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DIGESTIBILITY OF FAT SOURCES BY GROWING PIGS

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De-Fa Li and Gary L. Allee

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Summary

A digestion trial was conducted with 12 crossbred barrows averaging 48 lb to evaluate the digestibility of various fat sources. Fat sources evaluated were soybean oil, a 85% dry fat product composed of animal and vegetable fat, and a 80% dry fat product made by encapsulating choice white grease with casein. The control diet was a 18% crude protein corn-soybean meal diet with 10% cornstarch. Fat sources were added to the basal diet at the expense of cornstarch to supply 8% added fat. A crossover design was used with three pigs per diet in each of two periods. Digestibility of dry matter, energy, ether extract were ($P < .05$) lower for the diet containing the 85% dry fat product. Nitrogen digestibility and nitrogen retention were reduced also when the 85% dry fat product was fed. These results suggest that the two dry fat products evaluated are markedly different in nutritional value for growing pigs.

Introduction

Fat is an excellent source of energy providing approximately 2.25 times as much gross energy per unit weight as carbohydrate. Digestibility of a fat can be influenced by fatty acid composition, age or weight of the pigs, and processing method. Only limited information is available on the digestibility of various fat sources by growing pigs. The objective of this experiment was to compare the digestibility of two "dry fat" sources for growing pigs.

Procedures

A digestion trial was conducted with 12 crossbred barrows averaging 48 lb to evaluate digestibility of various fat sources. Fat sources evaluated were soybean oil (SO) a 85% dry fat product composed of animal and vegetable fat (DAV) and a 80% dry fat product made by encapsulating choice white grease with casein (DCWG). The control diet (corn soybean meal) contained 18% crude protein with 10% cornstarch. Fat sources were added at the expense of cornstarch to supply 8% added fat. A crossover design was used with three pigs per diet in each of two periods. Each period consisted of a 5-day adjustment and a 5-day total collection of urine and feces. Pigs were fed 2.20 lb and 2.64 lb daily for the first and second period, respectively. Fatty acid analysis of the fat sources used are given in table 1.

Results and Discussion

Data presented in table 2 show the effects of fat source on apparent digestibility. Pigs fed the diet with the dry animal and vegetable fat (DAV) had a lower ($P < .05$) apparent digestibility of dry matter, energy, and ether extract than pigs fed the casein-encapsulated choice white grease (DCWG) or soybean oil. There were no differences in apparent digestibility of dry matter, energy, ether extract, or nitrogen between pigs fed soybean oil and those fed DCWG. These results are

similar to our results with sows, suggesting there are marked differences in the effects of "dry fat" products on nutrient digestibility. This difference between fat products may be related to fatty acid composition and/or method of processing to produce a free flowing product.

Table 1. Fatty Acid Composition of Fat Sources

Source	% of total										%	
	12:0	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	Sat.	Unsat.
Soybean oil		.5	14.3	.5			1.6	27.4	45.5	10.2	16.4	83.6
Dried animal & vegetable fat	1.37	2.81	25.5	1.31	1.07	.09	46.1	16.4	3.18	.16	76.8	21.2
Dried choice white grease	1.0	1.4	23.7	5.0			12.0	47.9	9.0		38.1	61.9

Table 2. Apparent Digestibility of Diets Containing Various Fat Sources^a

Item	Control	Soybean Oil	DAV	DCWG
Dry matter, %	88.1 ^b	88.0 ^b	82.5 ^c	87.9 ^b
Energy, %	87.2 ^b	87.7 ^b	80.6 ^c	88.0 ^b
Ether extract, %	58.1 ^d	86.5 ^b	79.9 ^c	87.7 ^b
Nitrogen, %	86.3 ^b	85.3 ^{bc}	83.8 ^c	86.6 ^b
DE kcal/lb	1670	1862	1764	1860

^aEach value is the mean of six observations.

^{bcd}Means in the same row with different superscript differ (P<.05).