

# SUNFLOWER SEEDS IN SWINE RATIONS

by  
W. E. DINUSSON, J. N. JOHNSON, R. L. HARROLD, and R. ZIMPRICH

Very little information is available on the value of adding sunflower seeds to swine diets. Laudert and Allee (1974) fed 20, 40 and 60 percent seeds replacing corn and soybean oil meal to growing finishing swine. Feed intake decreased linearly as the level of sunflower seeds increased in the diet, and gains remained the same or less than for the pigs receiving the control diets. Digestibility of the ether extract increased and the energy digestibility decreased with each increase of seeds in the diet. The seeds used in these experiments averaged less than 34 percent oil.

Noland *et al.* (1980) used dehulled seeds (51.5 percent ether extract) in digestion trials with swine and reported no significant differences in digestibility of energy or apparent nitrogen retention when the soybean oil meal was replaced by the sunflower meals at 25, 50 or 100 percent. Kepler *et al.* (1981) reported that substituting 50 percent sunflower seeds at the expense of corn and soybean oil meal in swine rations reduced digestibility of all components except ether extract. However, a 25 percent substitution of seeds did not affect digestibilities appreciably.

Sunflower seeds with percentage composition oil, 41; hull, 22; protein, 18.6; acid detergent fiber, 15; phosphorus, 0.58; and calcium, 0.18 percent were used in swine rations at levels of 0, 2.5, 5, and 10 percent of ration replacing barley and soybean oil meal (table 1).

**TABLE 1. Ration Formulation and Analysis**

Ration	1	2	3	4
% Sunflower Seeds	0	2.5	5	10
Barley (lbs)	878	855.7	833.5	789.1
SBOM	100	97.5	95.0	90.0
Sunflower seeds	0	25.0	50	100
Limestone	10	9.8	9.5	9
DiCal	5	4.9	4.8	4.5
Vitamin premix	4	4.1	4.2	4.4
TM salt	3	3	3	3
Zinc Oxide (grams)	80	80	80	80
	1000	1000	1000	1000
<b>Chemical Analysis Percent</b>				
Dry matter	89.7	90.1	90.2	90.4
Total ash	5.4	5.6	6.3	5.1
Acid detergent fiber	9.0	9.3	10.0	11.0
Protein	15.5	15.7	15.6	15.6
Phosphorus	0.49	0.53	0.53	0.51
Calcium	0.73	0.86	0.70	0.67
Hull	—	—	—	—

Forty pigs were allotted on basis of breed, sex, and weight into eight lots of five pigs each to form "light" and "heavy" replicates. Weights were taken and feed recorded every 14 days. The trial was terminated when lots averaged in excess of 200 pounds per pig.

The high oil content seeds were mixed in proper portions with barley prior to grinding, mixing and pelleting.

The rations used and their analysis are presented in table 1 and results in table 2. Gains and feed required per pound of gain did not correlate with levels of seeds fed. It appeared that there was an increase in feed efficiency where 10 percent seeds (4.1% added oil) were included in the ration.

**TABLE 2. Sunflower Seeds for Swine (84 Days)**

Treatment	0	2.5	-5.0	10.0
% Sunflower Seeds	1	2	3	4
Lot No. <sup>1</sup>				
Initial wt., lb.	61.4	62.8	60.6	61.4
Final wt., lb.	205.4	224.6	210.2	216.0
Ave. daily gain, lb.	1.71	1.93	1.78	1.84
Feed/day, lb.	5.61	6.20	5.66	5.66
Feed/lb. gain, lb.	3.27	3.22	3.18	3.08
Lot No. <sup>1</sup>				
Initial wt. lb.	79.6	77.4	78.6	79.6
Final wt., lb.	235.4	205.2	203.6	225.0
Ave. daily gain, lb.	1.85	1.52	1.49	1.79
Feed/day, lb.	6.17	5.55	5.43	5.67
Feed/lb. gain, lb.	3.32	3.65	3.65	3.28
Averages for two lots:				
Ave. daily gain/lb.	1.78	1.73	1.64	1.78
Feed/lb. gain, lb.	3.30	3.44	3.42	3.18

<sup>1</sup>Five pigs per lot.

In another experiment, 24 crossbred pigs were allotted to four lots on the basis of weight and sex. They were self-fed pelleted rations containing 13, 26, or 39 percent sunflower seeds (table 3). Water was available at all times. Weights were taken every 14 days and feed intake recorded.

