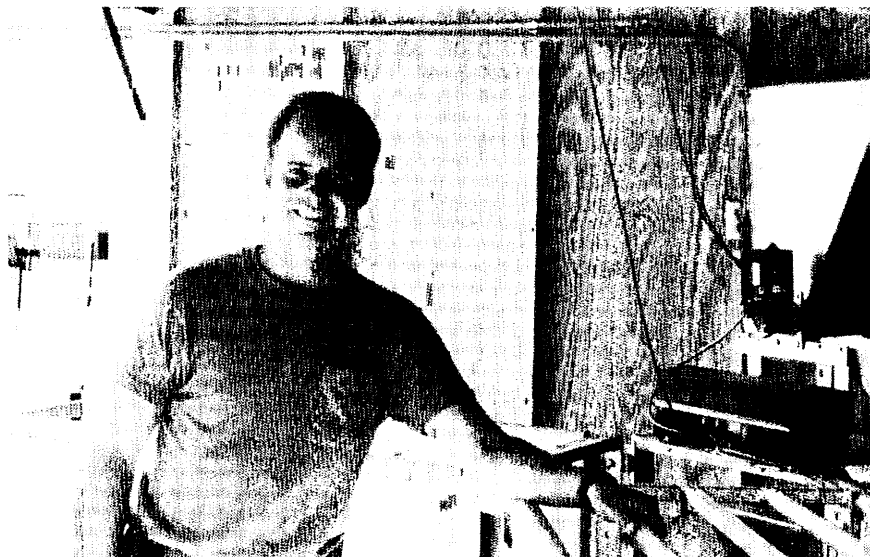
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were allotted by sex and weight and placed in pens containing 13 to 14 pigs each. A common phase I diet was fed for the first 7 days postweaning. The phase I diet contained 37.5% dried whey and 7.5% porcine plasma and was formulated to 1.5% lysine. After the phase I period, pigs were assigned to one of six dietary treatments that contained 10% dried whey and either 0, 1, 2, 3, 4, or 5% spray-dried blood meal. These diets were fed for the entire phase II period (d 7 to 28 postweaning). Phase II diets (Table 1) were formulated to contain 1.25% lysine, .68% isoleucine, and .30% methionine. Pigs and feeders were weighed on d 7, 14, and 28 postweaning to evaluate average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency (F/G).

Results and Discussion

During phase I (d 0 to 7), ADG, ADFI, and F/G were .34 lb, .38 lb, and 1.28,

respectively. During the first week of phase II (d 7 to 14), a linear and quadratic response ($P < .01$) in ADG occurred with the addition of blood meal to the diet (Table 2). Average daily feed intake followed a similar trend, with pigs receiving at least 2% blood meal consuming approximately .10 lb/d more than those pigs receiving no blood meal. A significant ($P < .01$) improvement in feed efficiency also occurred with the addition of blood meal during the first week of phase II. During phase II (d 7 to 28) and the overall trial, quadratic improvements ($P < .01$) occurred in ADG, ADFI, and F/G with the addition of blood meal. The optimum level of performance was achieved at the 2% blood meal level, with ADG, ADFI, and F/G being .68 lb, 1.05 lb, and 1.56, respectively, in the phase II period. The results of this trial indicate that an inclusion level of approximately 2% spray-dried blood meal in the phase II diet will optimize pig performance and cost effectiveness.



Joe Carpenter, swine herdsman, inspects the new computerized sow feeder.

Table 1. Phase II Diet Composition^a

Item, %	Spray-dried blood meal, %					
	0	1	2	3	4	5
Corn	49.62	51.74	53.85	55.97	58.08	60.20
Soybean meal (48% CP)	33.07	29.90	26.73	23.55	20.38	17.21
Dried whey, edible grade	10.00	10.00	10.00	10.00	10.00	10.00
Blood meal	-	1.00	2.00	3.00	4.00	5.00
Soybean oil	3.00	3.00	3.00	3.00	3.00	3.00
Monocalcium phosphate (21% P)	1.76	1.81	1.87	1.93	1.98	2.04
Limestone	.81	.81	.81	.81	.81	.82
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
Salt	.15	.15	.15	.15	.15	.15
Copper sulfate	.075	.075	.075	.075	.075	.075
Selenium premix	.05	.05	.05	.05	.05	.05
Vitamin E	.05	.05	.05	.05	.05	.05
Total	100.00	100.00	100.00	100.00	100.00	100.00

^aDiets were formulated to contain 1.25% lysine, .9% Ca, .8% P, and at least .68% isoleucine and .30% methionine.

^bProvided 50 g/ton Carbadox.

Table 2. Influence of Various Levels of Blood Meal in the Phase II Diet^a

Item	Spray-dried blood meal, %						CV
	0	1	2	3	4	5	
<u>d 7 to 14</u>							
ADG, lb ^{bcd}	.26	.34	.43	.40	.42	.40	22.9
ADFI, lb ^{ef}	.55	.59	.64	.61	.64	.63	11.8
F/G ^{bcd}	2.49	1.82	1.56	1.62	1.59	1.54	22.4
<u>d 7 to 28</u>							
ADG, lb ^{cd}	.60	.66	.68	.67	.66	.66	8.6
ADFI, lb ^f	.979	1.02	1.05	1.01	1.04	1.03	7.2
F/G ^{bcd}	1.66	1.54	1.55	1.51	1.60	1.57	3.8

^aSeven hundred and forty four weanling pigs were used (initially 12.8 lb and 22 d of age), 13-14 pigs/pen, 12 pens/treatment.

^bLinear effect of blood meal ($P < .01$, .05, respectively).

^cQuadratic effect of blood meal ($P < .01$).

^dControl vs blood meal ($P < .01$, .05, respectively).