



Biobutanol: Butanol from Cellulosic Biomass

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Introduction

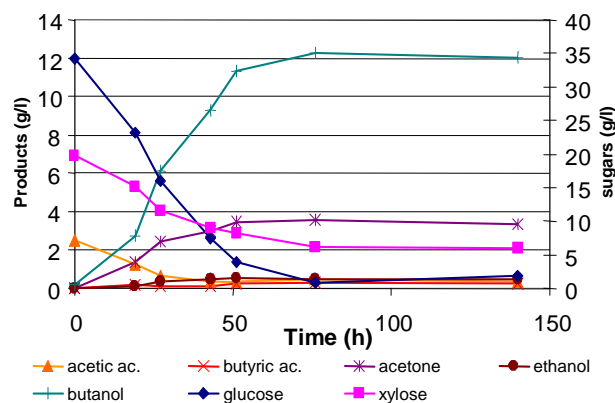
ABE (acetone, butanol, ethanol) fermentation has an industrial past, but competition with the petrochemical industry made it economically unattractive. Owing to new developments in biotechnology and higher oil prices there has been renewed interest in fermentative production of butanol, a platform chemical and alternative biofuel. High substrate costs and low volumetric productivity however remain significant bottlenecks that preclude the return of large-scale application implementation of ABE fermentation. By using our combined experience in biomass pretreatment, anaerobic fermentation, separation technology and energy system design, we are developing new concepts for conversion of biomass into butanol. The ultimate goal is to design a new efficient and economically viable bioprocess for the conversion of low-cost cellulosic feedstocks into butanol.

Objectives

- Reduce substrate costs for ABE fermentation by using (ligno-) cellulosic biomass feedstock
- Improve productivity of ABE by applying high-cell density fermentation and innovative separation techniques
- Develop an efficient and sustainable conversion system for cellulosic biomass into butanol based on:
 - Integration of biomass pretreatment with fermentation
 - In-line butanol recovery from fermentation broth
 - Energy recovery of non-fermentable byproducts



Low-cost, wet biomass (such as grass from maintained grasslands) are primarily composed of lignocellulose and are considered to have great potential as feedstock for fermentative production of biofuels



Batch fermentation of a mixed sugar (glucose/xylose) substrate by *C. beijerinckii*

Achievements to date

- First lignocellulosic hydrolysates tested for fermentability to ABE
- Laboratory bioreactor for continuous fermentation and cell retention developed
- Preliminary system design completed for small and large scale fermentative production of ABE
- Life Cycle Analysis of biomass-to-butanol initiated

Clostridium X meeting in 2008

As part of our on-going programme in ABE fermentation, we will be hosting the tenth Clostridium Meeting in 2008 at Wageningen UR in the Netherlands. For more details please visit the conference website at www.clostridium10.org

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