Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 10 *Swine Day (1968-2014)*

Article 1180

2008

Effects of feeding excess crude protein on growth performance and carcass traits of finishing pigs

S M. Williams

C Feoli

S Issa

See next page for additional authors

Recommended Citation

Williams, S M.; Feoli, C; Issa, S; Gugle, Terry L.; and Hancock, Joe D. (2008) "Effects of feeding excess crude protein on growth performance and carcass traits of finishing pigs," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 10. https://doi.org/10.4148/2378-5977.7020

Effects of feeding excess crude protein on growth performance and carcass traits of finishing pigs

Abstract

A total of 176 pigs (88 barrows and 88 gilts, average initial BW of 209 lb) were used in a 33-d experiment to determine the effects of excess dietary CP on growth performance and carcass measurements of finishing pigs. Pigs were sorted by sex and ancestry and blocked by weight with 11 pigs per pen and 4 pens per treatment. Treatments were corn-soybean meal based and formulated to a minimum of 0.80% total lysine but with 12, 14, 16, and 18% CP. Feed and water were consumed on an ad libitum basis until pigs were slaughtered (average final BW of 275 lb) at a commercial abattoir. Increasing CP concentration had no effect ($P > 0.20$) on ADG, ADFI, F/G, and HCW. With HCW used as a covariate, there were linear decreases in dressing percentage ($P < 0.01$) and loin depth at the last rib ($P < 0.04$) as CP concentration in the diet was increased from 12 to 18%. However, fat thickness at the last rib and percentage carcass lean were not affected ($P > 0.34$) by CP treatment. Our results indicate that increasing CP from 12 to 18% in diets for late-finishing pigs does not affect growth performance or carcass leanness but has small negative effects on dressing percentage and loin depth.; Swine Day, 2008, Kansas State University, Manhattan, KS, 2008

Keywords

Swine day, 2008; Kansas Agricultural Experiment Station contribution; no. 09-074-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 1001; Carcass; Finishing pigs; Growth; Protein

Authors

S M. Williams, C Feoli, S Issa, Terry L. Gugle, and Joe D. Hancock

EFFECTS OF FEEDING EXCESS CRUDE PROTEIN ON GROWTH PERFORMANCE AND CARCASS TRAITS OF FINISHING PIGS

S. M. Williams, J. D. Hancock, C. Feoli, S. Issa, and T. L. Gugle

Summary

A total of 176 pigs (88 barrows and 88 gilts, average initial BW of 209 lb) were used in a 33-d experiment to determine the effects of excess dietary CP on growth performance and carcass measurements of finishing pigs. Pigs were sorted by sex and ancestry and blocked by weight with 11 pigs per pen and 4 pens per treatment. Treatments were corn-soybean meal based and formulated to a minimum of 0.80% total lysine but with 12, 14, 16, and 18% CP. Feed and water were consumed on an ad libitum basis until pigs were slaughtered (average final BW of 275 lb) at a commercial abattoir. Increasing CP concentration had no effect ($P > 0.20$) on ADG, ADFI, F/G, and HCW. With HCW used as a covariate, there were linear decreases in dressing percentage ($P < 0.01$) and loin depth at the last rib ($P < 0.04$) as CP concentration in the diet was increased from 12 to 18%. However, fat thickness at the last rib and percentage carcass lean were not affected ($P > 0.34$) by CP treatment. Our results indicate that increasing CP from 12 to 18% in diets for late-finishing pigs does not affect growth performance or carcass leanness but has small negative effects on dressing percentage and loin depth.

Key words: carcass, finishing pigs, growth, protein

Introduction

It has been suggested that excess CP in diets for finishing pigs reduces energetic efficiency, causes greater organ weights, and leads to decreased carcass yield. These concerns are especially relevant today because diets based on dried distillers grains with solubles tend to have excess CP. Therefore, the objective of this experiment was to determine the effects of excess dietary CP on growth performance and carcass measurements of finishing pigs.

