

Kansas Agricultural Experiment Station Research Reports

Volume 0

Issue 10 *Swine Day* (1968-2014)

Article 153

1974

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Recommended Citation

Trotter, M and Allee, G L. (1974) "Sulfur amino acid requirement of the finishing pig," *Kansas Agricultural Experiment Station Research Reports*: Vol. 0: Iss. 10. <https://doi.org/10.4148/2378-5977.5993>

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Sulfur amino acid requirement of the finishing pig

Abstract

A growth and two nitrogen retention studies were conducted to determine the sulfur amino acid requirement of the finishing pig. Adding 0.10% DL-methionine to a 9.0% protein semi-purified basal diet containing 0.14% total sulfur amino acids significantly ($P < .05$) increased nitrogen retention, but further additions of DL-methionine had no beneficial effect. Daily gain was not significantly affected by adding DL-methionine to the basal diet, suggesting that the finishing pig has a lower sulfur amino acid requirement for daily gain than is essential for maximum nitrogen retention. These results suggest that the sulfur amino acid requirement of the finishing pig fed a 9.0% protein diet does not exceed 0.24% of the diet.; Swine Day, Manhattan, KS, November 14, 1974

Keywords

Swine day, 1974; Kansas Agricultural Experiment Station contribution; no. 483; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 221; Swine; Sulfur amino acid; Finishing pig; DL-methionine; Protein

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Sulfur Amino Acid Requirement of the Finishing Pig

Mike Trotter and Gary L. Allee

Summary

A growth and two nitrogen retention studies were conducted to determine the sulfur amino acid requirement of the finishing pig. Adding 0.10% DL-methionine to a 9.0% protein semi-purified basal diet containing 0.14% total sulfur amino acids significantly ($P < .05$) increased nitrogen retention, but further additions of DL-methionine had no beneficial effect. Daily gain was not significantly affected by adding DL-methionine to the basal diet, suggesting that the finishing pig has a lower sulfur amino acid requirement for daily gain than is essential for maximum nitrogen retention. These results suggest that the sulfur amino acid requirement of the finishing pig fed a 9.0% protein diet does not exceed 0.24% of the diet.

Introduction

Limited research data are available on the sulfur amino acid requirement of finishing pigs. The objectives of the present trials were to determine the sulfur amino acid requirement of the finishing pig.

Procedure

General. In the growth trial (trial 1), pigs were housed individually in pens with concrete

slats in an open-fronted building. Feed and water were supplied ad libitum. Initial and final weights were recorded and daily gain, feed efficiency and feed intake were determined at the conclusion of the trial. Pigs were slaughtered when they reached approximately 210 pounds. Specific gravity, backfat thickness, and loin-eye measurements were taken on carcasses.

For the nitrogen retention studies (trial 2 and 3), pigs were housed in metal metabolism cages allowing for separate collection of feces and urine. Daily intake of feed, provided in two equal portions, was constant. Fresh water was supplied at each feeding. A five-day test period preceded a five-day collection period.

The basal diet contained 10.0% isolated soybean protein, 80% cornstarch, 3% cellulose, 3% soybean oil, and vitamin and mineral fortification to meet NRC requirements. All essential amino acids, except methionine and cystine, were present at 120% of NRC (1968) recommended levels.

Trial 1. An individual feeding trial was conducted using fifteen Yorkshire barrows averaging 126 pounds. Pigs were allotted according to litter and weight to three treatment groups (table 10.1): (1) basal, (2) basal + 0.10% DL-methionine and (3) basal + 0.20% DL-methionine.

Trial 2. Three littermate Yorkshire barrows weighing an average of 129 pounds were randomly assigned to three treatments (table 10.2) as in trial 1. A latin square design was used, and daily feed intake was held constant at 4.4 pounds throughout the trial.

Trial 3. Three littermate Yorkshire gilts weighing an average of 129 pounds were randomly assigned to three treatments (table 10.3) as in trial 1. A latin square design was used, and daily feed intake was held constant at 4.4 pounds throughout the trial.

Results and Discussion

Trial 1. Results of the growth trial are presented in table 10.1. Adding DL-methionine to the basal diet containing 0.14% total sulfur amino acids did not improve either daily gain or feed efficiency, indicating that the sulfur amino acid requirement was met by the basal diet.

Pigs used in the growth trial were slaughtered when they reached approximately 210 pounds. Specific gravity and carcass measurements revealed no significant differences between pigs fed the basal diet and those fed supplemental methionine (table 10.1).

Trial 2. Adding 0.10% DL-methionine to the basal diet of finishing barrows significantly ($P < .05$) increased their nitrogen retention (table 10.2). Further additions of DL-methionine failed to increase nitrogen retention above that observed on the 0.10% addition.

Trial 3. Adding 0.10% DL-methionine to the diet of finishing gilts significantly ($P < .05$) increased their nitrogen retention, but further additions resulted in no significant increase.

Table 10.1. Performance and Carcass Characteristics of Finishing Pigs Fed Graded Levels of DL-Methionine^a

Item	Diet		
	Basal	Basal + 0.10% DL-methio-nine	Basal + 0.20% DL-methio-nine
Daily gain, lb.	1.38 ^b	1.44 ^b	1.61 ^b
Daily feed intake, lb.	4.75 ^b	4.67 ^b	5.09 ^b
Feed/gain	3.51 ^b	3.25 ^b	3.18 ^b
Specific gravity	1.0421 ^b	1.0476 ^b	1.0410 ^b
Backfat thickness, ² in.	1.41 ^b	1.34 ^b	1.34 ^b
Loin-eye area, in. ²	4.12 ^b	4.21 ^b	4.25 ^b

^aEach value is the mean of five individually fed pigs averaging 126 pounds initially.

^bMeans with different superscripts differ significantly ($P < .05$).

Table 10.2. Nitrogen Retention of Finishing Barrows^a
(Trial 2)

Diets	Daily N, g			
	Intake	Urine	Feces	Retained
1. Basal	27.98	14.48	1.95	11.55 ^b
2. Basal + 0.10% DL-methionine	28.96	11.79	1.56	15.61 ^c
3. Basal + 0.20% DL-methionine	30.10	12.76	1.73	15.61 ^c

^aEach value is the mean of three littermate barrows weighing 126 pounds initially.

^{bc}Means with different superscripts are statistically different (P<.05).

Table 10.3. Nitrogen Retention of Finishing Gilts^a
(Trial 3)

Diets	Daily N, g			
	Intake	Urine	Feces	Retained
1. Basal	27.98	13.48	2.01	12.49 ^b
2. Basal + 0.10% DL-methionine	28.96	9.19	2.05	17.72 ^c
3. Basal + 0.20% DL-methionine	30.10	10.04	1.71	18.35 ^c

^aEach value is the mean of three littermate gilts weighing 126 pounds initially.

^{bc}Means with different superscripts are statistically different (P<.05).