Kansas Agricultural Experiment Station Research Reports

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

Article 517

1993

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S R. Stuewe

K G. Friesen

Jim L. Nelssen

See next page for additional authors

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Abstract

Seventy-two high-lean growth gilts were used to determine the effects of dietary lysine on carcass characteristics and subprimal cut distribution of gilts fed to 230 or 300 lb. The gilts were fed one of six lysine treatments (digestible lysine of .44, .54, .64, .74, .84, and .94% corresponding to .55, .67, .79, .91, 1.03, and 1.15% total lysine, respectively). For gilts fed to 230 or 300 lb, effects on carcass characteristics or subprimal cut distribution were minimal. For gilts fed to 230 lb, only slight linear decreases in 402 ham and boneless 402C ham were observed as dietary lysine increased. Therefore, producers can utilize a level of lysine to maximize growth performance, without negatively affecting carcass characteristics or subprimal cut yields.; Swine Day, Manhattan, KS, November 18,1993

Keywords

Swine day, 1993; Kansas Agricultural Experiment Station contribution; no. 94-194-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 695; Swine; Pork; Lysine; Gilts; Meat yield

Authors

S R. Stuewe, K G. Friesen, Jim L. Nelssen, Robert D. Goodband, Michael D. Tokach, and John A. Unruh

THE INFLUENCE OF DIETARY LYSINE ON CARCASS CHARACTERISTICS AND SUBPRIMAL CUT DISTRIBUTION OF HIGH-LEAN GROWTH GILTS FED TO 230 AND 300 LB

S. R. Stuewe, J. A. Unruh, K. G. Friesen, J. L. Nelssen, R. D. Goodband, and M. D. Tokach

Summary

Seventy-two high-lean growth gilts were used to determine the effects of dietary lysine on carcass characteristics and subprimal cut distribution of gilts fed to 230 or 300 lb. The gilts were fed one of six lysine treatments (digestible lysine of .44, .54, .64, .74, .84, and .94% corresponding to .55, .67, .79, .91, 1.03, and 1.15% total lysine, respectively). For gilts fed to 230 or 300 lb, effects on carcass characteristics or subprimal cut distribution were minimal. For gilts fed to 230 lb, only slight linear decreases in 402 ham and boneless 402C ham were observed as dietary lysine increased. Therefore, producers can utilize a level of lysine to maximize growth performance, without negatively affecting carcass characteristics or subprimal cut yields.

(Key Words: Pork, Lysine, Gilts, Meat Yield.)

Introduction

The swine industry has been concentrating on optimizing lean pork production. Previous research has shown that high-lean growth gilts offer the largest potential for maximized lean tissue accretion and improved lean efficiency. These gilts when fed to heavier weights can also produce desirable carcasses with high subprimal cut yields. Lysine has normally been the first limiting amino acid for protein synthesis in pigs. Therefore, the objective of this study was to determine the effects dietary lysine on carcass characteristics and subprimal cut distribution of high-lean growth gilts fed to 230 or 300 lb.

Procedures

Growth performance for the gilts used in this study is discussed on page 96. One hundred eight gilts were blocked by initial weight and then allocated to one of six lysine treatments (dietary lysine of .44, .54, .64, .74, .84, or .94% which corresponds to .55, .67, .79, .91, 1.03, and 1.15% total lysine, respectively). One gilt was randomly selected and slaughtered when the pen mean weight reached 230 lb. The remaining two gilts were fed until the pen mean weight reached 300 lb. At this time, one gilt was randomly selected and slaughtered. The remaining gilt was not used in this part of the study.

Carcass characteristics were recorded at 24 hr postmortem. The left sides of the carcasses were then fabricated into closely trimmed, bone-in and boneless subprimal cuts according to National Association of Meat Purveyors (NAMP) Specifications.

Results and Discussion

Dressing percentage, USDA grade, percentage muscle, and subprimal cut yield percentages of gilts fed to 230 lb are given in Table 1. Carcass characteristics and subprimal cut percentages, except for the 402 ham and boneless 402C ham, were not influenced by dietary lysine ($P>.10$). The 402 ham and boneless 402C ham appeared to show slight linear decreases as dietary lysine increased ($P<.05$).

