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Effect of spray-dried blood meal in the phase III diet

Abstract

A total of 216 weanling pigs was used to evaluate the use of spray-dried blood meal (SDBM) in the phase III diet for pigs weighing approximately 25 pounds. At weaning, pigs (initially 11.6 lb and 21 d of age) were allotted by weight, gender, and ancestry to the dietary treatments. There were six pigs per pen with six replications per treatment. Pigs were started on a common phase I diet containing 20% dried whey, 7.5% spray-dried porcine plasma, and 1.75% spray-dried blood meal. This diet was formulated to contain 1.5% lysine and .44% methionine. On d 7 postweaning all pigs were switched to a common phase II diet that contained 10% dried whey and 2.5% spray-dried blood meal and was formulated to contain 1.25% lysine and .35% methionine. On d 21 postweaning and when weight averaged approximately 25 pounds, pigs were switched to one of six diets, control or containing .5, 1.0, 1.5, 2.0, or 2.5% spray-dried blood meal, that were formulated to contain 1.15% lysine. Pigs were fed experimental diets from d 21 to 42 postweaning (phase III). During phase I, average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency (F/G) were .54 lb, .61 lb, and 1.16, respectively. During phase II, ADG, ADFI, and F/G were .62 lb, 1.15 lb, and 1.90, respectively. On d 21, pigs weighed an average of 24 pounds when they were switched to the experimental diets. During phase III, linear ($P < .05$) depressions in ADG and F/G occurred with the addition of increasing levels of spray-dried blood meal in the diet. However, the reduction in performance was only evident at the 2 and 2.5% blood meal levels. Lower blood meal additions to the diet (< 2%) had no influence on pig performance. Similar to earlier research, our results indicate that complex protein sources are not required in the phase III diet for optimal pig performance.; Swine Day, Manhattan, KS, November 18,1993

Keywords

Swine day, 1993; Kansas Agricultural Experiment Station contribution; no. 94-194-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 695; Swine; Blood meal; Starter pigs; Performance

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EFFECT OF SPRAY-DRIED BLOOD MEAL IN THE PHASE III DIET

L. J. Kats, R. D. Goodband, J. L. Nelssen, M. D. Tokach, K. G. Friesen, B. T. Richert, and S. S. Dritz

Summary

A total of 216 weanling pigs was used to evaluate the use of spray-dried blood meal (SDBM) in the phase III diet for pigs weighing approximately 25 pounds. At weaning, pigs (initially 11.6 lb and 21 d of age) were allotted by weight, gender, and ancestry to the dietary treatments. There were six pigs per pen with six replications per treatment. Pigs were started on a common phase I diet containing 20% dried whey, 7.5% spray-dried porcine plasma, and 1.75% spray-dried blood meal. This diet was formulated to contain 1.5% lysine and .44% methionine. On d 7 postweaning all pigs were switched to a common phase II diet that contained 10% dried whey and 2.5% spray-dried blood meal and was formulated to contain 1.25% lysine and .35% methionine. On d 21 postweaning and when weight averaged approximately 25 pounds, pigs were switched to one of six diets, control or containing .5, 1.0, 1.5, 2.0, or 2.5% spray-dried blood meal, that were formulated to contain 1.15% lysine. Pigs were fed experimental diets from d 21 to 42 postweaning (phase III). During phase I, average daily gain (ADG), average daily feed intake (ADFI), and feed efficiency (F/G) were .54 lb, .61 lb, and 1.16, respectively. During phase II, ADG, ADFI, and F/G were .62 lb, 1.15 lb, and 1.90, respectively. On d 21, pigs weighed an average of 24 pounds when they were switched to the experimental diets. During phase III, linear ($P < .05$) depressions in ADG and F/G occurred with the addition of increasing levels of spray-dried blood meal in the diet. However, the reduction in performance was only evident at the 2 and 2.5% blood meal levels. Lower blood meal additions to the diet (< 2%) had no influence on pig performance. Similar to earlier research, our results indicate that complex protein sources are not required in the phase III diet for optimal pig performance.

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

Introduction

Previous research conducted at Kansas State University has shown spray-dried blood meal to be an effective protein source to use in combination with spray-dried porcine plasma in the high nutrient density diet (phase I) and to include by itself in the phase II diet. Spray-dried blood meal is used primarily for its stimulatory effect on feed intake in the early-weaned pig to help improve starter pig performance in the early postweaning period. However, little research has been done investigating the use of spray-dried blood meal in diets for later stages of pig growth. Therefore, this experiment was conducted to investigate the effect of spray-dried blood meal on starter pig performance from 25 to 50 lb when they typically would be fed the phase III diet.

