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LYSINE SUPPLEMENTATION OF BARLEY-SOYBEAN MEAL DIETS FOR GROWING PIGS

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The lysine requirement of pigs as suggested by the National Research Council (NRC) was determined using corn-soybean meal based diets. More recent research has indicated that differences exist in the availability of lysine in different ingredients. It has been suggested that lysine in barley is less available than lysine in corn. Thus, it is possible that diets formulated with barley and soybean meal to meet the NRC's suggested lysine requirement, might actually be deficient in this amino acid. This study was conducted to determine the lysine needs of pigs fed barley-soybean meal diets from approximately 45 to 75 lb.

Experimental Procedure

Ninety-six weaned pigs averaging approximately 45 lb were allotted on the basis of sex and weight to four replications of six dietary treatments. The pigs were housed, four per pen, in a slotted floor, enclosed confinement building. Pigs were weighed weekly during the four week experiment. Blood samples were collected from all pigs on day 28 of the experiment and these samples were analyzed for urea nitrogen.

The composition of the diets is shown in Table 1. Experimental treatments were as follows:

- Treatment 1 - Corn-soybean meal diet (.70% lysine)
- Treatment 2 - Barley-soybean meal diet (.70% lysine)
- Treatment 3 - Diet 2 plus .05% L-lysine
- Treatment 4 - Diet 2 plus .10% L-lysine
- Treatment 5 - Barley-soybean meal diet (.75% lysine)
- Treatment 6 - Barley-soybean meal diet (.80% lysine)

Results

The effects of treatments on daily gains, daily feed, feed/gain and blood urea nitrogen are summarized in Table 2. Pigs in treatment 1, fed the corn-soybean meal diet gained faster ($P < .01$) than pigs fed the barley-soybean meal diets (treatments 2 to 6). Rate of gain was related to feed consumption, as pigs fed the corn-soybean meal diet consumed an average of 3.84 lb of feed daily, while pigs fed the barley diets consumed only 2.85 to 3.15 lb per day. Feed efficiency

Table 1. Composition of Experimental Diets (%)

Diet	1	2	3	4	5	6
Lysine, %	.7	.7	.75	.8	.75	.8
Corn	80.57	--	--	--	--	--
Barley	--	84.87	84.81	84.74	82.92	80.97
Soybean meal, 44%	16.9	12.75	12.75	12.75	14.75	16.7
Dicalcium phosphate	1.5	1.2	1.2	1.2	1.15	1.15
Limestone	.6	.75	.75	.75	.75	.75
Salt, white	.3	.3	.3	.3	.3	.3
Premix ^a	.13	.13	.13	.13	.13	.13
L-lysine HCl	--	--	.06	.13	--	--

a

Supplied the following per lb of diet: vitamin A, 1500 IU; vitamin D, 150 IU; vitamin E, 5 IU; vitamin K, 1 mg; riboflavin, 1.5 mg; pantothenic acid, 6 mg; niacin, 8 mg; vitamin B₁₂, 6 mcg; chlortetracycline, 25 mg; zinc 100 ppm; iron, 75 ppm; copper, 7.5 ppm; manganese, 25 ppm; iodine, .175 ppm and selenium .1 ppm.

was not different among treatments. These data would indicate that the barley used in this experiment was not as palatable to the 45 lb pig as was corn. The barley was obtained from a local Brookings elevator and the variety is not known.

Table 2. Effect of Lysine in Barley Diets

Treatment No.	1	2	3	4	5	6
Initial wt, lb ^a	45.3	45.4	45.4	45.6	45.3	45.6
Final wt, lb	88.7	77.8	76.7	80.5	75.8	78.7
Avg daily gain, lb ^b	1.55	1.14	1.12	1.25	1.09	1.18
Avg daily feed, lb ^b	3.84	3.02	2.85	3.15	2.86	2.87
Feed/gain	2.49	2.66	2.56	2.55	2.63	2.43
Blood urea nitrogen, mg/dl	19.2	17.6	17.4	16.5	19.2	15.9

a

Four lots of four pigs each per treatment.

b

Treatment 1 different than treatments 2, 3, 4, 5 and 6 (P<.01).

Supplementing the barley diets with .05 and .1% lysine, either as synthetic lysine (treatments 3 and 4) or by altering the barley-soybean meal ratio (treatments 5 and 6) did not improve performance of pigs fed the barley based diets. These data suggest that a lysine level of .7% is adequate for pigs fed barley-soybean meal diets from weights of approximately 45 to 75 lbs.

Blood urea nitrogen values were all relatively high and there were no differences among treatments that would indicate the barley diet was deficient in lysine.

Summary

An experiment was conducted with 96 weaned pigs, averaging approximately 45 lb initially, to study the lysine needs of pigs fed barley-soybean meal based diets.

Barley-soybean meal diets were not improved by supplementation with synthetic lysine or soybean meal to supply additional lysine. Rate of gain and feed intake were higher for pigs fed corn than those fed barley as the dietary grain source.