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Sunflower oil seeds in nursery pig diets

Abstract

Two hundred forty pigs were used to evaluate the use of various amounts (0, 10, 15, 20, 25%) of black sunflower oil seeds in weanling pig diets. After 14 days, no significant differences were found between any of the dietary treatments in feed intake (FI), average daily gain (ADG), or feed efficiency (F/G). At the conclusion of the 5-wk study, no differences were found in FI, ADG, or F/G between those dietary treatments containing 0, 10, and 15% sunflower seeds. However, in those diets containing 20 and 25% sunflower seeds, there were linear ($p < .05$) reductions in FI and ADG. These results indicate that sunflower seeds, when finely ground using a hammermill with a 1/8 in screen, can be used in diets for weanling pigs up to 15% of the diet with no reduction in performance.; Swine Day, Manhattan, KS, November 17, 1988

Keywords

Swine day, 1988; Kansas Agricultural Experiment Station contribution; no. 88-149-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 556; Swine; Nursery pigs; Sunflower seeds; Weanling pigs; Starter diets

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K**SUNFLOWER OIL SEEDS IN NURSERY PIG DIETS****S****G. E. Fitzner and R. H. Hines****U**

Summary

Two hundred forty pigs were used to evaluate the use of various amounts (0, 10, 15, 20, 25%) of black sunflower oil seeds in weanling pig diets. After 14 days, no significant differences were found between any of the dietary treatments in feed intake (FI), average daily gain (ADG), or feed efficiency (F/G). At the conclusion of the 5-wk study, no differences were found in FI, ADG, or F/G between those dietary treatments containing 0, 10, and 15% sunflower seeds. However, in those diets containing 20 and 25% sunflower seeds, there were linear ($p < .05$) reductions in FI and ADG. These results indicate that sunflower seeds, when finely ground using a hammermill with a 1/8 in screen, can be used in diets for weanling pigs up to 15% of the diet with no reduction in performance.

(Key words: Nursery Pigs, Sunflower Seeds, Weanling Pigs, Starter Diets.)

Introduction

A large quantity of sunflower oil seeds are grown in Kansas. At times it may be economically feasible to include them in swine rations. Because of their high oil content and their moderate protein content, they can be used to increase the energy density of the ration as well as to replace a portion of the protein source. Since KSU recommends the use of a high nutrient-density diet for weanling pigs, a study was designed to evaluate the utilization of sunflower seeds in weaned pig diets as a source of energy.

Procedures

Four diets containing various levels of sunflower oil seeds, 10%, 15%, 20%, and 25%, were compared to a corn-soybean meal basal diet with 4% added soybean oil (Table 1). All diets were ground using a hammermill with a 1/8 in screen to reduce the anticipated effects of the increased fiber, which was highest (6.4%) in the diet containing 25% sunflower seeds. Also, 48% crude protein soybean meal was used to reduce the total fiber in the diets. As the level of sunflower seeds increased each 5%, the calculated amount of oil in the diet increased 2%. Table 2 shows the analyzed values for the black oil-type sunflower seeds used in this study. With each 5% increase in sunflower seeds, approximately 1% soybean meal and 4% corn were replaced. These diets were fed for 5 wk to 240 pigs weaned at 3 wk of age. Pigs were randomly allotted by sex to each of the five dietary treatments and were blocked by weight into either heavy or light weight blocks. Six replications per treatment were used, with eight pigs per pen. Pigs were weighed weekly, and performance criteria (feed intake (FI), average daily gain (ADG), and feed/gain (F/G)) were calculated.

Results and Discussion

At day 14, no differences were found in FI, ADG, or F/G for pigs on any of the dietary treatments (Table 3). Based on these results, there appears to be no problem with decreased palatability of the diets with added sunflower seeds.