Gilts fed to 300 lb (Table 2) also showed no differences ($P>.10$) in subprimal cut percentages or carcass characteristics,

except for the USDA grade and average backfat. The USDA grade and average backfat appeared to have a quadratic effect ($P<.05$), with the intermediate lysine levels giving higher values.

Even though differences in dietary lysine resulted in differences in gain and efficiency for high lean gilts fed to either 230 or 300 lb (p. 96), minimal differences in carcass traits or subprimal cut distribution were observed. Therefore, producers can focus on and use a level of lysine that can optimize growth performance, without significantly affecting carcass characteristics or subprimal cut yields.

Table 1. The Effects of Dietary Lysine on Carcass Characteristics and Subprimal Cut Distribution of Gilts Fed to 230 lb[a]

	Digestible Lysine, %[b]						
Item	.44	.54	.64	.74	.84	.94	CV
Live wt, lb	220.2	217.3	220.4	222.3	219.5	220.0	3.0
Hot carcass wt, lb	164.6	162.4	162.9	165.2	163.5	165.8	4.1
Dressing percentage, %[c]	74.8	74.7	74.0	74.3	74.5	74.7	2.1
Last rib backfat, in	.72	.75	.67	.75	.73	.76	16.1
Muscle score[d]	2.5	2.6	2.6	2.4	2.5	2.3	13.7
USDA Grade[e]	1.0	1.0	1.0	1.1	1.0	1.1	13.3
Average backfat, in	.87	.87	.89	.91	.87	.91	11.6
Carcass length, in	30.8	30.5	30.8	30.6	30.6	30.5	2.8
Tenth rib fat depth, in	.64	.73	.74	.69	.72	.74	22.9
Loin eye area, in^2	5.6	5.8	5.7	5.9	5.8	5.8	11.5
Percent muscle, %[f]	57.8	57.4	57.2	57.7	57.5	57.1	3.3
Percent lean, %[g]	53.9	53.6	53.2	53.9	53.6	53.1	5.1
Chilled side wt, lb	81.1	80.2	80.1	81.1	81.0	81.2	3.8
Hind foot, %	2.0	1.9	2.0	1.9	1.9	1.8	11.6
402 ham, %[h]	24.7	24.2	24.3	23.8	23.9	23.4	4.3
402C ham, boneless, %[h]	20.3	19.6	20.1	19.3	19.2	18.8	6.6
420 front foot, %	1.3	1.3	1.2	1.3	1.3	1.2	11.7
Jowl, %	2.2	2.2	2.3	2.1	2.4	2.3	16.6
421 neck bones, %	1.6	1.4	1.5	1.6	1.6	1.5	11.6
405 picnic shoulder, %	11.1	10.7	10.8	11.3	10.8	11.3	6.6
405A picnic shoulder, boneless, %	8.3	8.1	8.2	8.7	8.2	8.7	8.3
406 Boston butt, %	7.8	8.0	7.4	8.0	7.9	8.0	6.9
406A Boston butt, boneless, %	7.3	7.6	7.0	7.6	7.5	7.5	6.8
410 loin, %	22.5	22.1	22.2	22.1	22.1	21.6	7.1
413 loin, boneless, %	14.8	14.1	14.4	14.7	14.2	14.1	9.2
415 tenderloin, %	1.5	1.5	1.4	1.4	1.4	1.4	7.5
416 spareribs, %	3.9	4.1	4.0	3.8	3.9	4.0	6.5
408 belly, %	13.7	14.2	13.9	13.3	13.8	14.0	6.1
Boneless ham, loin and shoulder, %[i]	52.2	50.8	51.1	51.6	50.4	50.6	4.2

[a]Subprimal cut percentages are a percentage of chilled side wt.
[b]Digestible lysine of .44, .54, .64, .74, .84, and .94% correspond to .55, .67, .79, .91, 1.03, and 1.15% total lysine, respectively.
[c]Dressing percentage = (hot carcass wt, lb/live wt, lb) × 100.
[d]Muscle score: 1 = thin, 2 = average, and 3 = thick.
[e]USDA Grade = (4 × last rib backfat, in) – (1 × muscle score).
[f]Percent muscle = 100 × [10.5 + (.5 × hot carcass wt, lb) + (2.0 × loin eye area, in^2) – (14.9 × tenth rib fat depth, in)]/hot carcass wt, lb.
[g]Percent lean = 100 × [7.231 + (.437 × hot carcass wt, lb) – (18.746 × tenth rib fat depth, in) + (3.877 × loin eye area, in^2)]/hot carcass wt, lb.
[h]Linear effect of lysine ($P<.05$).
[i]402C ham + 405A picnic shoulder + 406A Boston butt + 413 loin + 415 tenderloin.

