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How much fat belongs in beef feedlot diets?

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This issue explains when added fat can improve beef ration energy and feed efficiency, how to set its inclusion from total dietary fat, and when the extra cost is justified.

In a recent University of Nebraska finishing trial, four fat sources were each added at 3.5% of diet dry matter in place of high-moisture corn. Cattle fed added fat converted feed more efficiently than those fed no supplemental fat, without a significant change in intake or average daily gain. Crude palm oil produced the largest improvement in feed conversion, about 7% when expressed as gain per unit of feed, but that result is not a recommendation to add 3.5% fat to every beef ration. The study tested specific sources in a particular finishing diet.

The useful question for a nutritionist is how much energy the animal actually gains from the addition, after accounting for the fat already in the diet, any effect on intake and digestion, and the cost of the replacement ingredients. A practical working range in many beef diets is about 4–6% total dietary fat on a dry matter basis, although young growing cattle and forage-based systems may call for greater restraint. This is a guide to examine, not a target to fill. If the basal diet contains 3% fat, adding roughly two percentage points of pure fat would bring a simple calculation near 5%, before the small change caused by removing other ingredients. Products differ in moisture and impurities; replacing ingredients also changes the energy, protein, fiber, and mineral balance. Feed analysis and a complete reformulation provide the real answer.

Why fats are attractive

Fat supplies considerably more energy per unit of dry matter than carbohydrate or protein. Small additions can raise energy density without increasing starch, reduce ration dust, and sometimes improve feed efficiency. This matters when physical fill limits intake, when extra grain would create another nutritional problem, or when fat costs less than the energy it replaces. The Nebraska trial illustrates the possible response, but its 3.5% addition displaced corn; the value of that exchange depends on ingredient prices and the feed required per unit of gain. Essential fatty acids are another contribution, although most beef diets do not need fat added for that reason alone.

Fats do not correct poor intake

Greater energy density can help cattle that cannot consume enough dry matter to meet their energy needs. It is less useful when intake has fallen because of irregular feed delivery, poor bunk management, inadequate water, heat stress, illness, or a difficult step-up program. In those cases, fat may raise calculated dietary energy while daily energy intake remains inadequate. Some fat additions can reduce intake further. On protein-deficient forage, meeting the protein requirement first can improve forage intake and digestion. Identify the reason cattle are eating too little, then decide whether more energy per kilogram of diet will solve a remaining problem.

The rumen sets a practical limit

Most conventional feed fats enter the rumen before their fatty acids reach the small intestine. At excessive levels, especially with readily available unsaturated fatty acids, they can impair fiber digestion and lower the energy recovered from the basal feed. That loss matters most when forage supplies a large share of the animal's energy. Saturation, physical form, amount fed, and the rest of the diet all affect the response. Rumen microbes hydrogenate many unsaturated fatty acids, but this does not make every oil equally suitable at every inclusion rate. An attractive laboratory fat value is of little use if the complete diet performs worse.

Count the fat already present

The limit applies to total dietary fat, not just the amount added from a tank. Distillers grains, full-fat oilseeds, bakery products, hominy feed, and some other byproducts can contribute substantial amounts. Their fat content changes with processing, especially as more or less oil is removed. Even corn and forage make smaller contributions that belong in the calculation. A ration can reach an excessive concentration with no obvious added-fat line in the formula. Use current ingredient analyses on a dry matter basis; then calculate the total after the added fat has displaced part of the basal mix.

Sources have different feeding values

Tallow, vegetable oils, acidulated soapstocks, calcium salts, oilseed products, and commercial blends differ in fatty-acid profile, free fatty acids, moisture, impurities, oxidation, and ruminal availability. These differences affect handling, digestion, and usable energy. A liquid unsaturated oil should not automatically receive the same energy matrix as tallow or a product intended to limit ruminal exposure. Ether extract measures a chemical fraction; it does not establish net energy delivered to cattle. Specifications and price should be evaluated together, using the basal ration in which the product will be fed rather than a generic value alone.

Handling and cost close the decision

Liquid fats must be stored, pumped, metered, and mixed accurately. Cold weather may increase viscosity; prolonged warm storage may encourage oxidation, especially in unsaturated products. Leaks, blocked nozzles, and poor calibration can make the intended inclusion differ from what cattle receive. Fat can control dust and help feed particles adhere, while excessive or uneven application can create clumps and inconsistent loads. Finally, compare the delivered and handling cost of fat with the value of the ingredients it replaces and the observed change in feed cost per unit of gain. Better feed conversion does not automatically mean a more profitable ration.

In Brief, added fat earns its place when it supplies useful energy at a competitive cost without depressing intake or the value of the basal feed. Start with total dietary fat, commonly assessed against a 4–6% working range, and adjust for cattle class, forage dependence, fat source, and actual performance. Correct management or forage deficiencies first. The right amount is the inclusion that improves the complete ration and its economics, not the highest percentage the formula will accommodate.

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