

## Oats in Swine Diets<sup>1</sup>

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R.O. Myer<sup>2</sup>

Oats are not a major feed grain for swine diets, but they can be used effectively with some limitations. Oats are highly palatable to all classes and ages of swine, and are higher in protein and lysine than corn (see Table 1).

Lysine content is important because swine, like most simple-stomached (non-ruminant) animals, do not require protein *per se*, but instead require specific levels of certain compounds that make up protein. These compounds are called amino acids. Some of these amino acids, termed “essential amino acids,” must be present in the diet for pigs to grow and perform well. A few essential amino acids tend to be limiting in typical swine diets. One essential amino acid, lysine, is usually the most-limiting (or first-limiting) amino acid. This term means that if a diet is formulated to supply the correct amount of lysine, then generally the levels of other essential amino acids will be adequate. Therefore, lysine content is an important consideration when comparing grains.

Oats are high in fiber (10 to 15%) and are too bulky to constitute a major portion of the diet for most classes of swine, especially for young, growing pigs. The average *energy value* of oats is given as 80% of the energy value of corn. The *feeding value*

can vary considerably depending on amount fed, and on quality and test weight of the oats. Oats have their highest replacement value when fed at low levels in the diet. Heavy oats of good quality can be used in the diet at higher levels than light oats.

Research at the North Florida Research and Education Center in Marianna (summarized in Table 2) has shown that oats can be fed at 25% of the diet without affecting performance of growing-finishing swine. At 50% of the diet, oats detrimentally affected feed efficiency. Inclusion of oats at the higher level results in measurably poor feed efficiency because it critically lowers energy content of the diet.

### Use of Oats in Swine Diet

Oats (32 lb/bu) can compose up to 25% of the diet for pigs under 60 lb, and up to 40% for growing–finishing swine, without measurably decreasing rate of gain. However, because of the lower concentration of energy in oats, daily feed intake and feed required per pound of gain increases as the level of oats in the diet is increased.

Oats perhaps have their best use in diets for gestating sows. Oats can constitute the sole grain source in diets for these sows. However, for optimal

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2. R.O. Myer, professor of Animal Science, North Florida Research and Education Center, Marianna; Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

results, oats should not compose more than 50% of the sows' diet. When using oats in rations for gestating sows, feed intake for the sows should be increased to offset the lower energy content of oat-containing diets. For lactating sows, the level of oats in the diet should be kept to 20% or less because lactating sows have high energy requirements.

Example diets formulated with oats are given in Table 3. The example diets are formulated to take advantage of the higher lysine concentration in oats, which results in some savings of soybean meal over comparable corn-based diets. But, producers using a commercially available complete protein-vitamin, mineral supplement should consider oats equal to corn and substitute oats for corn on an equal-weight basis when mixing swine diets. Decreasing the amount of a complete supplement to take advantage of the higher lysine and protein concentrations in oats would reduce the essential minerals and vitamins that the supplement provides in the diet. Such reduction could lead to inadequate mineral and vitamin levels in the diet, resulting in poor swine performance.

Oats should be ground or rolled for use in swine diets. A fine to medium grind is better than a coarse grind. Pelleting of swine diets containing oats usually improves feed conversion to a greater degree than pelleting of diets that use corn, grain sorghum, or wheat as the sole source of grain.

Besides providing an energy source, oats are often included in swine diets for other reasons. At a dietary level of 10 to 20%, oats are somewhat helpful in minimizing diarrhea problems prevalent in weaned pigs and newly arrived feeder pigs. Oats are frequently used to "bulk up" sow diets to help overcome constipation problems, particularly around farrowing time. And oats are also of value in protecting growing pigs against ulcers.

### **Relative Value of Oats**

How much can a producer pay for oats? Used as an energy source in swine rations, oats (32 lb/bu) are worth up to 80% of the purchase price of corn, pound for pound.

**Table 1.** Comparative nutrient composition of oats and corn (as-fed-basis).

Nutrient	Oats <sup>a</sup>	Corn
Crude fiber, %	12.0	2.5
Crude protein, %	11.5	8.3
Lysine, %	.40	.26
Calcium, %	.07	.03
Phosphorus, %	.31	.28
Metabolizable energy, kcal/lb	1230	1550

<sup>a</sup>32 lb/bu test weight.

**Table 2.** Performance of growing-finishing swine when fed diets containing oats.<sup>a</sup>

Item	Concentration of Oats		
	0%	25%	50%
Average daily gain, lb	1.67	1.72	1.63
Average daily feed intake, lb	5.35	5.58	5.60
Feed-to-gain ratio	3.20	3.24	3.44

<sup>a</sup>4 pens/treatment, 4 pigs/pen; average initial weight = 40 lb; 98-day experiment.  
Source: Leibbrandt, 1978. Florida Agricultural Experiment Station Animal Science Research Report MA-1978-4.

**Table 3.** Example swine diets using oats.

	Gestation	Lactation	Starter (20 to 50 lb)	Grower (50 to 125 lb)	Finisher (125 lb to market)
Ingredient, lb/ton					
Ground corn or grain sorghum	775	1440	1035	1005	1140
Ground oats	1000	200	400	600	600
Soybean meal (44%) <sup>a</sup>	150	300	500	350	220
Base mix <sup>b</sup>					
Dicalcium phosphate <sup>c</sup>	40	30	30	20	15
Limestone, ground	15	15	15	15	15
Salt	10	10	10	5	5
Vitamin-trace mineral premix <sup>d</sup>	10	5	10	5	5
Total	2000	2000	2000	2000	2000
Calculated composition (as-fed basis):					
Crude protein, %	12.1	13.2	17.6	15.3	13.0
Lysine, %	.51	.65	.93	.75	.58
Calcium, %	.80	.68	.70	.58	.51

**Table 3.** Example swine diets using oats.

Phosphorus, %	.80	.61	.64	.54	.47
Metabolizable energy, kcal/lb	1310	1410	1365	1360	1370
<p><sup>a</sup>Can replace 10 lb of 44% soybean meal with 9 lb of 48% soybean meal and 1 lb grain.</p> <p><sup>b</sup>A complete mineral-vitamin premix, or a complete mineral premix and separate vitamin premix can be substituted for the suggested base mix. Follow manufacturer's guidelines.</p> <p><sup>c</sup>Defluorinated phosphate or mono-dicalcium phosphate, if available, can be substituted for dicalcium phosphate. If substitution is made, however, diets must be reformulated because these products do not contain the same concentrations of calcium and phosphorus as dicalcium phosphate.</p> <p><sup>d</sup>Amounts shown are typical for many commercial products. Follow manufacturer's guidelines.</p>					