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B A. Koch

G L. Allee

Robert H. Hines

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## Isocaloric Swine Finishing Diets with Various Percentages of Alfalfa Meal and Tallow

R. H. Hines, B. A. Koch, and G. L. Allee

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### Summary

Increasing the alfalfa meal to 30% in a finishing pig diet did not significantly reduce average daily gain when tallow was also added to maintain the caloric density of the ration. Digestibility of dry matter and gross energy were reduced as fiber increased, but feed efficiency was not significantly changed with caloric density maintained. Increasing dietary alfalfa meal and tallow content did not change the percentage of dietary nitrogen retained. Rations containing high levels of alfalfa meal and tallow tended to "bridge" in self-feeders.

### Introduction

Grain prices increasing dramatically during 1974, caused producers to look for alternative energy feeds for swine. Previously reported research (Swine Industry Day, Report of Progress 221, 1974) suggested that up to 20% alfalfa meal could be used in swine finishing diets without significantly affecting performance. More than 20% alfalfa meal in a diet significantly reduced daily gain because of increasing fiber content of the diet and lower caloric density. This study was designed to evaluate if more than 20% alfalfa meal could be fed if fat were added to make the rations equal in calories to diets with less alfalfa meal.

### Procedure

Feeding Trial. One hundred pigs averaging 109 lbs. were allotted on the basis of breed, sex, and initial weight to the diets shown in table 6, with alfalfa meal varied from 0 to 30% and fat from 0 to 13%. All diets were fed in meal form.

Pigs were housed in a modified open-fronted building with concrete, slatted floors. Each pen (6' X 15') contained a two-hole self feeder with an automatic watering cup.

Digestion Trial. Six half-sib barrows averaging 126 pounds were selected from the pigs assigned to the feeding trial and were used in a replicated latin square digestion trial with rations containing 0, 20, or 30% alfalfa and 0, 8.5, or 13% fat, respectively. A five day preliminary period preceded a five day collection period as each pig was fed 1700 grams of ration per day during the digestion trial.

### Results and Discussion

Performances of finishing pigs fed isocaloric diets with various amounts of alfalfa meal and tallow are summarized in table 7. Average daily gain tended to decrease as percentage of alfalfa meal and tallow increased but not significantly. Dry matter digestibility

and gross energy digestibility (table 8) also decreased as alfalfa was increased. Higher energy per unit of weight of the tallow apparently overcame somewhat reduced digestibility of the higher fiber diets because gains were reduced less in this test with more than 20% alfalfa meal added to the diet than our previously reported trials. Dietary nitrogen retention apparently was not affected by increasing amounts of alfalfa meal and tallow.

Feed consumed per pound of weight gained did not differ significantly as alfalfa meal and tallow were increased. The increased bulk (fiber) in the diet was counteracted by the increased energy content of added tallow. The greatest problem encountered during the trial was feed "bridging" in feeders for the two highest levels of alfalfa meal and tallow. The "bridging" apparently limited feed intake by those two treatment groups, which may have adversely affected weight gain.

Table 6. Composition of diets for finishing swine.

Ingredients, %	Base	Alfalfa meal			
		10%	20%	25%	30%
Sorghum grain	85.7	72.9	59.6	53.0	46.0
Soybean meal (44%)	11.0	10.0	9.2	8.8	8.4
Alfalfa meal (17%)	-----	10.0	20.0	25.0	30.0
Fat (tallow)	-----	4.1	8.5	10.6	13.0
Dicalcium phosphate	0.8	1.0	1.1	1.3	1.0
Sodium phosphate	-----	-----	-----	-----	0.3
Limestone	1.2	0.7	0.3	-----	-----
Salt	0.3	0.3	0.3	0.3	0.3
Vit., t. min., antibiotic	1.0	1.0	1.0	1.0	1.0
Calculated analysis:					
Crude protein, %	12.6	12.7	12.8	12.9	12.9
Calcium, %	.65	.65	.66	.67	.66
Phosphorous, %	.47	.48	.48	.50	.50
DE, Kcal./lb.	1510	1494	1483	1475	1470
Proximate analysis:					
Crude protein, %	11.8	12.7	13.1	12.6	12.8
Crude fiber, %	2.5	4.2	5.9	7.4	7.7
Ether extract, %	1.9	6.2	10.1	11.9	14.2
GE, Kcal./lb.	2100	2194	2315	2333	2424

Table 7. Performances of finishing pigs fed isocaloric diets with indicated percentages of alfalfa meal and tallow. (71-day trial)

Alfalfa meal, %	0	10	20	25	30
Tallow, %	0	4.1	8.5	10.6	13.0
No. pigs <sup>a</sup>	20	20	20	20	20
Int. wt., lbs.	108.5	109.5	109.6	109.8	110.1
Final wt., lbs.	210.0	209.9	203.6	200.6	201.4
Avg. daily gain, lbs.	1.43	1.41	1.32	1.28	1.28
Avg. daily feed, lbs.	5.27	5.16	5.16	4.56	4.57
Feed/gain	3.68	3.65	3.79	3.54	3.52

<sup>a</sup>Ten pigs per pen, two replicates.

Table 8. Results of digestion trial using isocaloric diets with indicated percentages of alfalfa meal and tallow

Alfalfa meal, %	0	20	30
Tallow, %	0	8.5	13.0
Dry matter digested, % <sup>a</sup>	89.0	80.3	75.6
Gross energy digested, % <sup>a</sup>	88.0	78.9	75.6
Nitrogen digested, % <sup>a</sup>	78.9	72.3	68.2
Nitrogen retained, % <sup>a</sup>	41.1	39.8	38.4

<sup>a</sup>Apparent values - no correction for metabolic or endogenous factors.