Biomass Program

Feed Processing, Handling, and Gasification

Both current and future sugar biorefineries will generate a wide variety of residue streams that can be used as feedstocks for thermochemical processes, including corn stover, corn fiber, lignin-rich materials, and distillers' dried grain and solubles. The value and volume of the residue streams will have a significant impact on the potential for integrating thermochemical processes into sugar biorefineries. Residue stream properties such as density, moisture content, physical form, and mineral content can affect the processing of the residue into thermochemical feedstocks and thermochemical conversion.

R&D Pathway

Researchers will identify the volume and value of these potential thermochemical feedstocks and determine the composition and physical properties of the streams, including the lignin-rich residue from lignocellulosic sugar processes. This will enable researchers to define the unit operations and specific equipment required for processing and handling the residue prior to use as a thermochemical feedstock.

Residue processing and handling scenarios to be evaluated include:

- Drying of wet residues to be fed into a low-pressure, high-temperature process, such as gasification or pyrolysis
- Preparation of a slurry that can be pumped at high pressure to a hydrothermal conversion process.

In conjunction with the feed processing and handling work, NREL and PNNL are both working on advanced gasification technologies. NREL is studying the fundamental mechanisms and kinetics of trace product (e.g. tar) formation and conversion in steam and partial oxidation gasification. PNNL is working on wet gasification and the bench-scale demonstration of the sulfur/mineral matter removal technologies developed by the OBP Catalytic Hydrothermal Gasification project.

Thermochemical R&D

Benefits

- **Conversion of lignin-rich and other biomass or biorefinery residues into value-added fuels, products, and power**

Applications

Thermochemical processes can be used in thermochemical biorefineries or integrated into sugar biorefineries to convert biomass residues into fuels, products, and power.

Project Participants

National Renewable Energy Laboratory (NREL)
Pacific Northwest National Laboratory (PNNL)

Project Period

FY 2003 – FY 2006

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