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4-1-1955

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Recommended Citation

Wright, T., "A Comparison of Linseed and Soybean Oil Meal and Methods of Feeding Growing-Fattening Pigs" (1955). *Bulletins*. Paper 445.

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BULLETIN 445

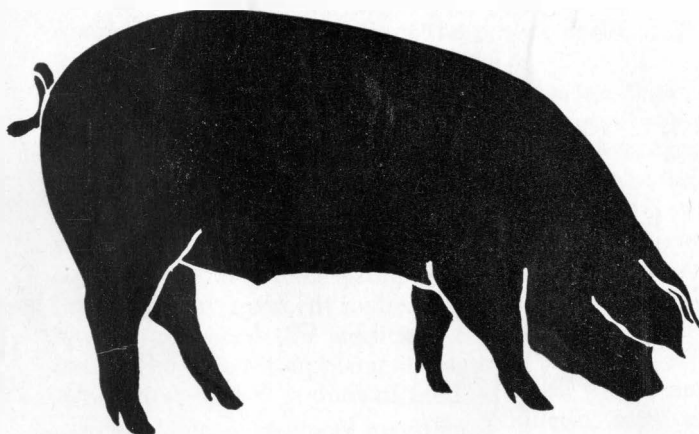
APRIL 1955

A COMPARISON

OF LINSEED AND SOYBEAN OIL MEAL

AND METHODS OF FEEDING

GROWING-FATTENING PIGS



ANIMAL HUSBANDRY
DEPARTMENT
Agricultural Experiment Station
SOUTH DAKOTA STATE COLLEGE
BROOKINGS

A Comparison of Linseed and Soybean Oil Meal And Methods of Feeding Growing-Fattening Pigs

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There are a number of questions the hog producer must decide when growing and fattening pigs for market. One question is whether to grind the corn and feed a mixed ration or to self-feed the corn without grinding. Another concerns the choice of the protein feeds or protein feed mixture with which to supplement the corn.

In an earlier experiment conducted at this Station from 1939 to 1941 linseed oil meal had proven superior to soybean oil meal when the rations were composed of 80 percent ground yellow corn, 10 percent tankage, 5 percent ground alfalfa hay, and 5 percent soybean or linseed oil meal. In addition 1 pound of a mineral supplement was added to each 100 pounds of feed.

In the same experiment a system of free choice feeding of shelled yellow corn, a protein supplement (composed of 2 parts tankage and 1 part soybean oil meal), alfalfa hay, and minerals produced faster

and more efficient gains than a complete mixed ration composed of the same ingredients.

Because of the rather great variation in the yearly results of this early experiment and also because of improvement in the process of producing soybean oil meal, another experiment was conducted during 1946 to 1950. These feeding trials, which are reported in this bulletin, were conducted to compare further the value of soybean oil meal and linseed oil meal in ra-

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tions for growing-fattening pigs and also to compare methods of feeding.

Conducting the Trials

Pigs used. The pigs used in these trials were thrifty purebreds from the Station herds. In the 1946, 1949, and 1950 trials these pigs averaged approximately 70 pounds when placed on the experiment, while in the 1947 and 1948 trials they averaged a little more than 140 pounds.

The pigs were divided as equally as possible into comparable lots.

Feeds used and method of feeding. The basal ingredients used in these trials were shelled yellow corn, tankage, soybean or linseed oil meal, alfalfa hay, and minerals. A mixture of 2 parts by weight of tankage, 1 part soybean or linseed oil meal, and 1 part ground field-cured, late cutting alfalfa hay were fed as a supplement to corn. In the lots where mixed rations were fed the calculated total protein content of the mixed rations varied from 12.9 to 15.8 percent. The lower level was fed to the heavier pigs in 1947 and 1948 and the higher pro-

tein ration was fed to the lighter weight pigs used in 1949.

The mineral supplement was the same in all trials. It consisted of 2 parts by weight steamed bone meal, 2 parts ground limestone, and 1 part salt. In three of the trials it was self-fed while in the last two trials 1 pound of this mixture was added to each 100 pounds of complete mixed feed.

In the lots where the pigs were fed free-choice, they received shelled yellow corn, a protein supplement (2 parts of tankage to 1 part of soybean or linseed oil meal), alfalfa hay, and the simple mineral supplement.