Procedure

A total of 176 pigs (88 barrows and 88 gilts, average initial BW of 209 lb) were used in a 33-d growth assay. Pigs were sorted by sex and ancestry, blocked by weight, and assigned to pens. There were 11 pigs per pen and 4 pens per treatment. The pigs were housed in a finishing facility having 6-ft × 16-ft pens with half solid and half slatted concrete flooring. Each pen had a self-feeder and nipple waterer to allow ad libitum consumption of feed and water.

All diets had at least 0.8% lysine but with 12, 14, 16, and 18% CP (Table 1). The diets were corn-soybean meal based, with the soybean meal fraction of the diet increased (largely at the expense of corn and synthetic amino acids) to supply greater CP to the diet. Pigs and feeders were weighed at d 0 and 33 to allow calculation of ADG, ADFI, and F/G, and the pigs were killed (average BW of 275 lb) so carcass data could be collected.

All data were analyzed as a randomized complete block design by using the MIXED procedure of SAS. Polynomial regression was used to describe the shape of the response to increasing concentrations of CP in the diet. Because differences in HCW are known to

affect other carcass measurements, HCW was used as a covariate to correct for slaughtering pigs at a constant age rather than constant weight.

Results and Discussion

Increasing CP concentration in the diet had no effect on ADG, ADFI, F/G, and HCW ($P > 0.20$). However, there were slight decreases in dressing percentage (linear, $P < 0.01$) and loin depth at the last rib (linear, $P < 0.04$) as CP concentration in the diet was increased from 12 to 18%. Fat thickness at the last rib and percentage carcass lean were not affected ($P > 0.34$) as CP concentration in the diet was increased.

In conclusion, increasing CP from 12 to 18% did not affect growth performance, carcass weight, or carcass leanness. There were linear decreases in dressing percentage and loin depth as CP was increased from 12 to 18%, but the effects were small.

Table 1. Composition of diets

	CP, %			
Ingredient, %	12	14	16	18
Corn	88.51	83.28	78.01	72.98
Soybean meal (47.5% CP)	8.80	14.50	20.06	25.15
Limestone	1.06	1.07	1.04	1.01
Monocalcium phosphate (21% P)	0.66	0.55	0.51	0.48
Salt	0.23	0.23	0.23	0.23
L-lysine HCl	0.39	0.19	---	---
L-threonine	0.11	0.02	---	---
L-tryptophan	0.05	0.01	---	---
DL- methionine	0.04	---	---	---
Vitamin premix	0.06	0.06	0.06	0.06
Trace mineral premix	0.04	0.04	0.04	0.04
Antibiotic [1]	0.05	0.05	0.05	0.05
Calculated analysis, %				
Lysine, %	0.80	0.80	0.81	0.95
Ca	0.55	0.55	0.55	0.55
P total	0.45	0.45	0.46	0.48

[1] To provide 40 g/ton tylosin.

Table 2. Effects of increasing CP concentration on growth performance and carcass characteristics of finishing pigs[1]

	CP, %					*P* value		
Item	12	14	16	18	SE	Linear	Quad	Cubic
ADG, lb	2.08	2.04	2.03	2.06	0.04	---[2]	---	---
ADFI, lb	6.30	6.28	6.24	6.15	0.18	---	---	---
F/G	3.03	3.08	3.07	2.99	0.08	---	---	---
HCW, lb	204.2	202.0	200.6	202.1	4.48	---	---	---
Dress, %[3]	73.6	73.3	73.1	73.2	0.21	0.01	---	---
Carcass lean, %[3]	55.0	54.5	54.5	54.4	0.7	---	---	---
Backfat thickness, in.[3]	0.74	0.76	0.76	0.76	0.04	---	---	---
Loin depth, in.[3]	2.50	2.45	2.43	2.41	0.04	0.03	---	---

[1] A total of 176 pigs (initial BW of 209 lb) with 11 pigs per pen and 4 pens per treatment.
[2] Dashes indicate $P > 0.15$.
[3] HCW used as a covariate.