



Biomass Program

Opportunity Analysis for Biobased Products

There are thousands of potential pathways for converting biomass components to fuels, chemicals, and materials making it difficult to choose which pathways to focus R&D efforts on. The DOE Office of the Biomass Program (OBP) is supporting analysis to identify the best product pathways to pursue based on impact, available technology, and the ability to integrate with other components of a biorefinery. The results of these efforts are presented in *Top Value Added Chemicals from Biomass* (“Top Ten”) reports for sugars and syngas (Volume I) and lignin (Volume II).

This project leverages previous work performed in developing the “Top Ten” analyses for sugars and syngas, and lignin and is:

1) developing process flow diagrams (PFD) and associated economics for specific products, and 2) building supporting economic models for specific unit operations in biobased product processes. The economic models will enable researchers to identify the major cost barriers associated with the steps of a biobased product process.

R&D Pathway

Researchers are developing detailed PFDs for specific

biobased products such as conversion of 1,4-butanediol to succinic acid, conversion of glucose to polyols, and conversion of glucose to acrylic acid. The PFDs are developed using current technology and future “potential” technologies. All of the parameters, such as productivity, rates, and temperature, for each unit operation in the process are defined and used in the development of the economic models.

Excel-based process and economics screening tools are being developed for specific unit operations associated with the production of sugar-based biobased products. Thus far, Bio-Process Economics Screening Tools (BEST) modules have been developed for anaerobic fermentation, aerobic fermentation, hydrogenation/hydrogenolysis, oxidation, and crystallization. Work will continue on separations-based modules (e.g., distillation, filtration) and the ability to link modules is being added.

Bioproducts R&D

Benefits

- Provide production cost estimates of specific products
- Identification of significant cost barriers by unit operation will help focus R&D on the areas with the greatest impact on technical and economic viability

Applications

Analysis and modeling results will streamline the sugar- and syngas-based product development process by enabling easy, preliminary identification of the technology areas/parameters with the greatest impact on technical viability and product economics.

Project Participants

Pacific Northwest National Laboratory

Project Period

FY 2004 – FY 2006

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