In all trials the pigs were self-fed in dry-lot with access to automatic waterers and adequate shelter.

Results and Discussion

The data from Trials 1, 4, and 5, in which the younger pigs were used, are summarized in Tables 1, 2, and 3. There was essentially no difference in rate of gain when the pigs were fed mixed rations containing 4 to 5 percent linseed oil

Table 1. A Comparison of Linseed Oil Meal and Soybean Oil Meal for Pigs (Trial 1, 1946)

	Mixed Rations		Free-Choice	
	Lot 1 Linseed Oil Meal	Lot 2 Soybean Oil Meal	Lot 3 Linseed Oil Meal	Lot 4 Soybean Oil Meal
Number of pigs	16	16	16	16
Av. number of days fed	126	119	138	133
Av. initial wt., lbs.	69.2	68.5	69.8	68.7
Av. final wt., lbs.	244.0	240.1	246.3	245.0
Average daily gain, lbs.	1.39	1.44	1.28	1.33
Feed consumed per 100 lbs. of gain, lbs.				
Corn	402.8	378.0	411.7	383.3
Tankage	38.9	32.7	39.2	36.8
Linseed oil meal	19.5		19.6	
Soybean oil meal		16.4		18.4
Alfalfa	19.5	16.3	6.7	6.5
Mineral Supplement*6	.6	1.2	1.1
Total	481.3	440.0	478.4	446.1

*2 parts by weight steamed bone meal, 2 parts ground limestone, 1 part salt.

Table 2. Linseed Oil Meal and Soybean Oil Meal for Growing-Fattening Pigs (Trial 4, 1949)

	Mixed Rations			Free-Choice
	Lot 1	Lot 2	Lot 3	Lot 4
	Linseed Oil Meal	Soybean Oil Meal*	Soybean Oil Meal (Mineral Free-Choice)	Soybean Oil Meal
Number of pigs	10	10	10	10
Av. number of days fed	88	87	87	99
Av. initial wt., lbs.	79.6	79.4	87.8	81.8
Av. final wt., lbs.	227.4	218.5	220.3	225.3
Av. daily gain, lbs.	1.68	1.60	1.52	1.45
Feed consumed per 100 lbs. of gain, lbs.				
Corn	307.4	292.5	318.4	341.8
Tankage	38.4	28.0	30.2	26.7
Linseed oil meal	19.2			
Soybean oil meal		14.0	15.1	13.4
Alfalfa	19.2	14.0	15.1	12.1
Mineral Supplement†	3.8	3.5	.8	.4
Total	388.0	352.0	379.6	394.4

*In Lots 1 and 2 one pound of the mineral supplement was added to each 100 pounds of mixed ration.

†See footnote Table 1.

meal or a similar amount of soybean oil meal. In Trial 1 the rate of gain was slightly greater on the soybean oil meal ration while in Trial 4 the reverse was true. However, in neither case were the differences significant. In both of these trials the pigs receiving the mixed ration containing the soybean oil meal made the more efficient gains. Approximately 9 percent more feed was required by the pigs fed the mixed ration containing linseed oil meal.

In Trial 1 the pigs fed free-choice

a protein supplement containing soybean oil meal made more efficient and slightly faster gains than those in Lot 3 fed the supplement containing linseed oil meal.

The one comparison, Trial 1, of feeding linseed oil meal in a mixed ration or as part of the protein supplement when fed free-choice shows a faster rate of gain by the pigs on the mixed ration. There was essentially no difference in the feed required per unit of gain.

Where soybean oil meal was fed

Table 3. Results of Feeding Growing-Fattening Pigs a Mixed Ration Compared to Self-Feeding Free-Choice (Trial 5, 1950)

	Lot 1 Free Choice Feeding	Lot 2 Feed Ground and Mixed
Number of pigs	9	9
Av. number of days fed	101	104
Av. initial wt., lbs.	70.4	69.3
Av. final wt., lbs.	226.1	232.9
Av. daily gain, lbs.	1.54	1.57
Feed consumed per 100 lbs. of gain, lbs.		
Corn	353.8	355.5
Tankage	33.6	33.4
Soybean oil meal	16.8	16.7
Alfalfa	20.6	16.7
Mineral Supplement*8	4.2
Total	425.6	426.5

*See footnote Table 1.

in a mixed ration faster rates of gain were produced in all three trials than when a free-choice method of feeding was followed. These differences varied from 0.03 pound per day faster gain in Trial 5 to 0.15 pound in Trial 4.

