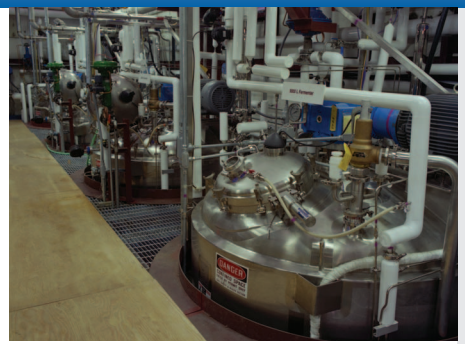
NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Fermentation

Bench-scale to pilot-scale capabilities for the conversion of biomass to sugars, fuels, and chemicals

Photo by Pat Corkery, NREL/PIX 16370

Photo by Pat Corkery, NREL/PIX 16372



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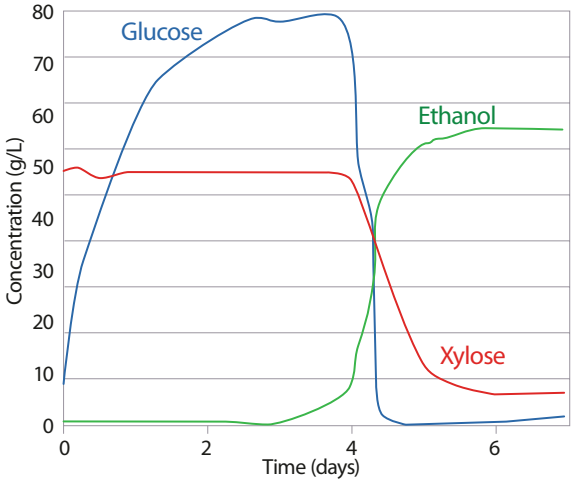

Enzymatic hydrolysis and fermentation of pretreated corn stover

Fermentation applications

- Enzymatic hydrolysis and fermentation testing
  - Different enzyme mixtures
  - Pretreated lignocellulosic feedstocks at low and high solids concentrations
  - Aerobic and micro-aerophilic cultivation processes
- Microorganism evaluation and development
  - Evaluating microorganisms for production of biofuels and bioproducts
  - Producing inhibitor-resistant and high-product-tolerant microorganisms for biofuels production
- Aerobic and heterotrophic algal process development
  - Studying the effect of the environment on algae growth and lipid production
  - Using algae residue as a feedstock for biofuels production

Bench-scale fermentation capabilities

- Fermentation systems with pH, temperature, and dissolved oxygen control
- Data acquisition and recipe control for the Biostat Q and Q-plus systems
- CO_2 and redox measurement capabilities
- At-line analytical equipment capable of monitoring glucose, xylose, ethanol, ammonium, and potassium ion with flexibility to measure other compounds
- Custom built bioreactor for high-solid lignocellulosic biomass slurries

Pilot-scale fermentation capabilities

- Multiple stirred bioreactor systems from 10 L to 100 L
- Two 160-L stirred vessels; two 1,500-L stirred vessels; four 9,000-L stirred vessels
- Feed and support vessels ranging in size from 100 L to 9,000 L

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