At the conclusion of the 5-wk trial, no differences were found in FI, ADG, and F/G between pigs fed the corn-soybean meal control diet and pigs fed the diets containing 10% and 15% sunflower seeds. There was a significant linear reduction in FI and ADG but an improvement in F/G in those pigs fed the diets containing 20% and 25% sunflower seeds. The improvement in F/G was probably due to the increased levels of sunflower oil (calculated to be 8 and 10% of the diets, respectively), which increased the energy levels in those diets even though the level of crude fiber was also increased (Table 1). The high level of crude fiber (6.4%) in the diet containing 25% sunflower seeds was near the maximum recommended level of 6 to 7%. As the maximum level of crude fiber is exceeded, feed efficiency is expected to decrease, which did not occur in this trial. This expected F/G effect from fiber may be masked when feeding sunflower seeds because of the increase in levels of oil in the diets, which we expect to cause an improvement in F/G. Following this initial trial, continuing studies are being conducted to evaluate the effects of processing diets containing sunflower seeds on the performance of the weanling pig. Types of processing include grinding at 1/8 and 3/16 in, as well as pelleting.

Table 1. Composition of Diets

Ingredients	Percent Sunflower Seeds				
	0	10	15	20	25
Corn	45.12	41.54	37.57	33.60	29.63
Soybean meal (48%)	27.28	24.90	23.89	22.87	21.85
Sunflower oil seeds	0	10	15	20	25
Dried whey	20	20	20	20	20
Soybean oil	4	0	0	0	0
Monocalcium phosphate	1.68	1.67	1.69	1.71	1.73
Limestone	.72	.68	.65	.62	.59
Salt	.1	.1	.1	.1	.1
Trace mineral premix ^a	.1	.1	.1	.1	.1
Vitamin premix ^b	.25	.25	.25	.25	.25
Copper sulfate	.1	.1	.1	.1	.1
Selenium premix ^c	.05	.05	.05	.05	.05
L-lysine HCl	.1	.1	.1	.1	.1
CSP-250 ^d	.5	.5	.5	.5	.5

Calculated Analysis

Crude fiber %	2.0	3.8	4.6	5.5	6.4
ME (Kcal/lb)	1564	1512	1525	1537	1550
Lysine %	1.25	1.25	1.25	1.25	1.25
Calcium %	.9	.9	.9	.9	.9
Phosphorus %	.8	.8	.8	.8	.8

^aContaining 10% Mn, 10% Fe, 10% Zn, 4% Ca, 1% Cu, 0.4% K, 0.3% I, 0.2% Na, and 0.1% Co.

^bEach pound of premix contains: vitamin A 1,000,000 IU, vitamin D₃ 100,000 IU, vitamin E 4,000 IU, menadione 400 mg, Riboflavin 1,000 mg, Pantothenic Acid 2500 mg, Niacin 5,500 mg, Choline 100,000 mg, and vitamin B₁₂ 5 mg.

^cEach pound of selenium premix contains 272.4 mg Se.

^dEach pound of CSP-250 contains 10g chlortetracycline, 10g sulfathiazole and 5g penicillin.

Table 2. Chemical Analysis of Black Sunflower Oil Seeds

Component	Percent
Moisture	6.36
Fat	47.64
Protein	19.46
Crude Fiber	19.70
Ash	3.37
Nitrogen Free Extract	3.47
Lysine	0.84

Table 3. Performance of Pigs Fed Diets with Black Sunflower Oil Seeds^a

Item	Percent Sunflower Seeds				
	0	10	15	20	25
<u>0-14 days</u>					
Avg daily gain, lb	.38	.35	.40	.34	.32
Avg daily feed intake, lb	.65	.62	.69	.58	.60
Feed/gain	1.75	1.78	1.76	1.71	1.88
<u>0-35 days</u>					
Avg daily gain, lb ^b	.85	.83	.83	.77	.77
Avg daily feed intake, lb ^b	1.52	1.49	1.48	1.31	1.31
Feed/gain	1.78	1.79	1.78	1.70	1.70

^aA total of 240 weaned pigs, 8 pigs/pen with 6 pens/treatment average initial weight was 12.9 lb, average final weight was 41.3 lb.

^bLinear effect (P < .05).