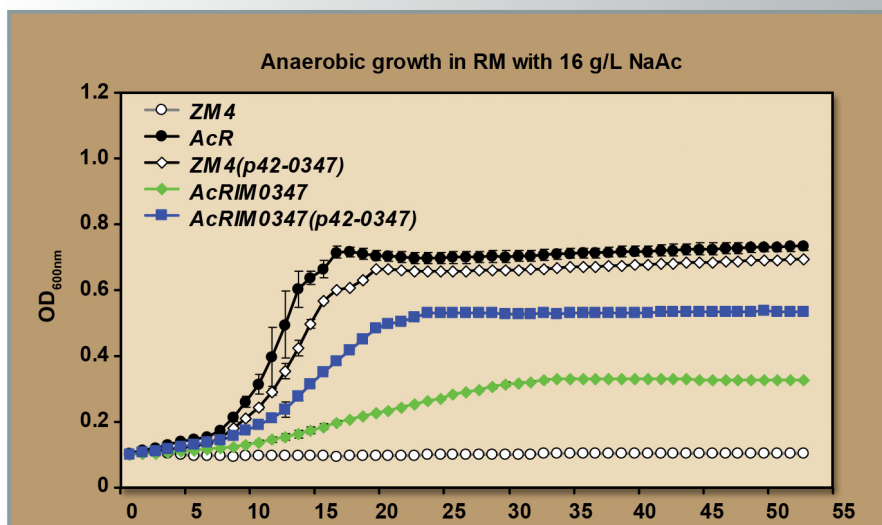


Genetically Modified Microorganisms with Enhanced Tolerance to Inhibitors and Stress

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Technology Summary

The potential of bioenergy to replace large amounts of petroleum depends largely on whether cellulosic ethanol can be cost-competitive with gasoline. A core challenge for cost efficient ethanol production is the resistance of biomass to breakdown. Pretreatment is needed to combat biomass recalcitrance for sugar release. However, inhibitors emerge during pretreatment that can interfere with fermentation by slowing ethanol production speed and decreasing the total yield, resulting in a higher cost product.

To address this issue, ORNL researchers identified a global regulator gene target and developed genetically modified strains of microorganisms with enhanced tolerance to a broad range of pretreatment inhibitors. These microorganisms could be used for industrial biocatalyst improvement and development for cost-competitive biofuel production.

Advantages

- Enhanced tolerance to a broad range of pretreatment inhibitors
- Improved biofuel production with faster fermentation time and reduced cost

Potential Applications

- Biomass-to-ethanol industrial scale production
- Potential for manipulation of homolog gene expression levels in other industrial strains and in new strains

Patent

Steven David Brown and Shihui Yang, *Microorganisms Having Enhanced Tolerance to Inhibitors and Stress*, U.S. Patent Application 12/795,882, filed June 8, 2010.

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