

FEEDS & FEEDING

A TECHNICAL PUBLICATION OF THE ANIMAL NUTRITION ACADEMY

Volume 2 – Issue 11

Oxidized fats can erase finishing pig performance

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Finishing diets may look correct on paper, but poor-quality fat can reduce intake, growth, feed efficiency, and carcass value before anyone suspects the energy source.

Fat is added to finishing diets because it supplies concentrated energy, reduces dust, and can support growth when feed intake limits energy consumption. But the value assigned to a fat in the formulation matrix assumes that the material delivered to the feed mill resembles the material originally evaluated. That assumption may be wrong. Fat can deteriorate during processing, transport, and storage, especially when exposed to heat, oxygen, light, metals, or repeated use. The result may be a diet that meets its calculated energy specification while delivering less biological value—and additional compounds the pig must absorb, metabolize, or eliminate.

Fat is not only an energy number

Fat is normally described in the formulation system by its energy value. Its actual feeding value, however, also depends on fatty-acid composition, degree of saturation, free fatty acids, moisture, impurities, unsaponifiable material, and oxidation status. Two loads sold under the same commercial description may therefore perform differently. Source history matters particularly with blended fats, recycled oils, and materials exposed to severe processing conditions. The matrix value should be treated as an expectation supported by specifications and supplier control, not as a permanent property of every ton received.

Oxidation changes biology

Oxidation begins when fatty acids react with oxygen and form primary products, including hydroperoxides. These unstable compounds subsequently break down into aldehydes, ketones, and other secondary oxidation products. The problem is therefore greater than a simple loss of energy. Oxidized lipids can reduce palatability and feed intake, increase the pig's oxidative burden, deplete antioxidant reserves such as vitamin E, and alter metabolic function. Responses vary with the fat source, degree and stage of oxidation, inclusion rate, and exposure period. This variability explains why mildly deteriorated fat may escape detection while still weakening performance.

Finishing pigs reveal the loss

Finishing pigs consume most of the feed used in the production cycle, so small performance losses become economically important. Reduced intake lowers daily energy and amino-acid consumption, while poorer gain efficiency increases feed required per kilogram of liveweight produced. Pigs may reach market weight later, finish at lighter weights, or become less uniform within a marketing group. Research with pigs consistently associates heavily oxidized lipids with lower feed intake, daily gain, and feed efficiency. Finishing studies have also reported reductions in carcass weight and dressing percentage.

Summer makes the risk worse

Oxidation accelerates with temperature, time, oxygen exposure, light, catalytic metals, and increasing unsaturation. Summer can therefore expose weaknesses that remain unnoticed during cooler months: warm storage tanks, slow inventory turnover, partially filled tanks with greater air exposure, long transport delays, and residual material left between deliveries.

Recycled cooking oils may carry additional risk because they have already experienced heat and oxygen. Antioxidants can slow further deterioration when added early and correctly, but they cannot restore fat that is already oxidized. When summer intake falls unexpectedly fat oxidation may be the cause.

Quality control beyond free fatty acids

Moisture, insoluble impurities, unsaponifiable material, and free fatty acids remain useful measures of handling and general fat quality. But free fatty acids primarily indicate hydrolytic breakdown; they do not describe oxidative deterioration adequately. Peroxide value measures primary oxidation products, whereas p-anisidine value helps assess secondary aldehydes formed later. A low peroxide value does not always mean fresh fat because peroxides may already have decomposed. No single test tells the whole story.

Price as a quality indicator

Purchasing decisions frequently compare fat sources by price per ton or calculated energy cost. That comparison is incomplete if the sources differ in oxidation status, impurities, digestibility, or consistency. A discounted fat becomes expensive when it reduces daily gain, worsens feed conversion, delays marketing, or lowers carcass weight. Establish receiving specifications, retain samples from questionable loads, record tank temperatures and delivery dates, and investigate sudden changes in odor, color, or performance. The correct comparison is the cost of usable energy delivered to the pig—not merely the price and matrix value of the fat entering the mill.

In brief, oxidized fats demonstrate why formulation accuracy cannot end at the computer. A finishing diet may satisfy its calculated energy specification and still underperform if the fat deteriorated before reaching the pig. Control begins with reliable suppliers and continues through transport, receiving tests, clean tanks, appropriate storage, rapid turnover, and correctly timed antioxidant protection. Free fatty acids alone cannot confirm oxidative quality, and peroxide value alone can also mislead when oxidation is advanced. Fat quality is therefore simultaneously a procurement, feed-mill, nutrition, and performance issue. In finishing pigs, an energy supplement that has lost biological value can quietly become a growth penalty.

SWINE EDITION | 11 August 2026

Originally distributed through the Feeds & Feeding newsletter at LinkedIn. Archived permanently by Animal Nutrition Academy at www.animalnutritionacademy.com

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