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Decrease in Protein Level in Final Finishing Phase of High Lean Gain Swine

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Abstract
At times the price of feed protein sources is high relative to the price of corn. Producers are then tempted to reduce the amount of protein in the diet, especially during the final finishing phase. Also, there is increasing interest in niche market pork production. Many of these markets require a modest amount of carcass fat. One possible strategy to add carcass fat is to reduce the protein content of the diet. The objective of this trial was to evaluate the effect of lower protein content of the diet on growth rate and fat deposition of a modern lean genetic line of finishing pigs.

Disciplines
Agricultural Science | Agriculture

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Introduction

At times the price of feed protein sources is high relative to the price of corn. Producers are then tempted to reduce the amount of protein in the diet, especially during the final finishing phase. Also, there is increasing interest in niche market pork production. Many of these markets require a modest amount of carcass fat. One possible strategy to add carcass fat is to reduce the protein content of the diet. The objective of this trial was to evaluate the effect of lower protein content of the diet on growth rate and fat deposition of a modern lean genetic line of finishing pigs.

Materials and Methods

Two groups of pigs were put on test from May 9, 2005 through August 30, 2005. Trial 1 was conducted in three small-scale hoop structures (20 × 36 ft) with two pens per hoop beginning in May and lasted 35 days until pigs reached market weight. Trial 2 was conducted in four pens in open-front housing beginning in July and lasted 51 days due to a hot Iowa summer. At the beginning and end of each trial, pigs were individually tagged, weighed, and scanned for 10^{th} rib backfat and loin muscle area. Periodic weights were recorded during the trials to measure growth rate patterns. There was no difference in average starting weight; the control (normal protein diet) pigs weighed 189 lb while the treatment (low protein diet) pigs weighed 188 lb. Litters were allocated uniformly across treatments while equalizing starting weight and ratio of barrows and gilts in each pen. Feed was processed at the farm. The treatment diet was processed then additional soybean meal was added to create the high protein control diets. The result was that the treatment diet (low protein) had 100 lb more corn and 100 lb less soybean meal/ton of feed than the control diet.

Results and Discussion

Pigs fed the low protein diet consumed less feed and grew slower than pigs on the control diet. Trial 1 control pigs weighed 282 lb and the low protein pigs weighed 257 lb, a difference of 25 lb/head. In trial 2, pigs fed control diet weighed 287 lb and the low protein pigs weighed 251 lb, a difference of 36 lb. The most noteworthy response is that pigs fed the low protein consumed 1.46 lb less feed/day leading to the reduced gain.

Pigs fed the low protein diet gained significantly less (-0.65 lb/day). Diet did not impact backfat, loin area, % lean, lean gain/day, or pen feed efficiency. Pigs in pens fed the low protein diet had a lower ADFI (-0.45 lb/day).

Gilts had less backfat (-0.20 in.), larger loin area (0.87 in^2), were leaner (4.43%), and gained more pounds of lean/day (0.07 lb).

There was a treatment by gender interaction for ADG ($P<.05$). While there was no difference in ADG between gilts and barrows fed the same diet, the interaction showed that gilts fed a low protein diet gained 0.82 lb/day less than gilts fed a control diet and barrows fed a low protein diet gained 0.48 lb/day less than barrows fed a control diet.

Lowering the diet's protein content below the pig's requirement was not effective in creating change in fat-to-lean ratio in the final finishing phase. Amino acid balances must be considered when attempting to reduce soybean meal

content. Although there was an interaction of dietary treatment by gender, gilt performance was more severely impacted than barrow performance. When split-sex feeding, it is possible that protein content can be lowered more in barrow diets than gilt diets.

Previous lean growth studies have not shown the magnitude of intake depression as these trials. The deficiency of specific amino acids may have been large enough to cause a metabolic response resulting in decreased feed intake.

Table 1. Growth, feed and carcass characteristics by treatment.

	Treatment diet		
	control	low protein	SE
ADG	2.27[A]	1.62[B]	0.06
Backfat	0.79	0.86	0.08
Loin muscle area	6.21	6.05	0.21
Percent lean	49.87	49.23	0.82
Lean gain/day	0.69	0.62	0.04
ADFI (pen)	7.70[a]	6.24[b]	0.41
FE (pen)	3.86	3.48	0.34

[A,B]=P<.01
[a,b]=P<.05

Table 2. Growth and carcass characteristics by gender.

	Sex		
	gilt	barrow	SED
ADG	1.93	1.95	0.08
Backfat	0.73[A]	0.93[B]	0.07
Loin muscle area	6.56	5.70	0.17
Percent lean	51.77[A]	47.34[B]	0.62
Lean gain/day	0.69[a]	0.62[b]	0.03

[A,B]=P<.01
[a,b]=P<.05

Table 3. Treatment*Gender interactions.

	Treatment diet	
	control	low protein
Gilt	2.33[a]	1.52[b]
Barrow	2.20[a]	1.72[b]

[a,b]=P<.05