



# Biomass Program

## Sugars R&D

### Enzymatic Biomass Conversion Process Integration

The overall objective of this project is to facilitate deployment of enzyme-based biomass conversion technology. The immediate goal is to explore integration issues and demonstrate that the improved lower-cost enzymes being developed by Genencor and Novozymes A/S improve process performance. The specific areas researchers are targeting include feedstock variability, integrated processing, and biomass compositional analysis.

#### R&D Pathway

Scientists will characterize the extent and economic impacts of corn stover compositional variability and will collaborate with the U.S. Department of Agriculture and/or Land Grant Universities to understand the causes of variability.

The integrated processing piece will work to identify process integration issues that have a major impact on process performance and economic viability. Benchmarking integrated performance will identify relevant issues that may hinder deployment of this technology. Improved and new analytical methods will be applied to demonstrate better mass balance closure around the

important unit operations of pretreatment and enzymatic cellulose hydrolysis. These efforts will enhance researcher's abilities to produce realistic process residues, wastes, and recycle streams, whose characterization is necessary to facilitate success of the emerging biorefinery industry.

Researchers will develop and extend wet chemistry analysis methods for raw feedstocks and process intermediates to improve mass balance closure. Some of the areas under development include work to improve biomass sugar quantification in pretreatment hydrolysates, identification of unknown water soluble components in herbaceous feedstocks, and improved lignin determination in raw feedstocks and process intermediates.



Integrated pilot plant for lignocellulosic biomass processing.

#### Benefits

- **Validate the potential of technology advancements to reduce capital and processing costs for converting lignocellulosic biomass to ethanol**
- **Improve overall viability of biorefineries**

#### Applications

**The results of this project will facilitate deployment of enzymatic hydrolysis and help validate the viability of enzymatic hydrolysis processes for converting lignocellulosic biomass to ethanol and other bioproducts.**

#### Project Partners

**National Renewable Energy Laboratory**

#### Project Period

**FY 2003 – FY 2005**

#### For more information contact:

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**Visit the Web site for the Office of the Biomass Program (OBP) at**  
[www.eere.energy.gov/biomass.html](http://www.eere.energy.gov/biomass.html)

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