The rations were ground, mixed, and pelleted. In order to grind the high oil seeds, they were mixed with the barley portion prior to grinding. No difficulty was encountered in the grinding, but with rations 3 and 4 the high oil content did not permit the pellets to hold their shape. Consequently, these were fed in an "oily" meal form.

*Dinussion, Johnson and Harold are Professors and Zimprich is an instructor, Department of Animal Science.*

A second trial involving another group of 24 crossbred pigs was conducted to serve as a replicate. All the pigs were maintained on their respective rations after the feeding experiment was terminated in both of these experiments and then were removed as individuals at about 225 pounds. Pigs were then slaughtered and complete carcass measurements made, including chemical analysis of meat and fat to assess carcass quality. These results are reported elsewhere (Marchello *et al.* 1982).

**TABLE 3. Sunflower Seeds for Swine**

	Ration			
	1	2	3	4
% Sunflower Seeds	0	13	26	39
Barley (lbs)	87.8	76.1	66.1	56.0
SBOM	10.0	8.6	6.0	3.5
Sunflower seeds	—	12.6	25.2	37.8
Limestone	1.0	1.0	1.0	1.0
Dicalcium phosphate	1.0	1.0	1.0	1.0
Vitamin premix	0.4	0.4	0.4	0.4
Trace mineral salt	0.3	0.3	0.3	0.3
Zinc Oxide (g)	6	6	6	6
Lysine hydrochloride (g)	—	6.4	25	45.4
Dry matter	88.9	88.6	89.7	90.0
Acid detergent fiber	9.7	9.3	13.1	14.9
Protein	15.4	15.2	15.1	15.0
Phosphorus	0.65	0.65	0.67	0.69
Calcium	0.84	0.85	0.86	0.84
Fat (oil)	2.1	6.5	9.7	15.5

## RESULTS AND DISCUSSION

Ration composition and analysis for both trials of the second experiment are reported in table 3. The performance results of the trials are given in table 4. The highest level of seed additions resulted in significantly less gain but had no affect on feed efficiency. The daily feed intake was also appreciably less for the 39 percent sunflower seed ration. Cook and Dinusson (1981) reported a slight increase in digestibility of energy and crude protein in swine rations containing seeds. The greatest increase was in ether extract (oil) digestibility. Calculating the total digestible nutrients (TDN) of the control and the 39 percent seed ration from the digestion coefficients would give 68 percent TDN for ration 1 and 76.6 percent TDN for ration 4 (as fed basis). However, the feed per pound of gain does not reflect the extra energy as measured by digestion studies. No explanation is apparent for this discrepancy.

This question is only of moot interest in any event, because the carcasses of the pigs fed more than 10 per-

cent of the ration as seeds (4 percent added oil) were of inferior quality and carcasses from the swine fed the 39 percent seeds were extremely soft, oily and never became firm (Marchello *et al.*, 1981).

Growing-finishing pigs should not be fed rations containing more than 10 percent seeds because of deleterious affect on carcass quality and the minimal benefit to gains and feed efficiency.

**TABLE 4. Sunflower Seeds for Swine**

	Ration			
	1	2	3	4
<b>Exp. 235 (84 days)</b>				
% sunflower seeds	0	13	26	39
Av initial wt (lb)	66.2	71.3	69.2	70.3
Av. final wt (lb)	202.2	210.8	195.8	182.5
Av daily gain (lb)	1.62	1.66	1.51	1.34
Feed per day (lb)	5.81	5.33	5.74	4.78
Feed per pound gain (lb)	3.59	3.21	3.81	3.58
<b>Exp. 237 (84 days)</b>				
Av initial wt (lb)	62.8	61.7	62.5	62.8
Av final wt (lb)	215.8	215.5	219.8	204.2
Av daily gain (lb)	1.82	1.83	1.87	1.68
Feed per day (lb)	5.46	5.87	6.18	5.07
Feed per pound gain (lb)	3.00	3.21	3.30	3.02
<b>Average of Exp. 235, 237 (2 lots)</b>				
Av daily gain (lb)	1.72	1.75	1.69	1.15*
Feed per pound gain (lb)	3.30	3.21	3.56	3.30

\*Treatment with 39% seeds gained significantly slower than the other treatments.

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