

Microorganisms to Speed Production of Biofuels

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Technology Summary

Researchers at ORNL developed microorganisms that can quickly overcome the resistance of biomass to breakdown, and improved both the cost and efficiency of the biofuel conversion process.

Conventional biomass pretreatment methods release sugars, weak acids, and metabolic by-products that slow down or even stop fermentation, resulting in slower biofuel production. ORNL researchers use information from the acetaldehyde-CoA/alcohol dehydrogenase gene, and its mutations, to synthesize a microorganism that is more tolerant of ethanol and consequently avoids the inhibitory by-products of conventional pretreatment. The researchers also developed a method for enhancing the resistance of the microorganism and producing alcohol from cellulosic biomass material.

Advantage

- Quicker fermentation process for lignocelluloses biomass

Potential Applications

- Treatment and conversion of lignocelluloses biomass to ethanol and butanol
- Production of fuel ethanol in industrial-scale quantities

Patent

Steven David Brown, Tatiana V. Karpinets, and Adam Guss, *Nucleic Acid Molecules Conferring Enhanced Ethanol Tolerance and Microorganisms Having Enhanced Tolerance to Ethanol*, U.S. Patent Application 13/112,641, filed May 20, 2011.

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