

---

## Ethanol and Biodiesel Today

Corn grain makes a good biofuel feedstock due to its starch content and relative easy conversion to ethanol. Infrastructure to plant, harvest and store corn in mass quantities benefits the corn ethanol industry. Under the renewable fuel standard set by congress in 2007 (RFS-2) grain based ethanol can make up 15 billion gallons of the 36 billion gallon per year. The remainder would be made from cellulosic feedstocks. Ethanol production was about 14 billion gallons in 2011. There are no federal subsidizes to build new plants or to entice fuel companies to use more ethanol. The fuel industry will use ethanol if it is priced competitive to gasoline and attractive as an octane additive. Ethanol plants which have been well managed and have control of their debt structure are profitable in today's corn price – gasoline price situation.

The corn based ethanol industry is mature. Federal subsidizes are incentivizing the development of three small commercial sized cellulosic plants in Nevada and Emmetsburg, Iowa and Hugoton, Kansas. All will use crop residues of corn (cobs, husks, leaves, and some stalks, wheat straw, etc.) All of the plants are about 25 million gal per year plants. The Hugoton plant will also generate more than enough electricity to operate the plant. The technology is there to produce ethanol or similar liquid fuels from cellulosic feedstocks. The two big questions are can it be done economically and what are the carbon implications.

We spend a lot of money producing nitrogen and phosphorus fertilizer and have in the past ignored the most fundamental nutrient in our soil, carbon and the organic matter level of the soil. Each 1 percent organic matter contains 1000 pounds of nitrogen per acre, 110 pounds of phosphorus, 105 pounds of potassium, 145 pounds of sulfur, and 12,000 pounds of carbon. At today's nutrient prices that is \$800 worth of nutrients per 1% organic matter. I am not sure that we can maintain and increase yields of crop fields in the face of mass removal of carbon for cellulosic production. Crop residues of interest for bioenergy include; corn stover, corn cobs, wheat and soybean straw, and rice hulls. An interesting twist on ethanol production is a pathway process has been approved for ethanol from milo production qualifying it as an advanced biofuel, which would give benefits in the West Coast market. We may see some incentives offered for milo production in some areas.

Soybean oil is currently a major feedstock for production of biodiesel. The most common method of biodiesel production is a reaction of vegetable oils or animal fats with methanol in the presence of sodium hydroxide (which acts as a catalyst). The process yields methyl esters (biodiesel) and glycerin. Biodiesel added at a 2 to 5 percent rate with diesel fuel has a significant share of the lubricity additive market. In addition the fuel is more air quality friendly. Sales of biodiesel rose to over a billion gallons in 2011 due to the addition of the Northeast heating fuel market. Again biodiesel is a mature industry and is not currently receiving federal subsidizes of any kind. New pathways to the manufacture of biodiesel are adding efficiency. The combination of these pathways and the potential for adding pure biodiesel at a 2 percent rate to diesel fuel moving in pipelines offers some hope of future use of the idle Beatrice facility.

Paul C Hay, Extension Educator

University of Nebraska-Lincoln Extension in Gage County • 1115 West Scott Street, Beatrice NE 68310

(402) 223-1384 • FAX: (402) 223-1370 • email: [phay1@unl.edu](mailto:phay1@unl.edu)