Table 2. The Effects of Dietary Lysine on Carcass Characteristics and Subprimal Cut Distribution of Gilts Fed to 300 lb[a]

	Digestible Lysine, %[b]						
Item	.44	.54	.64	.74	.84	.94	CV
Live wt, lb	295.2	295.2	303.0	296.8	197.2	292.0	3.4
Hot carcass wt, lb	225.5	225.7	229.8	223.5	221.9	221.2	3.4
Dressing percentage, %[c]	76.4	76.5	75.8	75.3	74.7	75.8	2.1
Last rib backfat, in	.86	1.0	1.1	.89	1.1	.84	18.2
Muscle score[d]	2.6	2.7	2.7	2.6	2.5	2.5	11.4
USDA Grade[ef]	1.1	1.5	1.7	1.3	1.8	1.1	38.2
Average backfat, in[f]	1.1	1.1	1.2	1.1	1.2	1.0	12.8
Carcass length, in	33.6	33.0	33.6	33.4	33.3	34.1	2.3
Tenth rib fat depth, in	1.0	1.1	1.1	.99	1.2	.96	22.9
Loin eye area, in^2	6.4	7.2	6.6	6.7	6.7	6.3	11.8
Percent muscle, %[g]	54.1	54.1	54.0	54.5	53.5	54.5	3.6
Percent lean, %[h]	49.4	49.9	49.4	50.2	48.8	49.8	5.6
Chilled side wt, lb	111.2	112.6	113.6	111.5	109.7	109.1	3.7
Hind foot, %	1.7	1.7	1.7	1.8	1.7	1.8	7.0
402 ham, %[h]	22.4	21.4	21.9	22.0	21.5	21.6	5.2
402C ham, boneless, %	17.7	17.0	17.5	17.4	16.8	17.2	6.6
420 front foot, %	1.1	1.1	1.2	1.3	1.2	1.2	9.5
Jowl, %	2.5	2.4	2.4	2.5	2.1	2.3	14.1
421 neck bones, %	1.5	1.6	1.5	1.5	1.4	1.5	21.0
405 picnic shoulder, %	10.2	10.3	10.3	10.5	10.2	10.4	7.7
405A picnic shoulder, boneless, %	7.9	8.0	8.0	8.2	7.8	8.0	9.6
406 Boston butt, %	7.7	7.8	7.7	7.9	7.6	7.9	9.4
406A Boston butt, boneless, %	7.3	7.5	7.4	7.6	7.3	7.6	9.4
410 loin, %	21.7	21.3	21.5	20.7	20.8	21.9	6.5
413 loin, boneless, %	14.0	13.7	14.3	13.6	13.5	14.4	9.4
415 tenderloin, %	1.3	1.2	1.3	1.2	1.2	1.3	12.1
416 spareribs, %	3.9	3.7	3.8	4.0	3.7	3.9	7.5
408 belly, %	14.8	14.2	14.7	15.5	15.2	14.7	5.3
Boneless ham, loin and shoulder, %[i]	48.2	47.4	48.5	48.0	46.6	48.4	4.8

[a]Subprimal cut percentages are a percentage of chilled side wt.
[b]Digestible lysine of .44, .54, .64, .74, .84, and .94% correspond to .55, .67, .79, .91, 1.03, and 1.15% total lysine, respectively.
[c]Dressing percentage = (hot carcass wt, lb/live wt, lb) × 100.
[d]Muscle score: 1 = thin, 2 = average, and 3 = thick.
[e]USDA Grade = (4 × last rib backfat, in) – (1 × muscle score).
[f]Quadratic effect of dietary lysine ($P<.05$).
[g]Percent muscle = 100 × [10.5 + (.5 × hot carcass wt, lb) + (2.0 × loin eye area, in^2) – (14.9 × tenth rib fat depth, in)]/hot carcass wt, lb.
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