Modified Yeast Show Improved Xylose Fermentation and Toxin Tolerance

WARF: P130153US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing genetically engineered yeast strains better able to ferment xylose and tolerate biomass pretreatment toxins.

Overview

Bleaching plant material with alkaline hydrogen peroxide (AHP) is an old process used for papermaking. Several decades ago researchers suggested that this method also could be used in biofuel production. The method involves treating switchgrass or corn stover with hydrogen peroxide under basic conditions. However, before enzymatic conversion can yield useful quantifies of glucose and xylose, the pH of the mixture must be adjusted to acidic conditions.

Unfortunately, this pretreatment produces molecules like *p*-Coumaric acid and Ferulic acid, which are toxic to fermenting microbes. This problem undercuts the practicality of AHP in an industrial biofuel setting.

The Invention

A UW–Madison researcher and others have developed genetically modified *S. cerevisiae* strains capable of xylose fermentation and better able to tolerate toxins associated with biomass pretreatment. The strains, called GLBRCY73 and GLBRCY87, were evolved in the presence of increasing amounts of *p*-Coumaric and Ferulic acids. Desirable specimens were selected based on strong growth characteristics.

Applications

- Industrial ethanol production

Key Benefits

- Good xylose fermentation
- More tolerant to toxins produced during biomass pretreatment
- Strains don't require hydrolysate purification steps prior to fermentation.
- Could lower biofuel manufacturing costs
- Strains are hardy and easy to work with on an industrial scale.

Additional Information

Related Technologies

- WARF reference number P100228US02 describes recombinant yeast strain with improved ethanol tolerance.

Tech Fields

- Clean Technology : Biofuels & renewable energy/fuels & fuels

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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