

South Dakota State University  
**Open PRAIRIE: Open Public Research Access Institutional  
Repository and Information Exchange**

---

South Dakota Swine Field Day Proceedings and  
Research Reports, 1983

Animal Science Reports

---

1983

## Sunflower Seeds in Growing-Finishing Swine Diets

A. D. Hartman  
*South Dakota State University*

R. C. Wahlstrom  
*South Dakota State University*

G. W. Libal  
*South Dakota State University*

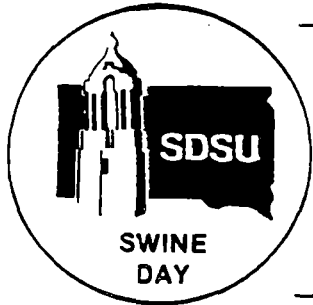
Follow this and additional works at: [http://openprairie.sdstate.edu/sd\\_swine\\_1983](http://openprairie.sdstate.edu/sd_swine_1983)

---

### Recommended Citation

Hartman, A. D.; Wahlstrom, R. C.; and Libal, G. W., "Sunflower Seeds in Growing-Finishing Swine Diets" (1983). *South Dakota Swine Field Day Proceedings and Research Reports, 1983*. Paper 4.  
[http://openprairie.sdstate.edu/sd\\_swine\\_1983/4](http://openprairie.sdstate.edu/sd_swine_1983/4)

This Report is brought to you for free and open access by the Animal Science Reports at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in South Dakota Swine Field Day Proceedings and Research Reports, 1983 by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact [michael.biondo@sdstate.edu](mailto:michael.biondo@sdstate.edu).



---

## SUNFLOWER SEEDS IN GROWING-FINISHING SWINE DIETS

A. D. Hartman, R. C. Wahlstrom and G. W. Libal

Department of Animal and Range Sciences

SWINE 83-3

---

South Dakota has become a leader in the production of sunflowers during the past few years. Sunflowers are an excellent oil crop as they may contain 40% oil that is highly unsaturated in nature. In swine diets, the addition of sunflower seeds would replace mainly the grain or carbohydrate source in the diet. This would increase the energy content of the diet and shift the energy source from carbohydrate to a mixture of carbohydrates and fat. A previous experiment reported in the 1982 South Dakota Swine Day proceedings indicated that 20% dietary sunflower seeds reduced rate of gain and produced softer carcasses but did not affect the eating quality of the pork.

The study reported herein was designed to further evaluate different levels of sunflower seeds in swine diets on swine performance and carcass characteristics.

### Experimental Procedure

Eighty crossbred pigs averaging 65.7 lb were allotted, four pigs per pen, to four dietary treatments. The pigs were housed in a completely enclosed confinement barn at the South Dakota State University swine research unit and fed to average pen weights of 220 lb. The four dietary treatments contained 0, 2.5, 5 and 10% sunflower seeds (table 1). Diets were formulated to contain the same amount of lysine among treatments. The chemical analyses of all diets are shown in table 2.

At average pen weights of 220 lb the barrows, which comprised one half the total number of pigs in the experiment, were slaughtered in the Animal Science meats laboratory. A fat sample was taken from the midline between the second and fifth lumbar vertebrae for iodine number determination. Following a 24-hour chill, carcass measurements were taken to determine carcass length, average backfat, pounds of muscle in a standardized 160 lb carcass, and loin eye area, color, firmness and marbling. The carcasses were also visually inspected and given a carcass firmness score based on the overall firmness of the carcass. Bacon sliceability, another indicator of carcass firmness, was also determined on cured and smoked bacon sides.

Table 1. Percentage Composition of Diets

Ingredient	<u>Dietary periods</u>							
	0	<u>To 130 lb</u>			<u>130 to 220 lb</u>			10
		2.5	5	10	2.5	5	10	
		<u>Sunflower seeds, %</u>						
Corn	76.6	74.3	71.9	67.2	82.5	80.2	77.8	73.0
Soybean meal	20.1	20.6	20.5	20.3	15.0	14.8	14.8	14.6
Sunflower seeds	0	2.5	5.0	10.0	0	2.5	5.0	10.0
Dicalcium phosphate	1.2	1.2	1.1	1.0	1.0	1.0	.9	.9
Limestone	.8	.8	.8	.8	.8	.8	.8	.8
Trace mineralized salt	.3	.3	.3	.3	.3	.3	.3	.3
Vitamin premix <sup>a</sup>	.4	.4	.4	.4	.4	.4	.4	.4

<sup>a</sup> Supplied per lb of diet: vitamin A, 1500 IU; vitamin D, 150 IU; vitamin E, 3 IU; vitamin K, 1.2 mg; riboflavin 1.5 mg; pantothenic acid, 6.0 mg; niacin, 9.6 mg; choline, 30 mg; vitamin B<sub>12</sub>, 6.0 mcg; selenium, 54 mcg and aureomycin, 12.5 mg.

