



Biomass Program

Sugars R&D

Biomass Structure

As a type of lignocellulosic biomass, corn stover is structurally resistant to degradation and requires pretreatment to convert its cellulose and hemicellulose fractions into simple sugars.

Pretreatment processes, such as dilute acid processing, attack the hemicellulose-lignin matrix that protects the cellulose and solubilize some of the hemicellulose and lignin, leaving “gaps” so that the cellulose is accessible to sugar conversion processes.

However, different lots of corn stover can have unique responses to dilute acid pretreatment. The differences in performance suggest that a higher level of structural variability exists among feedstocks and is independent of the differences found in bulk chemical composition. An understanding of the physical, chemical, and ultra-structural features of corn plants and their anatomical fractions, which influence process performance, will assist in the development of effective pretreatment processes.

In addition, differential performance during processing and the underlying physical, chemical, and ultra-structural features may also be a function of genetic diversity among cultivars, as well as the environmental influences the

plants experienced during growth, harvesting, and storage. By generating and characterizing materials for this task, a distinction between genetic and environmental factors may be revealed.



Potential biomass feedstock for bioproducts.

R&D Pathway

As part of this task, researchers will characterize the physical and chemical aspects of anatomical fractions collected from diverse varieties of corn stover. Working in collaboration with other tasks in the Office of the Biomass Program’s Sugar Platform, they will correlate pretreatment performance with these physical and chemical characteristics of lignocellulosic biomass.

Benefits

- **Improve process yield and economics of processing stover to sugars**
- **Mitigate risk associated with commercialization of biomass conversion processes**

Applications

Knowledge of differences in stover performance could lead to more effective pretreatment methods.

Project Participants

National Renewable Energy Laboratory

Project Period

FY 2003 – FY 2005

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

September 2004