

**K****PROTEIN REQUIREMENT OF FINISHING BARROWS****S****AND GILTS (110 TO 230 lbs).****U**

R. H. Hines, B. A. Koch, D. A. Nichols

L. M. Turlington, and R. D. Goodband

**Summary**

Eighty barrows and 80 gilts were fed diets containing four crude protein levels (16, 15, 14, and 13%) from approximately 115 lb to a market weight of 230-235 lb. Barrows and gilts were fed separately to determine their protein requirements during the finishing period. Performance traits (ADG, ADF, and F/G) of barrows and gilts were not significantly affected by increasing the protein content of the diet from 13 to 16%. However, barrows linearly decreased in fat thickness at the 10th rib as crude protein content in the diet was increased. Also, percent muscle increased linearly with increased protein for barrows, but increased protein in diets fed gilts did not result in an improvement in carcass leanness, loin eye, or percent muscle.

**Introduction**

Protein and lysine requirements of finishing pigs continue to be of interest to swine producers and researchers. This interest stems from the desire to cheapen costs of gain by reducing protein content of the diet. In addition, previous research has shown that barrows consume approximately 3/4-1 lb more feed per day and yield fatter carcasses with smaller loin eye areas than gilts. Therefore, a study was designed to evaluate 13, 14, 15 and 16% protein diets fed to finishing barrows and gilts fed separately to determine the effect of protein level on performance and carcass parameters.

**Procedures**

General: Pigs were housed in a modified, open-front building with 50% solid concrete floor and 50% concrete slates. Each pen (6' x 15') contained a two-hole self feeder and a nipple waterer. Pigs were randomly allotted to treatments by litter, initial weight, and sex. Carcass data were estimated by ultra sound (Technicare Unit) at the termination of the trial. Percent muscle was estimated by utilizing the following formulas:

Lb of Lean Pork =  $81.4 + .06 (.73 \times \text{Live Wt}) + 2.0 (\text{Loin Eye Area}) - 14.9 (\text{Fat Depth 10th rib})$

Percent Muscle = Lb of lean pork divided by 160 lb (ad. carc basis) x 100

Treatments: Eighty barrows and eighty gilts were utilized in the two replicates and fed diets containing crude protein levels 16, 15, 14, and 13%. The barrows and gilts were fed separately. The diets (table 1) were fed in meal form.

## Results

Table 2 presents the performance and carcass data of the barrows fed from an average of 114 lb to 237 lb. No significant differences were observed for the performance traits of ADG, ADFI, or F/G with increasing levels of protein in the diets. A linear decrease was observed for fat depth at the 10th rib as protein level was increased in the barrows. This linear reduction in fat depth caused a linear increase in percent muscle of the barrow carcasses.

Increasing the protein level of diets fed to gilts failed to significantly affect ADG, ADFI, or F/G (table 3). In addition, carcasses from the gilts were similar in loin eye area and fat depth at the 10th rib, regardless of protein level of the diet. Overall, barrows gained significantly faster (1.92 vs 1.70), consumed more feed daily (7.03 vs. 6.16), were fatter at the 10th rib (.98 vs. .73), and yielded a lower percent of muscle (55.7 vs. 57.9) than gilts. These differences between sexes are similar to expected differences between barrows and gilts reported by many researchers over the years.

In summary, this study indicates no beneficial effect on performance of either barrows or gilts with increasing levels of crude protein in the finishing diet. Other research stations have suggested that gilts will respond more than barrows to increasing levels of protein, however, in this study only the barrows showed a linear reduction in fat depth at the 10th rib with a corresponding improvement in percent muscle. Loin eye area, which is usually the most responsive carcass trait to increased protein levels, failed to be affected by the crude protein level of the diet for either barrows or gilts as evaluated by ultra sound (Technicare unit).

Table 1. Composition of Experimental Diets

Ingredient	% Crude Protein / % Lysine			
	16/.80	15/.73	14/.66	13/.58
Corn, ground	75.78	78.60	81.40	84.23
Soybean meal (44%)	21.67	18.85	16.05	13.22
Dicalcium phosphate	1.10	1.10	1.10	1.10
Limestone	.90	.90	.90	.90
Salt	.25	.25	.25	.25
Trace mineral mix <sup>a</sup>	.05	.05	.05	.05
Vitamin premix <sup>b</sup>	.25	.25	.25	.25

<sup>a</sup>Containing 5.5% Mn, 10% Fe, 1.1% Cu, 20% Zn, 0.15% I, and 0.1% Co.

<sup>b</sup>Each lb of premix contains the following: Vitamin A 4,000,000 IU, Vitamin D<sub>3</sub> 30,000 IU, Vitamin E 2,000 IU, Riboflavin 450 mg, Choline 40 mg, Niacin 250 mg, d-pantothenic acid 1200 mg, Niacin 2,500 mg, Vitamin B<sub>12</sub> 1.2 mg, menadione bisulfite 250 mg.

Table 2. Performance and Carcass Data of Finishing Barrows Fed Different Protein Levels<sup>a</sup>

Item	Protein Level, %			
	13	14	15	16
No. pigs	20	20	20	20
Daily gain, lb	1.92	1.92	1.96	1.89
Daily feed, lb	6.98	7.23	7.17	6.78
Feed/gain	3.64	3.76	3.68	3.59
Fat depth, 10th rib, in <sup>b</sup>	1.06	.97	.98	.93
Loin eye, in <sup>2</sup>	6.14	5.92	6.02	5.94
Carcass muscle, % <sup>c</sup>	55.15	55.70	55.85	56.00

<sup>a</sup> Average initial weight 114.4 lb, average final weight 237.2 lb.<sup>b</sup> Linear effect (P<.09).<sup>c</sup> Linear effect (P<.05).Table 3. Performance of Finishing Gilts Fed Different Protein Levels<sup>a</sup>

Item	Protein Level, %			
	13	14	15	16
No. pigs	20	20	20	20
Daily gain, lb	1.78	1.72	1.60	1.72
Daily feed, lb	6.44	6.08	5.94	6.16
Feed/gain	3.62	3.55	3.70	3.58
Fat depth, 10th rib, in	.76	.78	.64	.73
Loin eye, in <sup>2</sup>	6.20	6.03	5.98	6.08
Carcass muscle, %	57.95	57.35	58.45	57.90

<sup>a</sup> Average initial weight 112.8 lb, average final weight 227.4 lb.