



West Central News

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The current and future outlook for corn prices has many nutritionists considering alternative energy sources for animal diets. Glycerin (also known as glycerol or glycerine) is a three carbon compound that is a byproduct of the biodiesel industry. Plant and animal fats or oils are generally triglycerides, with three fatty acid chains attached to a glycerin molecule. To make biodiesel, the long chain fatty acids are cleaved from the glycerin backbone of the oil by esterifying the fatty acids with an alcohol – most commonly methanol.

Heating the oil, treating it with base, and adding a catalyst speed the esterification process. Glycerol and fatty acid esters are the end result. Glycerol is heavier than the fatty acid esters and is removed by centrifugation. The crude glycerin produced by this method will contain some water, salts from neutralization of the base used in the esterification process, and a small amount of methanol. Pure glycerin provides 4320 cal/g gross energy. Corn, depending on oil, starch, and protein content of the hybrid, has similar gross energy.

The metabolizable energy of corn is typically 87-89% of gross energy when fed to pigs. In a study presented at this year's Midwest Animal Science meeting, the metabolizable energy yield of crude glycerin added to the diet of growing pigs was examined. The crude glycerin was 86.9% glycerin and contained 3625 cal/g gross energy – 84% of corn's energy. The metabolizable energy derived from the glycerin was 3207 + 10 cal/g or about 88% of gross energy when included at levels up to 10% of the diet. In ruminants, no data exists on the metabolizable energy derived from glycerin. However, glycerin has an added benefit over corn – the glycerin molecule is gluconeogenic in ruminants. This characteristic has suggested that glycerin might be particularly useful in diets of dairy cattle around the time of calving as an aid in the prevention of ketosis.

Corn is currently \$3/bushel or about 6¢/lb. Right now, crude glycerin can be purchased in bulk for about 6¢/lb. This price varies considerably depending on biodiesel prices. Strictly from a corn energy comparison, the price of glycerin would have to be about 0.84 of the price of corn to be of equal value as an energy source. However, glycerin does not bring any protein to the diet while corn does. Corn is 9% protein and with soyprotein worth about 15¢/lb. (discounting for the energy value of soymeal), a pound of corn brings 1.35¢ of protein value. So to be a good buy, the crude glycerin would have to sell for about 3.75¢/lb. to be an economical substitute for 6¢/lb. corn. Much of the crude glycerin produced by the biodiesel industry contains small levels of methanol. Removal of this methanol will often add several ¢/lb. to the cost of crude glycerin, again making it less competitive with corn.

The value of glycerin as a preventative for ketosis and fatty liver in fresh dairy cow diets might merit paying substantially more than 6¢/lb. A South Dakota State study failed to demonstrate an added health benefit when glycerin was added to the diet of dairy cows around the time of parturition. A Penn State study (reported at the FASS meeting a few weeks ago) suggests a small improvement in energy balance in early lactation cows when glycerin was added to the diet. Further studies will be needed to confirm these results.

Lammers et al., Digestible and metabolizable energy of crude glycerol in growing pigs. Midwest Animal Science Meetings, Des Moines, IA, March 19-21, 2007.

Defrain et al., Feeding glycerol to transition dairy cows: effects on blood metabolites and lactation performance. J Dairy Sci. 2004 87:4195-206.

Chung et al., Effect of feeding dry glycerin to early postpartum Holstein dairy cows on milk production and metabolic profiles. FASS Meeting, San Antonio, July 8-12, 2007.

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