

### Summary

One hundred twenty-six crossbred pigs averaging 11.7 kg. (25.7 lbs.) were used to determine the effects of energy density (added fat or fiber) and calorie-protein, calorie-lysine, and calorie-nutrient ratios of rations on pig performance. The basal sorghum-soybean meal ration contained 16.0% crude protein, 0.80% lysine, 0.70% calcium, and 0.60% phosphorus. Soybean oil was the fat source and cellulose the fiber source. Adding 6% fat and maintaining a constant calorie-lysine, calorie-protein, or calorie-nutrient ratio increased ( $P < .05$ ) average daily gain and improved ( $P < .05$ ) feed efficiency, compared with gain and efficiency of pigs fed the basal ration. Pigs fed rations containing 6% fiber had similar average daily gain and feed efficiency as did pigs fed the basal ration.

### Introduction

In recent years swine producers have had renewed interest in adding fat and oats to rations for young pigs. Adding oats decreases energy density of the ration, but adding fat increases it. We therefore studied the effect of energy density on the performance of young pigs and in addition the effect of calorie-lysine, calorie-protein, and calorie-nutrient ratios on pig performance when fat was added to the rations.

### Experimental Procedures

One hundred twenty-six crossbred pigs averaging 11.7 kg. (25.7) were randomly assigned to 18 pens representing three replications of six dietary treatments. Pigs were housed, seven to a pen, in an environmentally controlled, slatted-floor nursery. The basal ration contained 16.0% protein, 0.80% lysine, 0.70% calcium, and 0.60% phosphorus. Soybean oil was the fat source and cellulose the fiber source. (The cellulose was assumed to provide no metabolizable energy.) The experiment, lasting 35 days, included these dietary treatments:

- A. Basal ration;
- B. 6% added fat with a constant calorie-lysine ratio;
- C. 6% added fat with a constant calorie-protein ratio;
- D. 6% added fat substituted on a weight basis for sorghum with no adjustments;
- E. 6% added fat with a constant calorie-nutrient ratio; and
- F. 6% added fiber substituted for sorghum.

### Results

Influences of energy density and methods of adding fat on performance of young pigs are shown in table 6. Adding 6% fat and maintaining a constant calorie-lysine, calorie-protein, or

calorie-nutrient ratio increased ( $P<.05$ ) average daily gain of the pigs and improved ( $P<.05$ ) feed efficiency, compared with gain and feed efficiency of pigs fed the basal ration and those fed 6% added fat with no adjustments. This demonstrates the importance of taking into account the reduced nutrient intake (except for energy) that occurs when fat is added to a swine ration. Pigs fed rations containing 6% fiber had average daily gains and feed efficiency similar to those of pigs fed the basal diet. Apparently, therefore, decreasing energy density of the ration of the young pig may not be as detrimental to performance as we once thought.

Table 6 . Effect of energy density and method of adding fat on pig performance.

Criteria	Rations					
	A	B	C	D	E	F
Number of pigs <sup>a</sup>	21	21	21	21	21	21
Avg. daily gain, lbs.	1.15 <sup>b</sup>	1.25 <sup>c</sup>	1.27 <sup>c</sup>	1.15 <sup>b</sup>	1.27 <sup>c</sup>	1.14 <sup>b</sup>
Daily feed intake, lbs.	2.52	2.35	2.40	2.32	2.36	2.51
Feed/gain	2.19 <sup>c</sup>	1.88 <sup>b</sup>	1.89 <sup>b</sup>	2.02 <sup>bc</sup>	1.86 <sup>b</sup>	2.20 <sup>bc</sup>

<sup>a</sup>Seven pigs per pen; average initial weight 11.7 kg. (25.7 lbs.).

<sup>b,c</sup>Means with different superscripts differ significantly ( $P<.05$ ).