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Dehulled Oats and Hulless Barley in Diets
of Young Weaned Pigs

Richard C. Wahlstrom and George W. Libal

Young weaned pigs have a higher requirement for protein than during later stages of the growth period. They also need a diet high in available energy for optimum gains. Cereal grains such as oats and barley are much higher in protein than corn and could be used to reduce the amount of supplemental protein needed in young pig diets. However, these grains are also higher in fiber and thus have less energy than corn. Hulless varieties or processing the grain to remove the hull are possible ways to obtain grains of a relatively high protein and energy value. These methods have not been too successful to date because most hulless varieties of barley do not yield well and dehulling oats removes about 30% of the weight of the original grain and therefore increases the cost of the product.

The objective of the experiment reported herein was to evaluate a dehulled high protein oats and a hulless barley in diets of young weaned pigs.

Experimental Procedure

One hundred eight crossbred pigs having an average initial weight of 25 lb. were allotted into 18 groups on the basis of ancestry and weight. Groups were randomly assigned to six experimental diets from three replicate groups. All pigs were housed, six pigs per pen, in an enclosed building with solid concrete floors that were bedded with wood shavings. The experiment was continued for 4 weeks with feed and water provided ad libitum.

The experimental dietary treatments were as follows:

- Diet 1--Corn-soybean meal (18% protein)
- Diet 2--Oats replaced half of corn in diet 1
- Diet 3--Dehulled oats
- Diet 4--Dehulled oats plus 0.2% L-lysine
- Diet 5--Hulless barley-soybean meal (18% protein)
- Diet 6--Hulless barley replaced half of corn in diet 1.

The composition of the diets is shown in table 1. The Spear oats was a high protein variety that by chemical analysis contained 16% protein and 0.65% lysine in the whole kernel, while the dehulled oats analyzed 0.93% lysine. The hulless barley contained 0.50% lysine.

Results

Rate of gain, daily feed consumption and feed efficiency data are presented in table 2. There were significant differences in both rate and efficiency of gain among treatments. Pigs fed the corn-soybean meal, corn-oats and dehulled oats plus lysine diets (Diets 1, 2 and 4) gained at a

similar rate, 0.88, 0.83 and 0.85 lb. per day, respectively, which was significantly faster than the 0.59 lb. per day gain of pigs fed the hulless barley diet (Diet 5). Significantly more feed was required per gain when pigs were fed the hulless barley diet than when pigs were fed Diets 1, 2 and 4. It would appear that the poor performance of pigs fed the hulless barley diet (Diet 5) was because of a deficiency of lysine. On analysis this diet contained only 0.71% lysine. Gain and feed/gain were improved when corn replaced half of the barley (Diet 6), but neither gain nor feed/gain were equal to those for pigs fed corn, corn-oats or dehulled oats plus lysine as the cereal grains, even though Diet 6 should have been adequate in lysine content.

Pigs fed the dehulled oats diet supplemented with 0.2% lysine (Diet 4) gained approximately 15% faster and required 27% less feed/gain than pigs fed the unsupplemented dehulled oats diet. These results suggest a deficiency of lysine in the dehulled oats. However, the analysis of 0.92% lysine would indicate that the diet should have been adequate in lysine unless the lysine in dehulled oats was not totally available.

Diets 1, 2 and 6 all contained equal levels of soybean meal and other nutrients and differed only in the energy source which was corn, equal parts of corn and oats and equal parts of corn and hulless barley, respectively. The hulless barley did not appear to be as good an energy source in the diet as corn or Spear oats as evidenced by slower gains and more feed/gain for pigs fed the barley-corn diet.

Summary

One hundred eight weanling pigs were fed diets containing corn, equal parts of corn and oats, dehulled oats, hulless barley and equal parts of corn and hulless barley as the cereal grains for a 4-week experimental period.

Supplementing the dehulled oats diet with 0.2% L-lysine increased rate and efficiency of gain. Pigs fed diets of corn, corn-oats and dehulled oats plus lysine gained significantly faster and required less feed/gain than pigs fed hulless barley as the grain source. Pigs fed the corn diet also required less feed/gain than pigs fed the dehulled oats diet without supplemental lysine.

Table 1. Composition of Experimental Diets (Percent)

Diet number	1	2	3	4	5	6
Ground corn	73.2	36.6	--	--	--	36.6
Ground oats	--	36.6	--	--	--	--
Dehulled oats	--	--	97.5	97.2	--	--
Hulless barley	--	--	--	--	90.6	36.6
Soybean meal, 48%	24.2	24.2	--	--	6.9	24.2
Dicalcium phosphate	1.4	1.4	1.1	1.1	1.1	1.4
Ground limestone	0.7	0.7	0.9	0.9	0.9	0.7
Trace mineral salt	0.4	0.4	0.4	0.4	0.4	0.4
L-lysine hydrochloride ^a	--	--	--	0.3	--	--
Premix ^b	0.1	0.1	0.1	0.1	0.1	0.1

^aSupplied 0.2% L-lysine.

^bSupplied per lb. of diet: vitamin A, 1800 IU; vitamin D, 180 IU; vitamin E, 3 IU; riboflavin, 1.5 mg; pantothenic acid, 6 mg; niacin, 9.6 mg; choline, 30 mg; vitamin B₁₂, 6 mcg; aureomycin, 50 mg; penicillin, 25 mg and sulfa-methazine, 50 milligrams.

Table 2. Effect of Dehulled Oats and Hulless Barley on Performance of Young Weaned Pigs

	Dietary treatments					
	1	2	3	4	5	6
Number of pigs ^a	18	18	18	18	18	18
Avg. initial wt., lb.	25.3	25.2	25.2	25.2	25.1	25.4
Avg. final wt., lb. ^b	49.9	48.3	46.0	49.0	41.5	46.0
Avg. daily gain, lb. ^b	0.88	0.83	0.74	0.85	0.59	0.74
Daily feed consumed, lb.	1.85	1.96	2.30	2.03	2.10	2.07
Feed/gain ^b	2.10	2.38	3.08	2.23	3.57	2.80

^aThree lots of 6 pigs each per treatment.

^bSignificant difference ($P < .01$) among treatments.