Table 2. Chemical Composition of Diets

Source	Dietary periods								
	To 130 lb			Sunflower seeds, %			130 to 220 lb		
	0	2.5	5	10	0	2.5	5	10	
Moisture	10.4	10.7	10.1	9.6	10.3	10.2	10.0	10.6	
Crude protein	16.7	17.8	17.0	17.5	14.2	15.6	14.8	14.8	
Crude fiber	3.0	3.3	3.6	4.3	3.0	3.3	4.2	3.7	
Ether extract	3.1	4.4	4.7	6.9	3.2	3.8	4.4	5.5	
Ash	4.5	5.0	4.4	4.4	3.8	4.1	3.8	3.9	
Nitrogen-free extract	62.3	58.8	60.2	57.3	65.5	63.0	62.8	61.5	
Lysine	.94	.91	.86	.82	.69	.75	.72	.69	

## Results

Performance data is summarized in table 3. Average daily gain for pigs to 130 lb average pen weights was unaffected by diet. In the dietary period from 130 to 220 lb and the overall period, average daily gain increased linearly ( $P < .01$ ) as the level of sunflower seeds in the diet increased. Although mean values for average daily feed intake increased with increasing dietary sunflower seed level, these increases were not significant. Feed efficiency was unaffected by diet.

Table 3. Performance Characteristics of Pigs<sup>a</sup>

Source	0	<u>Sunflower seeds, %</u>		10
		2.5	5	
To 130 lb				
Avg daily gain, lb	1.54	1.72	1.65	1.65
Avg daily feed, lb	4.32	4.52	4.32	4.52
Feed/gain	2.82	2.63	2.64	2.74
130 to 220 lb				
Avg daily gain, lb <sup>b</sup>	1.59	1.59	1.65	1.81
Avg daily feed, lb	5.93	6.00	6.39	6.55
Feed/gain	3.77	3.84	3.73	3.69
Overall				
Avg daily gain, lb <sup>b</sup>	1.57	1.63	1.68	1.76
Avg daily feed, lb	5.20	5.42	5.58	5.75
Feed/gain	3.32	3.34	3.28	3.30

<sup>a</sup>

Five blocks of four pigs each (average initial weight 65.7 lb).

<sup>b</sup>

Linear response ( $P < .01$ ).

Changes in carcass characteristics due to diet are shown in table 4. Carcass weight, carcass length, average backfat, tenth rib fat, pounds of muscle, and area, color, firmness and marbling of the longissimus muscle of pork carcasses did not change with the addition of sunflower seeds to the diet. Carcass firmness decreased ( $P < .01$ ) as the level of sunflower seeds in the diet increased. As carcass firmness decreased, bacon sliceability also became more difficult ( $P < .01$ ). Although there was a decrease in bacon sliceability scores as sunflower seeds were added to the diet, none of the scores indicated a severe slicing problem.

Iodine number is a chemical means of measuring the relative amount of double bonds in fatty acids making up the fat in a carcass. Fat having a large iodine number will contain more double bonds and be softer than fat with a smaller iodine number. Iodine numbers increased progressively with increasing levels of dietary sunflower seeds, indicating that sunflower seeds reduce carcass firmness.

Table 4. Effect of Dietary Sunflower Seeds on Carcass Characteristics

Source	0	Sunflower seeds, %		10
		2.5	5	
Carcass weight, lb	147.5	143.5	141.8	146.2
Carcass length, in	31.9	32.3	31.4	31.4
Avg backfat, in	.95	.94	.97	.98
Tenth rib fat, in	.96	1.05	.94	1.01
Longissimus muscle				
Area, <sup>a</sup> in <sup>2</sup>	4.90	4.38	4.65	4.58
Color <sup>b</sup>	3.10	3.10	3.20	3.50
Firmness <sup>b</sup>	2.70	3.00	3.00	3.00
Marbling <sup>b</sup>	2.80	2.90	2.70	3.00
Pounds of muscle <sup>c</sup>	86.8	85.5	87.9	87.5
Carcass firmness <sup>d,e</sup>	3.70	3.30	3.00	2.50
Bacon sliceability <sup>e,f</sup>	1.10	1.40	1.65	2.40
Iodine number <sup>g</sup>	55.77	58.17	64.18	71.04

<sup>a</sup> Range of 1 to 5 with 1 being the lightest and 5 the darkest.

<sup>b</sup> Range of 1 to 5 with 1 being the least and 5 the most.

<sup>c</sup> Kilograms of muscle in a standardized 160 lb carcass.

<sup>d</sup> Range of 1 to 5 with 1 being the softest and 5 the firmest.

<sup>e</sup> Linear response (P<.01).

<sup>f</sup> Range of 1 to 5 with 1 being the best and 5 the worst.

<sup>g</sup> Cubic response (P<.05).

### Summary

Eighty pigs were used to study the effects of feeding various levels (0, 2.5, 5 or 10%) of sunflower seeds in a diet during their growing-finishing period.

Performance was not affected by level of sunflower seeds up to average weights of 130 lb. From 130 lb to market weight, average daily gain increased as sunflower seeds in the diet increased. Feed intake and feed efficiency were not affected by diet. Carcass firmness decreased and bacon sliceability became more difficult as the level to dietary sunflower seeds increased. However, problems relating to carcass firmness did not appear to be severe enough to cause major processing difficulties.