

Enhancement of enzymatic hydrolysis as milestone for value added processing of ligno-cellulosic residues

AEE – Institute for Sustainable Technologies (AEE INTEC) was founded in 1988 as an independent research association and is now one of the leading institutes for applied research in the fields of solar thermal energy, low-energy and zero energy buildings as well as in energy efficiency in industry. Besides these energy related topics also sustainable water management is a focus area.

Background

Lignocellulosic waste (agricultural, forest residue and food waste etc.) is abundant and considered an important source for producing high-value chemicals and commodities. The conversion of ligno-cellulosic materials is on the one hand important to provide energy alternatives from waste streams to fossil fuels and to sustainably produce chemicals from renewable feedstocks. On the other hand, the amount of lingo-cellulosic waste is tremendous and using this waste as raw material would be one huge step in making our society more resilient towards the devastating resource depletion we are facing. Bioconversion of ligno-cellulosic waste into fuels and chemicals has important technological, commercial and also social dimensions, however developing an economic process still presents a major problem. The goal of this project is to develop a continuous enzymatic hydrolysis process using a plug-flow reactor for the first time with substantial effects on conversion rates and reduction in enzyme addition. The newly developed reactor shall be the basis for a hydrolysis reactor concept eventually applicable in the biobased industry, chemical industry, biodiesel production or pulp and paper industry to save energy, resources and time.

Master-Thesis

In this master thesis lab studies with the newly designed reactor shall be conducted. In the beginning stable and reproducible operating conditions shall be ensured in the new lab plant. Tests with pure alpha-cellulose will be performed with the new reactor in batch mode first to evaluate the flow and operating parameters. Monitoring of mixing-, flow behaviour and energy requirement, sampling and basic product analysis (pH, conductivity, sugar analysis over density) will be performed.

Tests will mimic the reference tests in a stirred tank (not part of the thesis) in terms of particle loadings, enzyme addition, temperature and residence time.

We request...

Thesis written in English or German

Solution-oriented, creative, independent and reliable operation-mode

Desirable: Knowledge of mass and energy balances, knowledge of process engineering, knowledge of practical lab work

We offer...

- Paid thesis, integration into ongoing project, stay abroad in England
- Start: now on
- Duration: 7 month
- Location: AEE INTEC (Gleisdorf)

Contact:

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