

Ethanol's Potential as a Renewable Fuel Source

It has been used as a fuel for over 100 years, with the first ethanol-powered vehicles appearing in the late 1880s. However, it wasn't until the 1973 oil crisis that several countries began introducing it into their fuel supplies as a way to reduce dependence on imports. Brazil was one of the early adopters and today obtains over 40% of its transportation fuel from sugarcane-based ethanol. In the United States, corn-based ethanol started gaining momentum in the late 1970s and the Renewable Fuel Standard was established in 2005, mandating the blending of increasing volumes of renewable fuels into gasoline.

Production Methods

There are two primary methods for producing it – from grain or from cellulosic waste materials. Grain [Ethanol](#) is the most common type produced today, with over 99% coming from corn in the U.S. The process starts by milling the corn kernels to extract starch, then using enzymes and yeast to ferment the starch into it. It is separated using a distillation process. Cellulosic ethanol can be made from numerous waste materials high in cellulose like agricultural residues, forestry waste, municipal solid waste, and energy crops. However, breaking down the cellulose into fermentable sugars is more complex, so commercial cellulosic ethanol facilities are still limited. Lignocellulosic has the potential to utilize many more feedstocks than first generation grain.

Impact on the Fuel Supply

The blending of it into gasoline reduces petroleum use and imports. In 2020, around 15 billion gallons of corn ethanol displaced over 1 billion barrels of imported oil. Biofuel producers credit with lowering fuel prices due to reduced oil consumption. However, others argue that federal mandates artificially inflate demand and corn prices, raising costs to livestock and food producers. Studies on the energy balance of corn have shown it lowers lifecycle greenhouse gas emissions by around 43% compared to gasoline. Cellulosic has an

