



# Cellulosic Ethanol Production from Starch or Cellulose Derived Sugars

**IP Status:** Issued US Patent; **Application #:** 12/668,982

## Robust Organisms can withstand Toxins created from Cellulose Hydrolysis or Starch Hydrolysis such as Acetate and Furfural

Robust microbes capable of efficiently producing cellulosic ethanol and able to withstand the toxic byproducts of cellulose hydrolysis processes have been developed. A major challenge in cellulosic ethanol production is that the sugar feedstocks that microbes require to produce ethanol by fermentation are often created in the same locations as toxic byproducts of the sugar-creation process itself. The designed microbes consume pentose or hexose sugars to create ethanol. These sugars are oftentimes produced by starch hydrolysis processes or cellulose hydrolysis. These hydrolysis processes also create various toxins such as acetate or furfural during biomass fermentation and therefore prevent optimal cellulosic ethanol production. For such adverse situations, University of Minnesota researchers have developed microbes capable of efficiently producing ethanol.

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## Cellulosic Ethanol Production from Hexose and/or Pentose Sugars

The created organisms are not affected by these inhibitory or toxic substances created during the hydrolysis of starch or the hydrolysis of cellulose. They are fully capable of producing ethanol from the C5 and/or C6 sugars pentose and hexose in the presence of toxins like furfural and acetate created during fermentation.

### BENEFITS OF MICROBES FOR CELLULOSIC ETHANOL PRODUCTION

Technology ID

z07117

Category

Life Sciences/Industrial Biotech

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- Pentose and hexose sugars are efficiently consumed by organisms
- Mixtures of sugars from a variety of biomass feedstocks can be used for cellulosic ethanol production
- Fermentation can occur in the presence of inhibitors and toxic compounds like acetate or furfural

**Researchers:** Friedrich Sreinc, PhD Professor, Chemical Engineering and Mechanical Science  
Dr. Sreinc's Research Lab