

Forage, corn feed alternative for cattle may come from biodiesel industry

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Researchers looked at four sets of cattle in different crude glycerin studies to determine its value as a livestock feed. Credit: Dr. Jim MacDonald

Crude glycerin, a byproduct of biodiesel production, could be an economical ingredient in cattle diets, according to studies by Texas AgriLife Research and West Texas A&M University personnel.

Dr. Jim MacDonald, AgriLife Research beef [cattle](#) nutritionist in Amarillo, said during biodiesel production from sources such as cottonseed oil, glycerol is separated from fatty acids. The fatty acids become the biodiesel and the glycerol, combined with the impurities that remain, is a potential ingredient in livestock feed.

“Crude glycerin is usually priced at a discount relative to corn, so we wanted to look at replacing corn to evaluate at the energy value of the glycerin,” MacDonald said. “Then the question became, what if you

replace forage, which would be the case with stocker cattle?”

MacDonald said glycerin has good flowability in low temperatures, as opposed to molasses or other similar products, and is non-corrosive to feeding equipment — both traits making it attractive to the cattle feeding industry.

Additionally, glycerin is low in phosphorus, protein and sulfur, which can be concentrated in other dietary ingredients, he said.

While the researchers knew the physical and nutritional properties made crude glycerin an attractive carrier in liquid supplement programs, relatively little was known about its performance implications in growing or high-concentrate finishing diets for beef cattle.

For the past two years, MacDonald has teamed up with Dr. Mike Brown at West Texas A&M University to conduct four experiments designed to determine the value of feeding crude glycerin in beef growing and finishing diets.

The studies were funded by the Texas Department of Agriculture Food and Fibers Research Grant Program with the thought that cottonseed oil could be used for biodiesel production. Capturing the value of the [byproduct](#) is important to bioenergy plants, and “that’s where we came in,” MacDonald said.

Another portion of the study was funded by the Department of Transportation – Research and Innovative Technology Administration through the South Central Sun Grant program.

The studies were designed to determine the feeding value, optimal concentration and which dietary components were most optimally displaced by crude glycerin in growing diets, he said.

Within the studies, the researchers looked at two strategies: replace corn or replace some forage. In the studies replacing corn, the researchers saw an optimal inclusion between 2.5 percent and 7.5 percent glycerin, MacDonald said. At 10 percent inclusion, feed efficiency was reduced.

When forage was replaced in one study, they saw no change in average daily gain, but the cattle consumed less feed and so feed efficiency was improved, Brown said. The feed efficiency was improved when either 5 percent or 10 percent glycerin was fed. Another advantage is a less bulky ration as forage is replaced.

“I feel very comfortable using crude glycerin up to 7.5 percent of a [diet](#),” MacDonald said.

The researchers even tested for a possible negative impact on fiber digestibility, but found none when the crude glycerin was fed at the low levels.

“We also saw an increase in microbial protein and a reduction in rumen ammonia,” MacDonald said.

This information could lead to further studies, he said. In high-forage diets, often excess nitrogen is formed in the rumen, which is excreted as urea and volatilized into the atmosphere as ammonia. The crude [glycerin](#) may allow more of the nitrogen to be captured before it is excreted and, thus, reduce ammonia emissions of cattle grazing high quality forage.

“We also observed no negative impacts on animal health up to 10 percent inclusion in diets of newly received calves,” MacDonald said.

Provided by Texas A&M AgriLife

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