



Biomass Program

Sugars R&D

Emerging Pretreatment Options

Pretreatment processes play an important role in the conversion of lignocellulosic biomass, enabling the break down of the biomass into useful intermediates such as sugars. The goal of this project is to evaluate biomass pretreatment options that reduce the cost of the pretreatment reactors and increase the enzymatic digestibility of residual cellulose in the pretreated biomass.

Process options to be evaluated for reducing the cost of pretreatment reactors include clean fractionation and hot wash processes. The effect of the different pretreatment technologies on the enzymatic digestibility of pretreated biomass residues will be evaluated in terms of lowering the enzyme requirements and increasing the residual cellulose-to-glucose hydrolysis rates and yields.

A comparative technoeconomic analysis of several pretreatment techniques being investigated by the Biomass Refining Consortium for Applied Fundamentals and Innovation (CAFI) will also be completed.

R&D Pathway

Researchers will test a pilot-scale dilute acid hot wash pretreatment process at conditions less severe

than standard pretreatment conditions. A technoeconomic analysis will be performed and used to compare it to currently available high-solids pretreatment approaches and other technologies.

The applicability of clean fractionation as a pretreatment process will be investigated, along with the resulting product composition and process opportunities. Researchers will perform a technoeconomic analysis to allow comparison to other pretreatment approaches.

The data generated by CAFI members investigating equipment design and cost issues for alternative pretreatment methods will be used to perform a comparative analysis to determine if any of the pretreatment alternatives have potential as a lower-cost emerging or longer-term option.

Benefits

- **Enable cost-effective conversion of lignocellulosic biomass to sugars**

Applications

This research will elucidate options in pretreatment chemistries and benchmark performance as guidance to industry.

Project Participants

**National Renewable Energy Laboratory
CISCO**

Project Period

FY 2004

For more information contact:

Rick Elander
National Renewable Energy Lab
Richard_Elander@nrel.gov

EERE Information Center
1-877-EERE-INF (1-877-337-3463)

Visit the Web site for the Office of the Biomass Program (OBP) at
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September 2004