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High and Low Protein Oats in Diets for Growing Pigs

George W. Libal, Steven L. Robbins and Richard C. Wahlstrom

It has been shown that presently used oat varieties have a wide range of protein content. In a previous experiment at this station it was shown that a variety of oats (Dal) that contained over 16% protein and 0.66% lysine could be used at a higher level in swine diets than was previously recommended for oats. In addition, it was possible to reduce the amount of supplemental protein in the diet indicating that the lysine present in the oats was highly available. Rate of gain of growing-finishing pigs was not affected when oats replaced 60% of the corn in the diet, but feed efficiency was reduced about 3%.

The objective of this experiment was to evaluate two varieties of oats, a high and a low protein oats, when they were fed as the only grain for growing pigs.

Experimental Procedure

One hundred twenty crossbred pigs averaging approximately 60 lb. were allotted on the basis of weight, ancestry and sex to three replicates of four treatments. Each lot contained four barrows and four gilts. The pigs were housed in a completely enclosed, slatted floor confinement building.

The two oat varieties used were Sioux which contained 10.9% protein and 0.46% lysine and Dal which had 15.6% protein and 0.61% lysine. Diets 1, 2 and 3 were formulated to be equal in lysine content while diets 4 and 5 were formulated on the basis of soybean meal levels. The composition of the diets is shown in table 1.

The experimental treatments were as follows:

1. Basal diet, corn-soy
2. Sioux oats-soy, equal lysine to diet 1
3. Dal oats-soy, equal lysine to diet 1
4. Sioux oats-soy, equal SBM to diet 3
5. Dal oats-soy, equal SBM to diet 2

The experiment was terminated when the pigs weighed approximately 125 lb. because of insufficient amounts of oats to continue the pigs to market weight.

Results

Growth and feed data for this trial are summarized in table 2. Pigs fed the corn-soybean meal diet gained significantly faster than did pigs fed the oats-soybean meal diets. This difference in gain was probably due to the higher energy content and less fiber in the corn diet. It is also possible that there were other nutrient differences in the diets that may have affected

growth performance. Diets 1, 2 and 3, which contained corn, Sioux and Dal oats, respectively, were formulated to contain equal lysine. Therefore, the amount of soybean meal in the oats diets was considerably less than in the corn diet. The pigs fed the higher protein Dal oats gained slightly faster than those fed the Sioux oats. However, these differences were not significant.

Feed consumption and feed efficiency of pigs fed the corn diet were significantly improved compared to those for all oat treatment groups. Pigs fed Dal oats were more efficient than those fed Sioux oats. These differences were significant when compared to those for pigs fed the Sioux oats diet at the lower soybean meal level, diet 4. These pigs required 4.35 lb. of feed per lb. of gain compared to 3.59 for pigs fed Dal at the same soybean meal level and 3.47 for pigs fed Dal at the higher soybean meal level.

Summary

One hundred twenty weanling pigs were fed diets of corn, Sioux oats and Dal oats as the cereal grain portion of the diet. Significantly faster and more efficient gains were obtained when pigs were fed the corn diets. Pigs fed Dal oats (15.6% protein and 0.61% lysine) gained slightly faster and were more efficient than pigs fed Sioux oats (10.9% protein and 0.46% lysine) when diets were fed on either an equal lysine or equal soybean meal basis.

Table 1. Composition of Diets (Percent)

Ingredients	Treatments				
	1	2	3	4	5
Corn	78.45	---	---	---	---
Sioux oats	---	85.3	---	91.0	---
Dal oats	---	---	91.0	---	85.3
Soybean meal, 44%	19.00	12.4	6.7	6.7	12.4
Dicalcium phosphate	1.20	0.4	0.4	0.4	0.4
Ground limestone	0.65	1.2	1.2	1.2	1.2
Trace mineral salt ^a	0.50	0.5	0.5	0.5	0.5
Premix ^b	0.20	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 B₁₂, 7.5 mcg and tylosin, 10 milligrams.

Table 2. Growth Performance of Pigs Fed High and Low Protein Oats

	1 Corn- SBM	2 Sioux oats- SBM ^a	3 Dal oats- SBM ^a	4 Sioux oats- SBM ^b	5 Dal oats- SBM ^c
Number of pigs	24	21	23	23	23
Avg. initial wt., lb.	60.0	59.8	59.9	60.0	60.3
Avg. final wt., lb.	122.9	122.1	125.8	121.6	127.2
Avg. daily gain, lb.	1.60 ^d	1.11	1.20	1.06	1.22
Daily feed consumed, lb.	4.82 ^e	4.32	4.30	4.63	4.21
Feed/gain	3.01 ^f	3.88 ^g	3.59 ^g	4.35	3.47 ^g

^aEqual lysine to corn-SBM diet 1. Sioux oats contained 10.9% protein and 0.46% lysine, Dal oats contained 15.6% protein and 0.61% lysine.

^bEqual SBM to diet 3.

^cEqual SBM to diet 2.

^dSignificantly greater than treatments 2, 3, 4 and 5 (P<.05).

^eSignificantly greater than treatment 5 (P<.05).

^fSignificantly less than treatments 2, 3, 4 and 5 (P<.05).

^gSignificantly less than treatment 4 (P<.05).