Mixing 1 pound of mineral supplement with each 100 pounds of ground feed resulted in faster and more efficient gains than feeding the mineral free-choice (Lot 3 compared to Lot 2, Trial 4).

Efficiency of gains. The data from Trials 2 and 3 conducted in 1947 and 1948 in which heavier pigs were used, have been combined and are presented in Table 4. The results show that when pigs were fed a mixed ration containing soybean oil meal they made more efficient gains than when linseed oil meal replaced the soybean oil meal. However, in the free-choice

method of feeding the linseed oil meal ration proved to be the most efficient. The wide variation in corn required per unit of gain between Lots 3 and 4 is difficult to explain since both lots consumed nearly the same amounts of protein supplement and alfalfa hay.

When considering feed efficiency the pigs fed mixed rations made approximately equal gains, whereas the pigs fed the free-choice rations with linseed oil meal made the fastest gains.

Feeding method. Considering the method of feeding there was an advantage in favor of the mixed rations over the free-choice method of feeding. This difference was much more marked with the heavy pigs than in the three trials with smaller pigs. In the case of the rations containing soybean oil meal a marked increase is noted, both

Pigs in each lot had access to self-feeders and automatic waterers.



Table 4. Results of Feeding Linseed Oil Meal and Soybean Oil Meal to Heavy Pigs (Average of Trials 2 and 3, 1947 and 1948)

	Mixed Rations		Free Choice	
	Lot 1 Linseed Oil Meal	Lot 2 Soybean Oil Meal	Lot 3 Linseed Oil Meal	Lot 4 Soybean Oil Meal
Number of pigs	20	20	20	20
Av. number of days fed	51	48	60	66
Av. initial wt., lbs.	144.8	146.1	141.6	141.6
Av. final wt., lbs.	238.3	234.9	241.0	234.6
Av. daily gain, lbs.	1.83	1.85	1.66	1.41
Feed consumed per 100 lbs. of gain, lbs.				
Corn	393.2	378.5	420.0	495.6
Tankage	31.2	27.7	14.3	14.4
Linseed oil meal	15.6		7.2	
Soybean oil meal		13.8		7.2
Alfalfa	15.6	13.8	8.1	8.6
Mineral Supplement*	2.8	2.9	1.1	1.2
Total	458.4	436.7	450.7	527.0

*See footnote Table 1.

in rate and efficiency of gain, when the ration was fed as a ground, mixed ration. In the comparison of the linseed oil meal rations there was very little savings of feed but a much faster rate of gain with the mixed ration than with the free-choice method of feeding.

In these trials with heavy pigs, the pigs receiving the complete mixed ration consumed more than twice as much protein supplement as did those pigs self-fed free-choice. This may account, at least in part, for the faster rate of gain of the pigs fed the mixed rations. In the trials with smaller pigs there was very little difference in the amount of protein supplement consumed by pigs fed either a complete mixed ration or fed free-choice.

Summary

One hundred and ninety-two pigs were used in five trials to compare linseed oil meal and soybean oil meal when fed either in a mixed ration or as part of a protein supplement fed free-choice.

Pigs receiving linseed oil meal or soybean oil meal at levels of 5 percent or less of the total mixed ration gained at nearly the same rate. In all trials with mixed rations the most efficient gains were made by those on the soybean oil meal ration.

In one trial, with 70-pound pigs, slightly faster and more efficient gains were made by those pigs fed free-choice shelled yellow corn, alfalfa hay, a mineral supplement, and a protein supplement containing one-third soybean oil meal when compared to pigs receiving linseed oil meal in the protein supplement. In the free-choice trials with heavier pigs, the faster and more efficient gains were made by the pigs on the linseed oil meal ration.

Feeding a ground and mixed ration produced slightly faster and more efficient gains than feeding the shelled corn, alfalfa hay, and protein supplement free-choice. This difference was especially noticeable in the two trials with heavy pigs.