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Protein Sequence for Finishing Swine

R. H. Hines, B. A. Koch, and Gary L. Allee

Summary

Using sixty barrows and gilts, we evaluated five protein sequences for finishing swine. Pigs fed rations containing 16% protein until they weighed 140 lbs., then 12% protein until they weighed 190 lbs., and there after 10% protein (ABC) until market weight gained significantly slower and at a greater cost per lb. of gain than did pigs in any of the other sequences. The cheapest cost per lb. of gain was observed for those pigs fed a 16% protein diet until they weighed 140 lbs. and then a 12% protein diet (ABB) until marketed at 240 lbs. Pigs with the leanest carcasses, largest loin eye, and greatest percentage of lean cuts were those fed a 16% protein diet (AAA) throughout the finishing trial. Pigs fed 16% protein diet to 140 lbs., 12% protein diet to 215 lbs. and then a 10% diet to market weight performed similarly to the ABB sequence group, as did pigs fed 16% protein diet to 190 lbs. and then a 10% ration (AAC) to market weight. Because of high feed costs, swine feeding programs may have to be evaluated continually to determine the most economical gain, which may or may not be compatible with superior rate of gain or carcass merit.

Introduction

During 1973 supplemental protein costs changed dramatically which stimulated interest in reviewing

protein recommendations for finishing swine. Growing pigs commonly are fed a 16% protein feed from the time they are weaned (5-8 weeks) until they weigh 125 lbs., at which time the protein content of the finishing diet is reduced to 12 or 13% crude protein, remaining at that level until market weight. High cost of protein has caused producers to feed rations lower in protein than generally recommended. This study was designed to evaluate five protein sequences for finishing swine to 240 lbs.

Procedure

General. Pigs were housed in a modified open-front building with concrete, slatted floor. Each pen (6' X 15') contained a two hole self-feeder and an automatic watering cup. Pigs were randomly allotted to treatments by breed, sex, and initial weight. Carcass data were taken on seven head (5 barrows and 2 gilts) per treatment. Pigs were removed individually for slaughter when they reached 235 to 245 lbs.

Diets. All diets (table 5.1) were fed in pellet form. Diet A was calculated to contain 16% crude protein; diet B, 12%; diet C about 10% crude protein. The proximate analysis of test diets indicated our milo source contained 8.4% crude protein; consequently, diets A and B were analyzed as being below the calculated values.

Table 5.1. Composition of Diets for Finishing Swine

Ration	A	B	C
Ingredients:	%	%	%
Gr. sorghum grain	76.3	88.7	96.0
Soybean meal (44%)	20.0	7.5	-----
Dicalcium phosphate	1.4	1.6	1.8
Limestone	1.0	.9	.9
Salt	.5	.5	.5
Vitamin, trace mineral, antibiotic	.8	.8	.8
Calculated analysis:			
Crude protein	16.0	12.0	10.0
Calcium	.78	.78	.78
Phosphorous	.60	.60	.60
Lysine	.78	.56	.26
Threonine	.54	.36	.26
Proximate analysis:			
Crude protein	15.1	10.7	8.4

Performance Trial. Sixty crossbred pigs averaging 100 lbs. were used to evaluate these five protein sequences:

- (1) AAA - 16% protein diet fed the pigs to slaughter weight.
- (2) ABB - 16% protein diet fed to approximately 140 lbs., then 12% diet to slaughter weight.
- (3) ABC - 16% protein diet fed to approximately 140 lbs., then 12% diet to 190 lbs. live weight, then 10% diet to slaughter weight.

(4) AAC - 16% protein diet fed to 190 lbs. live weight, then 10% diet to slaughter weight.

(5) ABC (Late) - 16% protein diet fed to 140 lbs., then 12% diet to approximately 215 lbs., then 10% diet to slaughter weight.

Pigs were weighed weekly so that diets could be switched when the average weight of pigs in the pen reached each critical weight. Pounds of feed consumed were recorded for each ration to allow us to calculate feed cost per lb. of gain for each sequence. Costs per pound of ration delivered to KSU were: ration A, \$6.33/cwt; ration B, \$5.85/cwt; ration C, \$5.55/cwt. All pigs had received a 16% crude protein diet from weaning until they were used in this study.

Results and Discussion

The results of performance parameters are shown in table 5.2. Pigs fed ration sequence ABC gained significantly slower during the test than did pigs fed the other sequences; however, they gained similarly to those in other treatments until they reached 190 lbs., when (upon switching to ration C) their growth rate declined significantly until market weight was reached. Pigs fed diets in the AAC sequence gained fastest up to 190 lbs., however, when switched to ration C, their gain was depressed slightly. Gain of pigs fed the sequence (ABC Late) was not depressed during the last 25 lbs. on the test, as it was for the other two groups fed ration C. Feed per lb. of gain favored the pigs fed the two sequences containing supplemental protein throughout the trial (AAA and ABB). Feed cost per lb. of gain was similar for sequences AAA, ABB, AAC, and ABC Late, which suggested that, reducing protein

supplementation during the late stages of the finishing period may not save feed costs. The highest cost per lb. of gain was for sequence ABC (1.6¢/lb. more expensive than sequence ABB, the lowest).

Table 5.2. Performance of Finishing Pigs Fed Five Protein Sequences to Market Weight (240 lbs.)

Protein sequence:	AAA	ABB	ABC	AAC	ABC Late
No. of pigs	12	12	12	12	12
Initial weight, lbs.	97.4	97.3	99.0	103.4	96.8
Daily gain, lbs.	1.58 ^a	1.65 ^a	1.46 ^b	1.64 ^a	1.68 ^a
Feed intake, lbs.	5.68	6.07	5.88	6.23	6.28
Feed/gain	3.60 ^a	3.68 ^a	4.03 ^a	3.80 ^a	3.74 ^a
Feed cost/ lb. gain, ¢	22.8	22.0	23.6	22.8	22.2

^{ab}Means with different superscripts differ significantly (P<.05).

Seven pigs were slaughtered in each treatment to determine effect on carcass traits (Table 5.3). All carcass parameters observed were not significantly different among treatments. Loin eye area was 0.2 to 0.4 sq. in. smaller for treatment ABC and ABC Late than for the other treatments. The largest loin eye was observed for treatment AAA which has been previously observed with higher levels of protein being fed to finishing hogs. Backfat thickness varied among treatments by

less than 0.1 inch; consequently, percentage of carcass weight of ham and loin or lean cuts did not differ significantly among treatments.

Table 5.3. Carcass Traits of Pigs Fed Five Protein Sequences to Market Weight (240 lbs.)

Protein sequence:	AAA	ABB	ABC	AAC	ABC Late
No. of pigs ^c	7	7	7	7	7
Slaughter weight, lbs.	239.6	243.1	238.7	242.7	244.0
Length, in.	31.7 ^a	31.0 ^a	31.0 ^a	31.5 ^a	31.5 ^a
Loin eye, sq. in.	4.36 ^a	4.20 ^a	3.99 ^a	4.25 ^a	3.96 ^a
Backfat, in.	1.44 ^a	1.52 ^a	1.47 ^a	1.47 ^a	1.51 ^a
Ham-loin (carc. wt.), %	38.6 ^a	38.2 ^a	37.0 ^a	37.3 ^a	37.0 ^a
Lean cuts (carc. wt.) %	55.2 ^a	54.9 ^a	53.0 ^a	54.0 ^a	52.8 ^a

^{ab}Means with different superscripts differ significantly (P<.05).

^cFive barrows and two gilts.