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

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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 ^a	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

^aKcal of metabolizable energy per gram of protein.

Table 25. Effects of fat level and calorie-protein ratio on performance of finishing pigs.^a

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

^aEach value is the mean of three pens of eight pigs.

^bFat level significant ($P < .05$).

^cC: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.^a

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 ^b , in.	1.22	1.35	1.24	1.35	1.35
Loin-eye area ^c , in. ²	4.86	4.75	5.14	5.31	4.65
% Ham	23.74	23.72	23.93	23.81	23.29

^aEach value is the mean of 21 observation.

^bFat level significant ($P < .05$).

^cC:P ratio significant ($P < .05$).