Blood Meal as an Amino Acid Source in Swine Diets

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Summary

Two trials involving 94 pigs were conducted to evaluate blood meal as a supplemental amino acid source in swine diets. Performance of growing pigs was markedly reduced when blood meal completely replaced soybean meal as a supplemental amino acid source. Adding 0.1% L-isoleucine to the corn-blood meal diet significantly improved daily gain and feed efficiency. However, growing pigs fed any diet containing blood meal in place of soybean meal had reduced performance. Finishing pigs fed blood meal as a partial or total replacement for soybean meal gained at the same rate and were just as efficient in feed utilization as did those fed the corn-soybean diet. These results suggest that blood meal can be fed as the sole supplemental amino acid source in the diet of finishing pigs but not in the diet of growing pigs.

Introduction

Soybean meal is the major supplemental amino acid source used in swine diets. High prices of soybean meal, however, have increased interest in alternative amino acid sources. We evaluated blood meal, a high protein byproduct that is also high in lysine, as a potential amino acid source in swine diets.

Procedure

Trial 1. Fifty-two crossbred (Duroc X Yorkshire) pigs averaging 75 pounds were randomly allotted (on the basis of sex and initial weight) to two replications of these four dietary treatments:

(A) Corn + soybean meal (control diet)
(B) Corn + blood meal
(C) Corn + blood meal + 0.1% L-isoleucine
(D) Corn + equal amounts of supplemental lysine from soybean meal and blood meal.

Composition of the diets used in trial 1, which lasted 32 days, is shown in table 2.1.

Trial 2. Forty-two crossbred pigs averaging 132 pounds were randomly assigned from outcome groups, based on sex and initial weight, to these treatments:

(A) Corn + soybean meal (control diet)
(B) Corn + blood meal
(C) Corn + equal amounts of supplemental lysine from soybean meal and blood meal.

Composition of the diets is shown in table 2.2. The trial was terminated when pigs averaged approximately 220 pounds.

Table 2.1. Composition of Diets (Trial 1)

Ingredients	A	B	C	D
Corn	75.2	88.0	87.9	81.7
Soybean meal	21.0	0.0	0.0	10.5
Blood meal	0.0	8.0	8.0	4.0
Dicalcium phosphate	1.5	2.0	2.0	1.7
Limestone	0.8	0.5	0.5	0.6
Salt	0.5	0.5	0.5	0.5
L-Isoleucine	0.0	0.0	0.1	0.0
Vitamin, trace mineral, and antibiotic premix	1.0	1.0	1.0	1.0
	100.0	100.0	100.0	100.0
Calculated analysis:				
Protein, %	16.0	14.3	14.3	15.0
Lysine, %	0.78	0.78	0.78	0.77
Isoleucine, %	0.79	0.38	0.48	0.58
Calcium, %	0.73	0.71	0.71	0.70
Phosphorus, %	0.60	0.60	0.60	0.60

Table 2.2. Composition of Diets (Trial 2)

Ingredients	A	B	C
Corn	84.1	91.7	88.1
Soybean meal	12.5	0.0	6.0
Blood meal	0.0	4.8	2.4
Dicalcium phosphate	1.1	1.4	1.3
Limestone	0.8	0.6	0.7
Salt	0.5	0.5	0.5
Vitamin, trace mineral, and antibiotic premix	1.0	1.0	1.0
	100.0	100.0	100.0
Calculated analysis:			
Protein, %	13.1	12.10	12.53
Lysine, %	0.55	0.55	0.55
Isoleucine, %	0.61	0.37	0.48
Calcium, %	0.61	0.60	0.60
Phosphorus, %	0.50	0.50	0.50

Results and Discussion

The effects of partially or totally replacing soybean meal with blood meal in the diets of growing pigs are shown in table 2.3. Blood meal resulted in a marked reduction in daily gain and increased the feed required per unit of gain. Adding 0.1% L-isoleucine to the corn-blood meal diet significantly ($P<.05$) increased daily gain and improved feed efficiency, suggesting that an isoleucine deficiency limited performance of the pigs fed the corn-blood meal diet. Pigs fed diet (D), in which equal quantities of supplemental lysine were supplied by blood meal and soybean meal, gained significantly slower than did pigs fed the corn-soybean control diet, suggesting that the heat used in processing may impair the availability of the amino acids in blood meal.

As shown in table 2.4, finishing pigs fed blood meal as a total replacement for soybean meal gained at the same rate and were just as efficient in feed utilization as pigs fed the corn-soybean meal (control) diet. Similarly, pigs fed the diet in which equal amounts of supplemental lysine are supplied by soybean meal and blood meal (diet C) gained at the same rate as did pigs fed the control diet. These results suggest that blood meal can replace soybean meal as a supplemental amino acid source in the diet of finishing pigs.

Table 2.3. Effect of Total or Parital Replacement of Soybean Meal with Blood Meal in Swine Diets (Trial 1)

Item	Diet A	Diet B	Diet C	Diet D
No. of pigs	13	13	13	13
Initial wt. (lb.)	73.7	75.3	75.5	75.8
Final wt. (lb.)	129.4	113.0	122.0	124.5
Daily gain (lb.)	1.75[a]	1.19[c]	1.46[b]	1.51[b]
Feed/gain	2.63[b]	3.23[a]	2.80[b]	2.68[b]

[abc]Means on the same line with different superscripts differ significantly ($P<.05$).

Table 2.4. Effect of Total or Partial Replacement of Soybean Meal with Blood Meal in Swine Diets (Trial 2)

Item	Diet A	Diet B	Diet C
No. of pigs	14	14	14
Initial wt. (lb.)	132.7	132.8	130.3
Final wt. (lb.)	221.1	222.8	223.8
Daily gain (lb.)	1.76[a]	1.79[a]	1.86[a]
Feed/gain	3.44[a]	3.26[a]	3.31[a]

[a]Means on the same line with different superscripts differ significantly ($P<.05$).