

PROJECT

## **ABEFerm**

### **Butanol from biogenic wastes**

#### ***Butanol aus biogenen Reststoffen***

**Funding:** National (Austria)

**Duration:** Jan 2010 - Jan 2011

**Status:** Complete with results



#### **Background & policy context:**

For the purpose of achieving the Kyoto targets, various national and European initiatives and regulations have been set up to replace fossil fuels by biofuels. In addition to biodiesel and ethanol, butanol is another possible biofuel that can be used in certain areas. Unlike biodiesel and bioethanol butanol still plays a subordinate role in biofuel production in Austria.

#### **Objectives:**

The aim of this project is to establish a competitive process for bio butanol production. Therefore, the following partial objectives are formulated: To find the optimal microbiological system, application of innovative substrate preparation, and design and testing of an integrated fermentation and product separation system.

#### **Parent Programmes:**

[A3plus - Alternative Propulsion Systems and Fuels](#)

**Institute type:** Public institution

**Institute name:** Federal Ministry for Transport, Innovation and Technology (BMVIT)

**Funding type:** Public (national/regional/local)

**Other funding sources:** Federal Ministry for Transport, Innovation and Technology (BMVIT)

#### **Partners:**

##### **Vienna University of Technology- Institute of Chemical Engineering**

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##### **PROFACTOR GmbH**

DI Dr Wolfgang Schnitzhofer

##### **BIOGAS SYSTEMS GmbH**

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## **Key Results:**

In the ABEFerm project, a fermentative process for the production of acetone (A), butanol (B) and ethanol (E) was developed based on (pre-treated) wheat bran. The focus was on the selection of more robust strains of microorganisms, on the substrate pre-treatment and the fermentation with simultaneous product separation.

For the bio process different microorganisms have been selected and tested; e.g. Batch fermentations in a stirred tank, where a synthetic sugar mixture was used which corresponds to the composition of the sugar in wheat bran.

The continuous ABE fermentation has been demonstrated in a newly developed bioreactor system with the possibility of an integrated product separation.

For butanol separation different membrane separation processes were tested: The best method was identified as the combination of membrane distillation (MD) with a connected distillation of the permeate flow.

Optimization of processes and thermal interconnections show enormous potential for energy savings.

In a final economic evaluation costs for butanol (at a plant size of 20,000 tons per year) were estimated about 2.5 € / kg. These costs could be lowered by several further measures (efficient substrate pre-treatment, improved implementation, optimized process control).

Findings of the study are published by a final report (short version, German only) which is available online via the Federal Ministry for Transport, Innovation and Technology (BMVIT): [www2.ffg.at/verkehr/file.php?id=459](http://www2.ffg.at/verkehr/file.php?id=459)

**STRIA Roadmaps:** Low-emission alternative energy for transport

**Transport mode:** Multimodal transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Deployment planning/Financing/Market roll-out, Societal/Economic issues

**Geo-spatial type:** Other