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Insoluble and fermentable fiber for swine diets

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This issue explains how fiber type and stage of production guide ingredient selection, formulation, and practical feeding decisions in swine diets.

Fiber often enters a swine formula through an ingredient decision. Wheat bran becomes competitively priced, soybean hulls offer a way to reduce feed cost, or sugar beet pulp is selected for a sow diet. The formula may meet its crude fiber specification, yet that figure tells us little about how the diet will behave. Two diets with similar crude fiber can differ in bulk, water retention, fermentation, and usable energy. These differences matter when the objective is to support a newly weaned pig, feed a restricted gestating sow, or produce a finished pig economically.

The formulation question is which fiber characteristics suit the animal, and how much the complete diet supplies. Soluble and insoluble fiber measurements improve that assessment, but neither directly measures fermentability. Nor do we have a universally accepted set of phase-specific fiber requirements comparable to those available for amino acids. Nutritionists must combine analytical values with ingredient knowledge, the production objective, and feeding results. A maximum tolerable inclusion of a fibrous ingredient is not a minimum requirement for fiber. A gestation allowance expressed in grams per day cannot be transferred unchanged to a nursery or finishing formula. Better fiber data are valuable when they lead to a better decision about the complete diet.

Know what the analysis measures

Crude fiber loses substantial dietary fiber during lab analysis; it is useful for older specifications but does not represent total fiber. Neutral detergent fiber (NDF) and acid detergent fiber (ADF) measure different plant cell wall fractions and largely omit soluble fiber. Total dietary fiber (TDF) includes soluble (SDF) and insoluble (IDF) fractions. NDF is not IDF, and NDF plus SDF is not TDF. To compare ingredient values, check the analytical method and moisture basis. A figure reported at 88% dry matter cannot be entered unchanged as an as-fed value for a wet or unusually dry ingredient.

Separate solubility from fermentation

Solubility describes behavior in water; fermentability describes microbial breakdown and the resulting short-chain fatty acid supply. Some soluble fibers raise viscosity; others do not. Insoluble fiber may also ferment, while lignification restricts it. In a 2026 University of Illinois study, at 88% dry matter, SDF/IDF values (%) were: wheat bran 2.5/36.5; soybean hulls 5.6/62.2; sugar beet pulp 14.9/49.1. Their TDF values are 39.0%, 67.8%, and 64.0%, respectively. These are analytical means, not specifications for every shipment. Sugar beet pulp supplies more soluble fiber than wheat bran, although most of its TDF is insoluble.

Start cautiously after weaning
Immediately after weaning, feed intake and digestive capacity limit performance. A modest contribution from predominantly insoluble, low-viscosity fiber may help, depending on the basal diet and health conditions. Kansas State favors this approach early and recognizes a possible role for soluble fiber later in the nursery. This guides ingredient choice; it is not a fixed inclusion target. More fiber can dilute energy and reduce nutrient utilization. Judge feed intake, gain, feed efficiency, and fecal condition together. Firmer feces alone do not prove better growth.

Price fiber through performance
Growing and finishing pigs tolerate more fibrous ingredients than newly weaned pigs, but energy dilution still matters. Use suitable net energy values and maintain the required digestible amino acid to energy balance. A cheaper feed can cost more if pigs need additional feed or days to reach market weight. High-fiber diets may also lower dressing percentage through greater intestinal contents and digestive tract weight. Where payment is on a carcass basis, calculate cost per unit of carcass gain. Reducing fibrous ingredients before marketing may recover some yield; the response depends on the preceding diet and withdrawal period.

Feed gestating and lactating sows
Restricted-fed gestating sows can benefit from bulky, fermentable ingredients that support satiety and bowel function, although responses vary. Adequate water and daily energy remain essential. An older suggestion is 350–400 g NDF per sow daily. At 2.5 kg feed, this equals 14–16% NDF as-fed. It is not a universal requirement and tells us nothing about fermentability. During lactation, the priority is sufficient nutrient intake for milk production. Moderate fiber can remain useful, but excessive bulk and lower energy density can constrain intake. Gestation and lactation therefore require separate decisions.

Calculate the complete diet
Kansas State provides practical comparisons; Feedipedia and the National Swine Nutrition Guide have wider ingredient coverage. The 2026 University of Illinois database reports SDF, IDF, and TDF for 846 samples. None establishes optimal dietary targets. For each ingredient, multiply its inclusion by its fiber percentage, then sum. At a 10% inclusion rate, replacing an ingredient containing 10% TDF with one containing 40% TDF raises dietary TDF by three percentage points. Match analytical methods and convert values to the shipment's as-fed moisture basis before calculating. SDF does not measure fermentability, and TDF cannot replace net energy.

In Brief, choose fiber for a defined purpose and assess its contribution in the complete diet. Young pigs, finishing pigs, and sows place different demands on the same ingredient. Better analyses permit closer control of fiber fractions, but they do not yet provide phase-specific requirements. Feed intake, usable energy, animal response, and cost must still determine whether the chosen ingredient improves the program.

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