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A Comparison of Opaque-2, Double Mutant and Normal Corn in Diet

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A Comparison of Opaque-2, Double Mutant and Normal Corn in Diets for Finishing Pigs

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One of the amino acids required in the diets of pigs is lysine. Regular corn varieties contain approximately 0.25% lysine, while the requirement for optimum growth of the pig is about 0.8% for the weanling pig and 0.5% for the finishing pig from 125 lb. to market weight. Therefore, corn must be supplemented with protein supplements that contain much higher levels of lysine in order to obtain balanced diets. A few years ago scientists discovered that corn containing a gene called Opaque-2 contained from 50 to 100% more lysine and about 50% more tryptophan, another essential amino acid, than normal corn. This corn is now known as opaque-2 corn and has been shown to be superior to regular corn when fed to pigs. More recently another gene, Floury 2, has been incorporated along with the Opaque-2 gene to form a corn called Double Mutant.

The objective of this experiment was to compare the performance of finishing pigs fed normal, opaque-2 or double mutant corn without supplemental protein with that of pigs fed a normal corn-soybean meal diet from 130 to 200 lb. in weight.

Experimental Procedure

Sixty crossbred gilts averaging approximately 132 lb. were allotted to three replications of four treatments. Pigs were housed in uninsulated, wooden houses placed on concrete and had access to concrete outside lots where feeders and waterers were located. The experiment was conducted during January and February.

The four treatments were as follows:

1. Normal corn diet
2. Opaque-2 corn diet
3. Double mutant corn diet
4. Normal corn-soybean meal diet.

The composition of the diets is shown in table 1. All diets were supplemented with minerals and vitamins. The three corns were all of the same variety and differed only in the genes incorporating amino acids. Lysine content was 0.28, 0.39 and 0.37% for the normal, opaque-2 and double mutant corns, respectively. The corn was ground, mixed with the other ingredients and self-fed.

Results and Discussion

A summary of the performance of the pigs in this experiment is shown in table 2. Gilts fed the normal corn diet without protein supplement gained at the slowest rate, 1.32 lb. per day. Pigs fed the higher lysine corns, opaque-2 and double mutant, gained about 14% faster (1.50 lb. per day), while feeding a corn-soybean meal diet resulted in the fastest gains of 1.59 lb. per day.

Feed efficiency also was the best for pigs fed the corn-soybean meal diet. However, pigs fed the opaque-2 corn were nearly as efficient as they required 4.24 lb. of feed per lb. of gain which was only 1.9% more than the 4.16 lb. of feed per lb. of gain required by pigs fed corn-soy diets. Feed/gain ratios for pigs fed the normal corn and double mutant corn diets were 4.84 and 4.40, respectively.

Summary

Sixty pigs were fed diets of normal, opaque-2 or double mutant corn supplemented with minerals and vitamins but without supplemental protein from 132 to 200 pounds. Gains were increased from 1.32 to 1.50 lb. per day by feeding the higher lysine corns (opaque-2 and double mutant). However, these corns do not contain adequate lysine to support optimum gain as pigs fed a corn-soy diet gained at the fastest and most efficient rate. Feed/gain was only slightly reduced when opaque-2 corn was fed.

Table 1. Composition of Diets (Percent)

Treatment	1	2	3	4
Normal corn, ground	97.4	--	--	89.8
Opaque-2 corn, ground	--	97.4	--	--
Double mutant corn, ground	--	--	97.4	--
Soybean meal (44%)	--	--	--	7.9
Dicalcium phosphate	1.4	1.4	1.4	1.1
Ground limestone	0.5	0.5	0.5	0.5
Trace mineral salt (0.8% zinc)	0.5	0.5	0.5	0.5
Vitamin-antibiotic premix[a]	0.2	0.2	0.2	0.2

[a]Provided per lb. of diet: 1500 IU vitamin A; 350 IU vitamin D; 1.25 mg riboflavin; 5 mg pantothenic acid; 10 mg niacin; 50 mg choline; 7.5 mcg vitamin B_{12} and 5 mg oxytetracycline.

Table 2. Results of Feeding Opaque-2 and Double Mutant Corn to Finishing Pigs

	Corn			
	Normal	Opaque-2	Double Mutant	Corn-Soy
Number of pigs[a]	15	15	15	15
Avg. initial wt., lb.	132.2	132.3	132.3	132.3
Avg. final wt., lb.	198.9	201.3	201.6	202.5
Avg. daily gain, lb.	1.32	1.50	1.50	1.59
Avg. daily feed, lb.	6.41	6.36	6.58	6.64
Feed/gain	4.84	4.24	4.40	4.16

[a]Three lots of 5 pigs each per treatment.