

Table 2. Percent lean, fat, and bone and percent closely trimmed lean cuts of swine at two degrees of fatness fed to weights of 220, 250 or 280 pounds

Group	No. litters	Percent lean ^a	Percent fat ^a	Percent bone ^a	Percent closely trimmed lean cuts ^b
220 (S.E.)	6	55.6 (\pm .92)	31.0 (\pm 1.3)	13.5 (\pm .40)	58.2 (\pm .53)
250	6	56.3	29.9	13.7	58.0
280	6	55.8	31.3	13.0	56.4
Fat (S.E.)	9	54.6 (\pm .75)	32.3 (\pm 1.1)	13.2 (\pm .33)	57.6 (\pm .43)
Lean	9	57.2	29.2	13.6	57.5

^aPercent lean, fat and bone or carcass weight were obtained in the 1975-fall season.

^bPercent closely trimmed lean cuts of carcass weight were obtained in the 1976-spring season.

pigs have more rapid gains at heavier weights. They also indicate little difference in percent lean, fat and bone as weight increases from 220 to 250 and 280 pounds live weight. Percent closely trimmed lean cuts declined somewhat, however, as pigs reached 280 pounds live weight.

Response of Growing Boars to Lysine Supplemented Corn-Soybean Meal Diets

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Story in Brief

A trial was conducted involving 108 growing boars to measure the effect of lysine supplementation on rate of gain, feed conversion, daily feed intake, backfat thickness, and loin eye area. The boars were fed either an 18 percent crude protein ration, a 16 percent crude protein + 0.16 percent added lysine, or a 14 percent crude protein + 0.32 percent added lysine ration from approximately 48 to 120 pounds. The protein level was then reduced 2 percent for each treatment from approximately 120 to 220 pounds body weight. The added lysine resulted in equivalent lysine levels for all treatments during

Periods 1 (48 to 120 pounds), and 2 (120 to 220 pounds) as compared to the standard 18 to 16 percent crude protein rations for the same weight periods.

The results indicate that when lysine was added to the 16 percent ration from 48 to 120 pounds (Phase 1), and to the 14 percent ration from 120 to 220 pounds (Phase 2) growth performance for the boars was equal to the standard 18 to 16 percent crude protein rations.

However, when the crude protein content was reduced 4 percent (18 to 14 percent plus lysine) there was a significant reduction in average daily gains during Period 1 with an increase in feed required per pound of gain. There was also a significant decrease in feed intake and loin eye areas for boars receiving this treatment.

Introduction

Previous work at Oklahoma State University indicated that a 16 percent crude protein ration from 55 to 120 pounds (Phase 1), and a 14 percent crude protein ration from 120 to 220 pounds (Phase 2) was inadequate for growing boars. However, boars fed either a 18 or 20 percent crude protein diet during Phase 1, and a 16 or 18 percent ration during Phase 2 had significant improvements in rate of gain, feed conversion, backfat thickness, and loin eye areas.

This study was initiated to determine if growth performance could be maintained at the level of the control rations (18 to 16 percent crude protein) by keeping the lysine content equal to the control, when the crude protein was reduced.

Experimental Procedure

One hundred and eight purebred Duroc, Hampshire, and Yorkshire boars were used in this study. The boars averaging 47.9 pounds were randomly allotted within breed and litter to three experimental treatments. Each treatment consisted of four replicas containing nine boars each. The boars were housed and group fed in an open-front concrete finishing floor equipped with self feeders and automatic waters.

Materials and Methods

Phase 1

Phase 1 included the time period from the time the boars started test at 47.9 pounds body weight until they had reached an average body weight of 123.6 pounds. The boars on Treatments 1, 2, and 3 were fed an 18 percent C.P., 16 percent C.P. + 0.16 percent additional lysine, and a 14 percent C.P. + 0.32 percent additional lysine ration, respectively. Composition of the experimental rations is shown in Table 1. At the end of Phase 1, average daily gain, feed per pound gain, and average daily feed intake were determined.

Table 1. Composition of experimental rations

Ingredients (percent)	Ration designation (percent)					
	18% C.P.	16% C.P.	16% C.P.	14% C.P.	14% C.P.	12% C.P.
Yellow Corn	64.0	69.5	69.2	74.7	74.5	80.3
Soybean Meal (44%)	27.75	22.1	21.9	16.3	16.0	10.25
Wet Molasses	5.0	5.0	5.0	5.0	5.0	5.0
Salt	0.5	0.5	0.5	0.5	0.5	0.5
Dicalcium Carbonate	1.5	1.65	1.65	1.75	1.75	1.8
Calcium Carbonate	0.7	0.7	0.7	0.7	0.7	0.6
Vitamin=trace mineral mix ¹	0.5	0.5	0.5	0.5	0.5	0.5
Aureomycin 50	0.5	0.5	0.5	0.5	0.5	0.5
Lysine mix			0.5	0.5	1.0	1.0
Total	100.00	100.00	100.00	100.00	100.00	100.00
% Crude Protein, calculated	17.99	15.99	16.02	14.03	14.02	12.00
% Calcium, calculated	0.69	0.71	0.70	0.71	0.71	0.71
% Phosphorus, calculated	0.61	0.61	0.61	0.61	0.61	0.59
% Lysine, calculated	0.92	0.76	0.92	0.76	0.91	0.76

¹Supplied 3,000,000 I.U. vitamin A, 300,000 I.U. vitamin D, 4 gm. riboflavin, 20 gm. pantothenic acid, 30 gm. niacin, 1,000 gm. choline chloride, 15 mg. vitamin B₁₂, 6,000 I.U. vitamin E, 20 gm. menadione, 0.2 gm. iodine, 90 gm. iron, 20 gm. manganese, 10 gm. copper, and 90 gm. zinc per ton of feed.