Procedures

A total of 216 pigs (initially 11.6 lb and 21 d of age) was used in a 42 d trial. Pigs were allotted by weight, gender, and ancestry and placed in pens containing six pigs/pen. All pigs were started on a common phase I diet containing 20% dried whey, 7.5% spray-dried porcine plasma,

and 1.75% spray-dried blood meal and formulated to contain 1.5% lysine and .44% methionine. Pigs were fed this diet for the first 7 days postweaning, at which time they were switched to a common phase II diet that contained 10% dried whey and 2.5% spray-dried blood meal and formulated to 1.25% lysine and .35% methionine. Pigs were fed the phase II diet until they averaged approximately 25 pounds. Then pigs were switched to one of six dietary treatments. Experimental diets included a control and additions of .5, 1.0, 1.5, 2.0, or 2.5% spray-dried blood meal and were formulated to contain 1.15% lysine and .35% methionine. As shown by previous research conducted at Kansas State University, spray-dried blood meal is deficient in methionine. Therefore, DL-methionine was added as spray-dried blood level was increased to ensure that methionine was not limiting. Pigs received experimental diets from d 21 to 42 postweaning. Pigs and feeders were weighed on d 7, 14, 21, 28, 35, and 42 postweaning to evaluate ADG, ADFI, and F/G.

Results and Discussion

During phase I (d 0 to 7 postweaning), ADG, ADFI, and F/G were .54 lb, .61, and 1.16, respectively. During phase II (d 7 to 21 postweaning), ADG, ADFI, and F/G were .62 lb, 1.19 lb, and 1.90, respectively. When pigs were switched to experimental diets containing various levels of spray-dried blood meal, there were no significant differences in pig weights.

Increasing the blood meal level in the phase III diet (d 21 to 42 postweaning) caused linear ($P < .05$) depressions in ADG and F/G. Pigs receiving a diet containing no blood meal gained .08 lbs/day more than pigs receiving 2.5% blood meal. Feed efficiency ranged from 1.69 to 1.80 for pigs receiving the control and 2.5% spray-dried blood meal, respectively. However, the reduction in performance due to adding blood meal was only evident at the 2 and 2.5% blood meal levels. Lower blood meal additions (< 2%) had no influence on pig performance. Therefore, when the pig reaches approximately 25 pounds, spray-dried blood meal apparently is no longer required for maximal growth performance.

Previous research has demonstrated that spray dried blood meal is an excellent protein source for the phase I and II diets. These diets are essential to achieve high levels of growth performance immediately postweaning. However, once pigs are consuming adequate quantities of feed, simpler phase III starter diets are most economical. The results of this experiment support KSU recommendations of feeding complex starter diets during phase I and II and switching to a simple, corn-soybean meal diet for phase III.

Table 1. Diet Composition

Item, %	Phase I[a]	Phase II[b]
Corn	45.29	58.76
Soybean meal, 48.5% CP	16.13	21.26
Dried whey, edible grade	20.00	10.00
Spray-dried porcine plasma	7.50	-
Spray-dried blood meal	1.75	2.50
Soybean oil	5.00	3.00
Monocalcium phosphate, 21% P	1.91	1.97
Antibiotic[c]	1.00	1.00
Limestone	.69	.83
Vitamin premix	.25	.25
Trace mineral premix	.15	.15
DL-methionine	.15	.05
L-Lysine HCl	.10	.15
Copper sulfate	.075	.075
Total	100.00	100.00

[a]Diet was formulated to contain 1.5% lysine, .44% methionine, .9% Ca, and .8% P and was fed from d 0 to 7 postweaning.
[b]Diet was formulated to contain 1.25% lysine, .35% methionine, .9% Ca, and .8% P and was fed from d 7 to 21 postweaning.
[c]Provided 150 g/ton Apramycin in phase I and 50 g/ton Carbadox in phase II.

Table 2. Phase III Diet Composition[a]

	Spray-Dried Blood Meal, %					
Item, %	Control	.5	1.0	1.5	2.0	2.5
Corn	60.75	61.75	62.76	63.77	64.78	65.78
Soybean meal, 48.5% CP	31.99	30.45	28.91	27.37	25.83	24.30
Soybean oil	3.00	3.00	3.00	3.00	3.00	3.00
Spray-dried blood meal	-	.50	1.00	1.50	2.00	2.50
Monocalcium phosphate, 21% P	1.53	1.56	1.59	1.61	1.64	1.67
Antibiotic[b]	1.00	1.00	1.00	1.00	1.00	1.00
Limestone	.89	.89	.89	.89	.89	.89
Salt	.35	.35	.35	.35	.35	.35
Vitamin premix	.25	.25	.25	.25	.25	.25
Trace mineral	.15	.15	.15	.15	.15	.15
Copper sulfate	.075	.075	.075	.075	.075	.075
DL-methionine	.014	.018	.022	.026	.031	.035
Total	100.00	100.00	100.00	100.00	100.00	100.00

[a]Diets were formulated to contain 1.15% lysine and .35% methionine and were fed from d 21 to 42 postweaning.
[b]Provided 50 g/ton Carbadox.

Table 3. Influence of Spray-Dried Blood Meal in the Phase III Diet[a]

	Spray-Dried Blood Meal, %						
Item	Control	.5	1	1.5	2	2.5	CV, %
ADG, lb[b]	1.33	1.38	1.34	1.32	1.29	1.27	6.34
ADFI, lb	2.25	2.34	2.28	2.25	2.22	2.29	6.63
F/G[b]	1.69	1.70	1.70	1.69	1.72	1.80	4.64

[a]A total of 216 pigs with 6 pigs/pen and 6 pens/treatment (initially 24.0 lb and 42 d of age).
[b]Linear response ($P < .05$).