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Dried blood has been used for animal feeds for many years. Although it is a product containing high amounts of protein, the conventional methods used for drying blood give a product in which some of the amino acids, particularly lysine, are not readily available to the animal. A previous experiment reported at the 1973 Swine Day (A.S. Series 73-39) indicated that levels of 2 and 4% blood meal could replace an equal level of soybean meal without affecting pig performance.

The present experiment was conducted to obtain further information on the value of blood meal as a partial substitute for soybean meal in diets for growing pigs and to study the availability of lysine in blood meal.

Experimental Procedure

A total of 144 pigs averaging 53 lb. initially were used in this experiment. The pigs were allotted to three replications of six treatments on the basis of ancestry, sex and weight. Each lot consisted of four barrows and four gilts. They were housed in a confinement type building in pens 9 x 7.5 ft. that contained a three-hole self-feeder and a nipple type, automatic waterer. All the pens had slatted floors, one-half of them had 8-inch wide slats and the other half had 5-inch slats.

The six dietary treatments were as follows:

1. Corn-soybean meal basal diet
2. Two percent blood meal replaced 2% soybean meal
3. Four percent blood meal replaced 4% soybean meal
4. Two percent blood meal replaced an equivalent amount of protein from soybean meal
5. Four percent blood meal replaced an equivalent amount of protein from soybean meal
6. As diet 5 plus 0.1% L-lysine

The compositions of the 14% protein grower and the 12% finisher diets for the six treatments are shown in tables 1 and 2, respectively. Pigs were changed to the lower protein diets when lots averaged 120 pounds. The experiment was terminated when pigs reached an average weight of approximately 200 pounds.

Results

Growth performance of the pigs fed the various dietary treatments is shown in table 3. Significant ($P<.005$) differences existed among treatments in feed required per unit of gain during the growing period up to a weight of 120 pounds. Pigs fed the corn-soybean meal diet required the least feed/gain and those fed

the diets containing 4% blood meal (diets 3 and 5) without lysine supplementation required the most feed/gain. Although average daily gains were not significantly different among treatments during this period, gains were also lowest for pigs fed diets 3 and 5.

There were no significant differences among treatments during the period from 120 lb. to market weight. However, pigs fed diet 5 containing 4% blood meal and 2.5% corn to replace 6.6% soybean meal, an equivalent substitution of protein, gained only 1.38 lb. per day compared to gains of 1.51 to 1.65 for the pigs receiving the other dietary treatments. For the total period the pigs fed diet 5 also gained less per day (1.41 lb.) and required the highest amount of feed/gain (3.56 lb.). Pigs in the other treatment groups had similar gains ranging from 1.53 to 1.59 lb. per day while feed/gain ranged from 3.26 to 3.47 pounds. It would appear that the lysine in blood meal was not highly available as pigs fed diet 6 containing 0.1% supplemental lysine gained 0.17 lb. per day faster and required 0.22 lb. less feed/gain than pigs fed the same diet without lysine (diet 5).

Summary

Pigs fed diets containing 2 and 4% of conventionally dried blood meal replacing an equal amount of soybean meal or 2% blood meal replacing an equivalent amount of protein gained at similar rates but required slightly more feed/gain than pigs fed a corn-soybean meal diet. A diet containing 4% blood meal replacing an equivalent amount of protein from soybean meal resulted in reduced pig gains and decreased feed efficiency. Supplementing this diet with 0.1% lysine improved performance to that of pigs fed the corn-soybean meal diet. These results suggest that up to 4% soybean meal can be replaced with an equal amount of blood meal; but, if 4% blood meal replaces an equivalent amount of protein, a deficiency of lysine may exist.

Table 1. Composition of Diets Fed to 120 Pounds (Percent)

Ingredients	Treatments					
	1	2	3	4	5	6
Ground yellow corn	82.7	82.7	82.7	84.1	85.3	85.2
Soybean meal (44%)	14.6	12.6	10.6	11.2	8.0	8.0
Blood meal	--	2.0	4.0	2.0	4.0	4.0
Dicalcium phosphate	1.5	1.5	1.5	1.5	1.5	1.5
Ground limestone	0.5	0.5	0.5	0.5	0.5	0.5
Trace mineral salt[a]	0.5	0.5	0.5	0.5	0.5	0.5
L-lysine	--	--	--	--	--	0.1
Vitamin-antibiotic mix[b]	0.2	0.2	0.2	0.2	0.2	0.2

[a] Contained 0.8% zinc.
[b] Supplied per lb. of diet: vitamin A, 1500 IU; vitamin D, 150 IU; riboflavin, 1.25 mg; pantothenic acid, 5 mg; niacin, 10 mg; choline, 50 mg; vitamin B_{12}, 7.5 mcg and aureomycin, 10 milligrams.

Table 2. Composition of Diets Fed From 120 to 200 Pounds (Percent)

Ingredients	Treatments 1	2	3	4	5	6
Ground yellow corn	88.4	88.4	88.4	89.8	91.1	91.0
Soybean meal (44%)	9.0	7.0	5.0	5.6	2.3	2.3
Blood meal	--	2.0	4.0	2.0	4.0	4.0
Dicalcium phosphate	1.4	1.4	1.4	1.4	1.4	1.4
Ground limestone	0.5	0.5	0.5	0.5	0.5	0.5
Trace mineral salt[a]	0.5	0.5	0.5	0.5	0.5	0.5
L-lysine	--	--	--	--	--	0.1
Vitamin-antibiotic mix[b]	0.2	0.2	0.2	0.2	0.2	0.2

[a] Contained 0.8% zinc.
[b] See table 1.

Table 3. Growth Performance of Pigs Fed Blood Meal

	Treatments 1	2	3	4	5	6
Number of pigs[a]	24	24	24	24	24	24
Initial weight, lb.	53.0	53.0	53.0	53.0	53.0	53.0
Final weight, lb.	200.0	200.2	202.2	199.9	201.4	201.5
Initial to 120 lb.						
Avg. daily gain, lb.	1.59	1.53	1.48	1.51	1.43	1.55
Feed consumption, lb.	4.60	4.62	4.75	4.72	4.70	4.70
Feed/gain[b]	2.89	3.03	3.20	3.11	3.28	3.04
120 lb. to market						
Avg. daily gain, lb.[c][d]	1.51	1.65	1.63	1.54	1.38	1.61
Feed consumption, lb.	5.38	6.14	6.07	5.50	5.26	5.73
Feed/gain[e]	3.55	3.71	3.71	3.60	3.80	3.59
Overall						
Avg. daily gain, lb.[c]	1.54	1.59	1.55	1.53	1.41	1.58
Feed consumption, lb.	5.00	5.37	5.41	5.14	5.01	5.28
Feed/gain[e]	3.26	3.38	3.47	3.37	3.56	3.34

[a] Three replicates of six treatments with four barrows and four gilts per pen.
[b] Significant treatment difference ($P<.005$).
[c] Significant sex difference ($P<.005$).
[d] Significant replication difference ($P<.05$).
[e] Significant replication difference ($P<.025$).