



# Biomass Program

## Bioproducts R&D

### Biocatalyst Development for Chemicals

In 2002, Cargill Dow LLC began production of its first biobased product from starch, polylactide polymer (PLA), via lactic acid at the company's new plant in Nebraska. Starch is composed of glucose and represents only a small fraction of our nation's abundant biomass resources; the majority of biomass is a mixture of glucose, other sugars such as xylose, and lignin.

Cargill Dow seeks to expand the capability of its lactic acid producing biocatalyst to include utilization of xylose. This will enable the use of a broader biomass resource base, lowering the cost of PLA production and reducing the use of petroleum resources. To achieve this objective research will focus on developing a xylose fermenting biocatalyst for the production of lactic acid, other chemicals. The biocatalyst will facilitate the conversion of non-food agricultural crops to a variety of chemicals, including polylactide, propylene glycol, acrylates, ethylene, and ethanol.



Photo: NREL

### R&D Pathway

The first step will be to identify the genetic components necessary for efficient utilization of xylose in biocatalysts suitable for commercial production.

In a second step, researchers will incorporate genetic modifications in the best biocatalysts for commercial production of lactic acid and other chemicals, and test the relative performance of these biocatalysts.

As a final step, the most promising strains will be optimized to meet performance targets for volumetric productivity and sugar conversion yield.

### Benefits

- Enables more complete use of existing biomass resources
- Contributes to reduction in use of petroleum for fuels and chemicals

### Applications

This research will increase the utilizable fraction of biomass for chemicals and fuels production, and ultimately make bioproducts more cost-competitive.

### Project Partners

Cargill Dow LLC  
VTT

### Project Period

FY 2002 – FY 2004

### 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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