Phase 2

The boars were started on Phase 2 immediately upon completion of Phase 1. The boars on Treatments 1, 2, and 3 were fed a 16 percent C.P., 14 percent C.P. + 0.16 percent added lysine, and a 12 percent C.P. + 0.32 percent added lysine ration, respectively. The composition of the experimental rations is shown in Table 1. The boars were individually removed from the test on Phase 2 when they reached 220 pounds. Average daily gain, feed per pound gain, and average daily feed intake were determined. In addition, ultrasonic estimates of backfat thickness, and loin eye were obtained by the use of the Ithaco Scanogram Model 721 instrument.

The scanogram readings for estimated backfat thickness were taken at the midline at three locations (the first rib, last rib, and last lumbar vertebra). Loin eye area estimates were made at the tenth rib. All scanogram estimates were adjusted to a 220 pound basis for each boar using the National Association of Swine Records Standards.

Results and Discussion

Phase 1

The results are shown in Table 2. Boars on Treatment 3 had significantly lower average daily gains of 1.33 pounds as compared to gains of 1.61 and 1.56 pounds for boars on Treatments 1 and 2, respectively. Gains for boars receiving Treatment 2 tended to be lower than those on Treatment 1, but the difference was not significant. No large differences were noted in average daily feed intake but boars on Treatment 2 consumed slightly more feed per day.

Table 2. Summary of results for Phase I, Phase II, and Total Period

	Treatments (percent)		
	1 (18-16 %)	2 (16-14 % + lys) ^{1,2}	3 (14-12% + lys) ^{1,3}
Pens per treatment, no.	4	4	4
Boars per pen, no.	9	9	9
PHASE I			
Avg. initial wt., lb	48.86	47.86	47.11
Avg. final wt., lb	122.75	123.45	127.60
Avg. daily gain, lb ⁴	1.61 ⁴	1.56 ⁴	1.33 ⁴
Feed per lb gain, lb	2.48	2.64	2.83
Avg. daily feed intake, lb	4.00	4.11	3.74
PHASE II			
Avg. initial wt., lb	122.75	123.45	127.60
Avg. final wt., lb	220.25	218.94	200.42
Avg. daily gain, lb	2.08	2.17	2.00
Feed per lb gain, lb	3.06	3.35	3.26
Avg. daily feed intake	6.35	7.25	6.52
TOTAL PERIOD			
Avg. daily gain, lb ⁴	1.85 ⁴	1.84 ⁴	1.57 ⁴
Feed per lb gain, lb	2.81	2.92	3.00
Avg. daily feed intake, lb	5.21	5.47	4.69
Adj. backfat thickness, in.	1.02	1.01	1.04
Adj. loin-eye area, sq. in. ⁴	5.32 ⁴	5.38 ⁴	4.98 ⁴

¹Phase I treatments were 18, 16 and 14 crude protein rations for Treatments 1, 2 and 3, respectively. Phase II treatments were 16, 14 and 12 percent crude protein rations for Treatments 1, 2 and 3, respectively.

²Both the 16 and 14 percent crude protein rations received 0.16 percent added lysine.

³Both the 14 and 12 percent crude protein rations received 0.32 percent added Lysine.

⁴Means with different superscripts are significantly different ($P < .05$)

Results from Phase 1 indicate that a 14 percent crude protein ration based primarily on yellow corn and soybean meal, with additional lysine added, is inadequate for growing boars from approximately 48 to 120 pounds if optimum performance is to be obtained.

Phase 2

Results are shown on Table 2. Although not significant, boars on Treatment 2 (14 percent C.P. + lysine) had slightly higher average daily gains (2.17 pounds) and feed intake per day (7.25 pounds per day) as compared to Treatments 1 and 3. Boars on Treatment 1 (16 percent crude protein) tended to require less feed per pound of gain.

Results from Phase 2 indicate that growing boars from approximately 120 to 220 pounds, when fed a 14 percent + lysine ration or a 12 percent plus lysine ration have similar growth performance to boars on a standard 16 percent crude protein corn-soybean meal ration.

Total Period

Performance data was computed for the total feeding period. Boars on Treatment 3 had significantly lower average daily gains of 1.57 pounds as compared to gains of 1.85 and 1.84 pounds for boars on Treatments 1 and 2, respectively. Feed required per pound of gain tended to increase as crude protein decreased and added lysine increased.

There were no significant differences in backfat thickness for boars receiving the three treatments. Boars on Treatment 1 and 2 had significantly larger loin eye areas of 5.32 and 5.38 square inches as compared to 4.98 square inches for boars on Treatment 3.

These results indicate that a 16 percent crude protein, plus added lysine, ration from approximately 48 to 120 pounds and a 14 percent, plus added lysine, ration from approximately 120 to 220 pounds will support growth equal to a standard 18 to 16 percent crude protein corn-soybean meal based ration.

Based on the reduced average daily gains, reduced feed efficiency, and smaller loin eye areas as compared to the standard ration, the 14 to 12 percent crude protein ration plus lysine was found to be inadequate for growing boars.