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G L. Allee

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## Effects of fat level and calorie-protein ratio on performance of finishing pigs

### Abstract

One hundred twenty finishing pigs averaging 52.9 kg (116 lbs.) initially were used to study effects of fat level and calorie-protein (C:P) ratio on performance and carcass traits of pigs fed a sorghum-soybean meal basal ration. The basal ration contained 13.1% crude protein, 0.55% lysine, 0.68% calcium and 0.59% phosphorus. Fat (tallow) was added to the basal ration at the expense of sorghum at 0, 3, 6, and 9% while maintaining a constant C:P ratio. Also, 9% fat was added to the basal ration without adjusting the C:P ratio. With a constant C:P ratio, daily gain and feed efficiency were improved by adding fat. Pigs fed the basal ration supplemented with 9% added fat while maintaining a constant C:P ratio gained faster and were more efficient ( $P < .05$ ) than pigs fed 9% added fat without adjusting the C:P ratio. Carcass data were collected on 75 pigs at approximately 100 kg (220 lbs.). Adding fat resulted in a small, yet significant ( $P < .05$ ), increase in backfat thickness. However, carcass value, on a grade and yield basis, was not reduced by adding fat.; Swine Day, Manhattan, KS, November 11, 1976

### Keywords

Swine day, 1976; Kansas Agricultural Experiment Station contribution; no. 519-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 283; Swine; Fat; Calorie-protein ratio; Performance; Basal ration; Lysine

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### Summary

One hundred twenty finishing pigs averaging 52.9 kg (116 lbs.) initially were used to study effects of fat level and calorie-protein (C:P) ratio on performance and carcass traits of pigs fed a sorghum-soybean meal basal ration. The basal ration contained 13.1% crude protein, 0.55% lysine, 0.68% calcium and 0.59% phosphorus. Fat (tallow) was added to the basal ration at the expense of sorghum at 0, 3, 6, and 9% while maintaining a constant C:P ratio. Also, 9% fat was added to the basal ration without adjusting the C:P ratio. With a constant C:P ratio, daily gain and feed efficiency were improved by adding fat. Pigs fed the basal ration supplemented with 9% added fat while maintaining a constant C:P ratio gained faster and were more efficient ( $P < .05$ ) than pigs fed 9% added fat without adjusting the C:P ratio. Carcass data were collected on 75 pigs at approximately 100 kg (220 lbs.). Adding fat resulted in a small, yet significant ( $P < .05$ ), increase in backfat thickness. However, carcass value, on a grade and yield basis, was not reduced by adding fat.

### Introduction

There is renewed interest in adding fat to swine rations. Our studies with young pigs have shown the importance of calorie-protein ratio when fat is added to rations. The objective of this

experiment was to determine the effects of fat level and calorie-protein ratio on performance and carcass traits of finishing pigs.

### Experimental Procedures

We randomly assigned (by sex and weight) 120 finishing pigs averaging 52.9 kg (116 lbs.) initially to experimental treatments. Pigs were housed in a modified open-front, totally-slatted finishing barn. Each 6' x 15' pen contained an automatic waterer and self-feeder. The basal (sorghum-soybean meal) ration contained 13.1% crude protein, 0.55% lysine, 0.68% calcium, and 0.59% phosphorus. Fat (tallow) was added to the basal ration replacing sorghum at 0, 3, 5, and 9% but maintaining a constant calorie-protein ratio. Additionally, 9% fat was added to the basal ration without adjusting the calorie-protein ratio (table 24). Performance data were summarized on an equal time basis [when pigs in a replicate averaged approximately 100 kg (220 lbs.)]. Carcass data were collected on 75 pigs at 100 kg (220 lbs.). The experiment was conducted during the fall and winter of 1975.

### Results and Discussion

Influences of fat level and calorie-protein ratio on the performance of finishing pigs are shown in table 25. Adding fat to the basal ration while maintaining a constant calorie-protein ratio significantly ( $P < .05$ ) increased

Table 24. Composition of rations, %.

Fat level, %	0	9	9
C:P ratio <sup>a</sup>	23.6	23.6	28.6
Ingredient			
Sorghum	83.60	67.6	74.6
Soybean meal (44%)	12.50	19.5	12.5
Fat	0.00	9.0	9.0
Dicalcium phosphate	1.4	1.4	1.4
Limestone	1.0	1.0	1.0
Salt	0.5	0.5	0.5
Vitamin, trace mineral and antibiotic premix	1.0	1.0	1.0
	100.0	100.0	100.0

<sup>a</sup>Kcal of metabolizable energy per gram of protein.

Table 25. Effects of fat level and calorie-protein ratio on performance of finishing pigs.<sup>a</sup>

Fat level, %	0	3	6	9	9
C:P ratio	23.6	23.6	23.6	23.6	28.6
Daily gain <sup>b,c</sup> , lb.	1.52	1.65	1.61	1.72	1.58
Feed intake <sup>b</sup> , lb.	5.44	5.34	5.10	5.02	5.23
Feed/gain <sup>b,c</sup>	3.65	3.30	3.18	2.92	3.31

<sup>a</sup>Each value is the mean of three pens of eight pigs.

<sup>b</sup>Fat level significant (P<.05).

<sup>c</sup>C:P ratio significant (P<.05).

average daily gains. With a constant C:P ratio, feed efficiency improved as fat in the diet increased. Adding fat resulted in linear decrease in feed intake. Calorie-protein ratio significantly (P<.05) affected both daily gain and feed efficiency, thus demonstrating that it is important to increase protein when fat is added to a ration. The ration containing 9% added fat with protein not adjusted resulted in significantly (P<.05) slower gains and more feed per unit of gain than the ration containing 9% added fat with protein increased to maintain a constant calorie-protein ratio.

The effect of fat level and C:P ratio on carcass measurements are shown in table 26. Adding fat to the ration resulted in a small yet significant (P<.05) increase in backfat thickness. Calorie-protein ratio did not effect backfat thickness but widening the ratio reduced loin-eye area. Sold on a grade and yield basis, carcasses produced on rations containing added fat were not penalized.

Table 26. Effect of fat level and calorie-protein ratio on carcass measurements.<sup>a</sup>

Fat level, %	0	3	6	9	9
C:P ratio	23.6	23.6	23.6	23.6	28.6
Slaughter wt., lbs.	224	218	220	226	219
Backfat thickness <sup>b</sup> , in.	1.22	1.35	1.24	1.35	1.35
Loin-eye area <sup>c</sup> , in <sup>2</sup>	4.86	4.75	5.14	5.31	4.65
% liam	23.74	23.72	23.93	23.81	23.29

<sup>a</sup>Each value is the mean of 21 observation.

<sup>b</sup>Fat level significant (P<.05).

<sup>c</sup>C:P ratio significant (P<.05).