



Biomass Program

Biochemical Platform Processing Integration

The objective of this project is to facilitate deployment of enzyme-based biomass conversion technology. The immediate goal is to explore integration issues that impact process performance and to demonstrate improved performance of the lower-cost enzymes being developed by Genencor and Novozymes.

R&D Pathway

Scientists and engineers in this project will continue efforts to advance core process knowledge with emphasis on producing process relevant residues and waste streams for testing. Ultimately, this work reduces risk as well as capital and operating cost by overcoming technical barriers associated with high-solids processing, understanding the impact of feedstock variability, and developing a better understanding of the key interactions controlling process efficiency and performance.

For example, the effect of feedstock compositional and structural variability on conversion processes (e.g., cellulose digestibility) will be tested. In addition, use of the Biomass Surface Characterization Laboratory tools is expected to

provide insight into mechanisms affecting performance.

The newest cellulases recently developed by the enzyme manufacturers will be tested under process relevant conditions to aid in future efforts to develop even more effective and low-cost enzymes.

Researchers will also develop and extend wet chemical, on-line, and automated compositional analysis methods for raw feedstocks and process intermediates. Some of the areas under development include work to improve biomass sugar quantification in pretreatment hydrolysates and fermentation streams, 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.

Biochemical R&D

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 help validate the viability of enzymatic hydrolysis-based processes for converting lignocellulosic biomass to ethanol and other bioproducts to facilitate deployment of this technology.

Project Partners

**National Renewable Energy
Laboratory**

Project Period

FY 2006 – FY 2008

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June 2006