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Lysine Supplementation for Growing-finishing Swine Rations

B.A. Koch and R.H. Hines

The protein level and protein quality of swine rations consisting primarily of grain can be changed by adding either protein like soybean meal or individual amino acids like lysine.

Protein requirements are based on individual amino acids that compose the protein. Amino acid most lacking in grain proteins is lysine, so lysine is the most limiting amino acid in growing-finishing rations made up primarily of grain.

Feeding trials reported here were designed to: (1) compare corn and sorghum grain, (2) determine the value of 0.1% of lysine added to the ration, (3) compare performance of barrows and gilts and (4) determine feeder space needed.

Design and Results

Trial 1:

Eighty weanling pigs, 40 barrows and 40 gilts, (Duroc, Hampshire and Yorkshire) averaging about 75 pounds each were divided into 8 similar groups of 10 each on the basis of breed, sex and weight. Barrows and gilts were grouped separately. Each group was fed free-choice a pelleted ration based on corn or sorghum grain. Rations were prepared in the grain science and industry department.

The trial started December 30, 1968, and ended March 11, 1969, using the new growing-finishing facilities. Pens were 6' x 15'. Each pen had a two-holed self-feeder and an

automatic waterer. Floors were concrete slats over a pit with circulating fluid. A plywood 4' x 6' pallet on the floor of each pen reduced the cold. The south side of the building was covered with clear plastic, and supplemental heat was used but inside temperatures fell below freezing quite often.

Trial 2:

Fifty-six weanling pigs (Duroc, Hampshire, Yorkshire and Crossbred) averaging about 55 pounds each were divided into 4 similar groups of 14 pigs each on the basis of breed, sex and weight. Each group contained barrows and gilts. Rations, housing and management were the same as in trial 1 except for feeder space. In two pens one two-hole feeder served 14 pigs. In the other two pens two two-hole feeders served 14 pigs. During the first 70 days of the trial two pigs were removed from each treatment group for reasons not related to ration. The trial started April 2, and ended July 8, 1969.

Summary

Feeding corn or sorghum grain with or without lysine added did not significantly affect rate of gain, feed efficiency or daily feed intake under conditions tested.

Difference in performance of barrows and gilts was very small.

Twelve pigs eating from one feeder (2 openings) gained at the same rate as 12 pigs eating from two feeders (4 openings). Feed efficiency tended to be somewhat better when 12 pigs had access to two feeders.

Table 7. Composition of rations fed in lysine supplementation trials.

	S-407E	S-407F	S-407G	S-407H
Ground yellow corn, lbs.	824	---	822	---
Ground sorghum grain, lbs.	---	824	---	822
44% protein soybean meal, lbs.	150	150	150	150
Ground limestone, lbs.	7.5	7.5	7.5	7.5
Dicalcium phos., lbs.	8.5	8.5	8.5	8.5
Hardy T.M. salt, lbs.*	5.0	5.0	5.0	5.0
Merck NCR-42 premix, lbs.**	5.0	5.0	5.0	5.0
Lyamine 50, lbs.	---	---	2.0	2.0
Zinc oxide, gms.	<u>36</u>	<u>36</u>	<u>36</u>	<u>36</u>
Total, lbs.	1,000	1,000	1,000	1,000
Proximate analyses:***				
Moisture, %	13.6	13.0	12.4	11.9
Crude protein, %	15.9	15.2	16.9	16.4
Ether extract, %	2.2	2.5	2.9	3.0
Crude fiber, %	3.1	2.2	2.2	2.6
Total ash, %	3.6	3.7	3.7	4.0

* Evaoprated salt, 97%; ZN, 1.80%; Co, 0.022%; MN, 0.400%; Cu, 0.048%; Fe 0.33%; I, 0.011%

** Each pound contains 100 mg. of riboflavin; 500 mg. of d-pantothenic acid; 1500 mg. of niacin; 11,522 mg. of choline chloride; 1.6 mgs. of vitamin B₁₂ activity; 300,000 U.S.P. units of vitamin A; 30,000 U.S.P. units of Vitamin D₂; 0.3 gram of penicillin (procaine penicillin) and 1.0 gm. of streptomycin (from streptomycin sulfate).

*** Courtesy of the Kansas State University grain science and industry department laboratory.

Table 8. Performance of growing-finishing pigs (with and without lysine supplementation).

	S-40E	S-407F	S-407G	S-407H
	(corn)	(sorghum)	(corn+lysine)	(sorg.+lysine)
<u>Trial 1 (Dec. 30, 1968 to March 11, 1969).</u>				
<u>Av. daily gain, lbs.*</u>				
Barrows	1.43 + .07**	1.26 + .09	1.39 + .09	1.40 + .09
Gilts	1.37 + .06	1.37 + .09	1.31 + .06	1.34 + .08
Av.	1.40	1.32	1.35	1.37
<u>Av. daily feed, lbs.</u>				
Barrows	4.54	4.31	4.40	4.52
Gilts	4.14	4.20	4.03	3.88
Av.	4.34	4.26	4.22	4.20
<u>Av. feed eff., lbs. feed/lb. gain</u>				
Barrows	3.19	3.45	3.20	3.24
Gilts	3.24	3.19	3.09	3.12
Av.	3.22	3.32	3.14	3.18
<u>Trial 2 (April 2 to July 8, 1969).</u>				
<u>Av. daily gain, lbs.***</u>				
1 Feeder	---	1.27 + .05	---	1.30 + .05
2 Feeders	---	1.29 + .05	---	1.34 + .05
Av.	---	1.28	---	1.32
<u>Av. daily feed, lbs.</u>				
1 Feeder	---	3.68	---	4.16
2 Feeders	---	3.70	---	3.72
Av.	---	3.69	---	3.92
<u>Av. feed eff., lbs. feed/lbs. gain</u>				
1 Feeder	---	3.06	---	3.31
2 Feeders	---	2.93	---	2.89
Av.	---	2.99	---	3.06

* Fed to average live weight of 170 pounds.

** Standard error of mean

*** Fed to average live weight of 180 pounds.