

Triticale Grain in Swine Diets¹

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Triticale is a grain developed by crossing durum wheat with rye in order to combine the grain quality, productivity, and disease resistance of wheat with the vigor, hardiness, and high lysine content of rye. Triticale is higher in protein and essential amino acids than corn, with 50% higher lysine content (Table 1).

Lysine content is important because swine, like most simple-stomached (nonruminant) 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.

Although appearance might suggest triticale to be high in fiber, its crude fiber content is actually similar to that of wheat or corn. (Phosphorus, crude fat, and energy concentrations are similar to those of

wheat.) Triticale kernels are usually larger than wheat kernels, but not as dense. The test weight of triticale is 48 lb/bu, compared to 60 lb/bu for wheat.

Results of feeding experiments indicate that pigs fed triticale-based diets had rates of gain and feed efficiencies similar to those of pigs fed corn-based diets. This research also indicates that triticale can satisfactorily replace part of the soybean meal (up to 100 lb of 44% soymeal per ton of mixed diet) and all of the corn in adequately fortified corn-soybean meal diets for swine.

Use of Triticale in Swine Diets

Triticale contains more protein than corn, but diets must be formulated to meet essential amino acid requirements (especially lysine) rather than the crude protein requirement of the pig. When both diets contain equal levels of lysine, the crude protein content of a triticale-based diet is usually higher than that of a comparable corn-based diet. If diets containing triticale are formulated to meet crude protein requirements *only*, lysine levels will be inadequate to support maximum performance.

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Because of triticale's higher lysine content, producers who mix their own diets using a soybean meal-premix can save 100 lb soybean meal (44%) per ton of diet over comparable corn-based diets. Example diets formulated with triticale are given in Table 2. The example diets are also formulated to take advantage of the higher phosphorus concentration in triticale. This saves 5 lb dicalcium phosphate per ton of diet over comparable corn-based diets, which gives further advantage to producers who mix their own diets from "scratch."

Producers using a commercially available complete protein-vitamin-mineral supplement should consider triticale equal to corn and substitute triticale for corn on an equal-weight basis when mixing swine diets. However, decreasing the amount of a complete supplement to take advantage of the higher lysine and protein concentrations in triticale 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.

Triticale should be ground or rolled for use in swine diets. A medium grind is preferred. Finely ground triticale is not desirable because it readily absorbs moisture from the air and from the pigs' saliva, which can result in feed spoilage and reduced feed intake.

Relative Value of Triticale

Triticale is worth approximately 4 to 8% more than the purchase price of corn on an equal-weight basis because triticale not only replaces all of the corn in a typical swine diet, but also part of the soybean meal (or other protein supplement). For producers who mix their own diets using a complete protein-vitamin-mineral supplement, however, triticale is worth no more than the purchase price of corn on an equal-weight basis. So, when complete supplements are used, triticale should replace corn on a pound-for-pound basis only.

Special Considerations

Care must be exercised in storing triticale. Because it is highly nutritious, stored-grain insects multiply rapidly in it; steps should be taken to protect grain that is to be stored over a long period of time. Also, triticale-based diets may cause self-feeders to "gum-up" a little, in which case proper adjustment and frequent checking may be required. The problem can be minimized by mixing triticale with corn or grain sorghum (however, mixing triticale with wheat will *not* help this problem).

Summary

1. Triticale has been found to be a palatable grain and can be used as either the partial or sole grain source in diets for all classes of swine.
2. Diets containing triticale should be balanced to meet lysine rather than crude protein requirements. (Triticale-soybean meal diets are higher in crude protein than comparable corn-soybean meal diets.)
3. Triticale has higher lysine content than corn, so producers who mix their own diets using a soybean meal-premix program can save 100 lb soybean meal (44%) per ton of mixed diet.
4. Producers who mix their own diets using a complete protein-vitamin-mineral supplement should think of triticale *only* as a replacement for corn, and not as a partial replacement for the complete supplement.
5. Triticale should be ground (medium to coarse) or rolled for use in swine diets.
6. Triticale is worth 4 to 8% more than the price of corn on an equal-weight basis for those producers who can take advantage of triticale's higher lysine content. Otherwise, triticale is worth the same price as corn.

Table 1. Comparative nutrient composition of triticale, corn, and wheat (as-fed basis).

Nutrient	Triticale ^a	Corn	Wheat ^b
Crude protein, %	12.5	8.3	11.5
Lysine, %	.39	.26	.30
Crude fiber, %	2.8	2.5	2.4
Crude fat, %	1.8	3.9	1.9
Calcium, %	.05	.03	.04
Phosphorus, %	.33	.28	.39
ME, kcal/lb ^c	1450 ^d	1550	1500

^aTriticale grown in the Southeast.
^bSoft red winter wheat.
^cME = metabolizable energy.
^dEstimated.

Table 2. Example of swine diets using triticale.

	Starter (20 to 50 lb)	Grower (50 to 125 lb)	Finisher (125 lb to market)
Ingredient, lb/ton			
Ground triticale	1485	1655	1800
Soybean meal (44%) ^a	450	300	160
Base mix: ^b			
Dicalcium phosphate ^c	25	15	12.5
Limestone, ground	20	20	17.5
Salt	10	5	5
Vitamin-trace mineral premix ^d	10	5	5
Total	2000	2000	2000
Calculated composition (as-fed basis):			
Crude protein, %	18.8	16.5	14.4
Lysine, %	.96	.77	.60
Calcium, %	.75	.62	.55
Phosphorus, %	.64	.53	.48
Metabolizable energy, kcal/lb	1420	1435	1450

^aCan replace 10 lb of 44% soybean meal with 9 lb of 48% soybean meal and 1 lb triticale.
^bA 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.
^cDefluorinated 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.
^dAmounts shown are typical for many commercial products. Follow manufacturer's guidelines.