Fueling Value

Ethanol production and use has a long history of helping farmers and others by adding value to corn at the same time as it saves drivers at the gas pump. Henry Ford and Alexander Graham Bell were among the first to recognize that the plentiful sugars found in plants could be easily and inexpensively converted into clean-burning, renewable fuel. Bell himself referred to ethanol as a “clean, beautiful, and efficient fuel” more than a century ago.

Today’s industry uses state-of-the-art technologies to produce ethanol and valuable bio-products from the starches and sugars found in grains, beverage and food waste, and cellulosic biomass, and American farmers themselves are often actively involved in many of these ethanol plants through ownership or leadership positions.

More than 90 percent of U.S. fuel ethanol is produced using the dry mill process, with the remaining amount coming from wet mills. The main difference between the two processes is in the initial treatment of the grain.

In DRY MILLING, the entire grain kernel is first ground into “meal,” then slurried with water to form a “mash.” Enzymes are added to the mash to convert starch to sugar. The mash is cooked, then cooled and transferred to fermenters. Yeast is added and the conversion of sugar to alcohol begins. After fermentation, the resulting “beer” is separated from the remaining “stillage.” The ethanol is then distilled and dehydrated, then blended with about 2% denaturant (such as gasoline) to render it undrinkable. It is then ready for shipment. The stillage is sent through a centrifuge that separates the solids from the solubles. These co-products eventually become distillers grains, as well as corn distillers oil.

In WET MILLING, the grain is first separated into its basic components through soaking. After steeping, the slurry is processed through grinders to separate the corn germ. The remaining fiber, gluten and starch components are further segregated. The gluten component (protein) is filtered and dried to produce animal feed. The remaining starch can then be fermented into ethanol, using a process like the dry mill process.
On average, 1 bushel of corn (56 pounds) processed by a dry mill ethanol biorefinery produces:

- 2.92 gallons of denatured fuel ethanol
- 15.86 pounds of distillers grains animal feed (10% moisture)
- 0.80 pounds of corn distillers oil
- 16.5 pounds of biogenic carbon dioxide

Source: RFA