

Do Ethanol by-product feeds affect beef quality ?

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Development of the ethanol industry has been good for cattle feeders with access to by-product feeds. However, research studies indicate the feeding of dry distillers' grains and other by-products of the ethanol industry can affect beef carcass quality. As is often the case, too much of a good thing can have a detrimental effect. Whether it costs cattle feeders money in the long run probably depends on some additional factors. But, with the likelihood of increased availability of corn distillers' by-products (or co-products), cattle feeders need to be aware of potential consequences.

It's certainly no secret that the ethanol industry is growing rapidly. Production in the U.S. has increased by about 265% since 1999. Close to four billion gallons of ethanol were produced in 2005, utilizing 14.6% of the country's corn crop. With expanded production of ethanol comes the increased availability of corn distillers' co-products. The energy and protein content of co-products, as well as favorable prices, have made these alternative feedstuffs popular.

That's particularly true in the Northern Plains states like Nebraska, Iowa and South Dakota. According to estimates, over 80% of Nebraska feedlots, with at least 2,000-head capacity, include corn distillers' co-products in their cattle rations. Of course, much of the ethanol and its co-products are currently produced in northern states. That's also where the greatest growth in production is expected. In Nebraska, for example, 12 ethanol plants are currently in production and nine new plants are under construction. According to the Nebraska Ethanol Board, plans are being drawn for at least 23 more plants.

Kansas State University Extension Feedlot Specialist Chris Reinhardt says most feedlots using corn distillers' co-products include them at the rate of 10% to 30% of the total ration, on a dry matter basis. However, Reinhardt says production capacity for ethanol could nearly double within the next 18 months. How could a corresponding increase in the supply of corn distillers' co-products affect future ration inclusion rates? If the price of co-products becomes more attractive, compared to corn, will feeders be tempted to increase co-product levels?

There is cause for some concern, says Reinhardt, because the rate at which corn distiller's co-products are fed can have an effect on carcass marbling scores. After reviewing 13 university studies, Reinhardt concluded that feeding co-products at levels above 30% can result in reduced marbling.

"There is a statistically significant difference," states Reinhardt. "Biologically, it's a modest difference, but it is real."

Some cattle feeders and nutritionists believe corn distillers' co-products used at levels below 30% of the total ration may actually help improve carcass quality grade. But Reinhardt says no controlled studies, thus far, have offered any evidence suggesting that low-level feeding of co-products will enhance marbling.

It's not likely that corn distillers' co-products could help boost marbling deposition. Scientists suspect marbling is influenced by the amount of starch in the diet. Starch is believed to enhance marbling, but starch is fermented out of grain during the ethanol production process. While the resulting co-product feeds are considered good sources of energy, it is due to their fat content rather than starch. And fat does not appear to promote marbling. So, as the ration inclusion rate for corn distillers' co-product increases, the starch content decreases. Less starch means less marbling and lower carcass quality grade.

"If, for example, a pen of cattle is fed distillers' grains at a 40% inclusion rate, we might see 4% to 7% fewer Choice carcasses, compared to a pen fed a ration with no distillers' grains," explains Reinhardt. "If the inclusion rate is increased from 20% to 40%, there might be a reduction of a couple of percentage points."

By itself, a ration containing more than 30% corn distillers' co-products may not wreck carcass quality grades for a pen of cattle. Other factors contribute to the outcome. At higher levels, corn distillers' co-products could cause a 2% to 4% reduction in marbling. However, if health history, grain processing issues, or implant regime each caused similar reductions, the additive effect could be considerable.

"Our concern is for the future," adds Reinhardt. "If co-products become more abundant and the price becomes even more attractive, we'll have to watch inclusion rates to avoid possible reductions in carcass quality."

Meat scientists will continue to study the possible effects that distillers' co-products might have on beef quality and palatability. New research at the University of Nebraska is designed to determine whether feeding distillers' co-products influences the fatty acid content of beef, and whether fatty acid content is correlated with differences in marbling. The study will also address questions about whether differences in fatty acids might make marbling more difficult to see.

According to the study's lead researcher, Chris Calkins, previous work has demonstrated that off-flavors in beef are associated with oxidation of fatty acids. Sulfur-based compounds are also suspected contributors to off-flavor, and distillers' co-products are known to possess variable but relatively high levels of sulfur.

Calkins says the new study will further assess the relationship of intramuscular fat and marbling scores from cattle fed distillers' co-products. It will evaluate the effects of different co-products on fatty acids, sulfur and off-flavor in beef. Additionally it will explore variations in sulfur content of different feedstuffs.

Hopefully, the study will provide answers to further guide the use of distillers' co-products in feedlot rations.