

**Team member:** Dipl.-Ing. Thomas Kaeding  
 Dipl.-Ing. Donna Tjahjasari  
**Supervisor:** Prof. Dr. An-Ping Zeng  
**Project term:** 2008 – 2010  
**Financed by:** European Union, 7<sup>th</sup> framework program



## Description:

This project aims to an integrated bioprocess in which low quality glycerol from biodiesel production is mainly converted to 1,3-propanediol, while byproducts are used for biogas and fertilizer production.

A key issue of the project is downstreaming of the 1,3-Propanediol, as this is currently the most energy consuming and therefore cost intensive part of the process.

To access the challenge of an efficient separation a continuous working miniplant is constructed.

Miniplant technology show several advantages for integration of bioconversion to a whole process and optimization of the downstream:

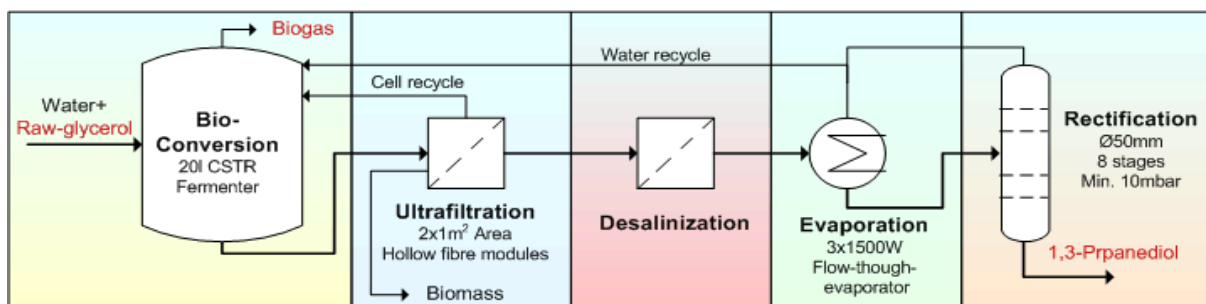
- Very small scale but all are streams and unit operations are included
- Easy scale-up even to industrial scale
- High flexibility for adjustment of apparatus and parameters
- High flexibility for integration of alternative unit operations



**Fig. 1. Miniplant for 1,3-propanediol production**

In first tests the bioconversions could already successfully be combined with ultra filtration for biomass separation instead of centrifugation as former published (Grothe 2000). In this way even proteins could be removed, thus minimizing the foaming effect in later evaporation/ rectification.

The next challenging tasks include: (1) developing an effective and low energy-consuming desalination step to remove organic and inorganic salts from the fermentation broth, (2) integrating all the unit operations into a continuously working miniplant with recycle or reuse of process water and energy.



**Fig. 2: Flowsheet with present configuration of the Miniplant for 1,3-Propanediol production**

## References

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## Contact: Prof. Dr. An-Ping Zeng

Institute of Bioprocess and Biosystems Engineering, Technical University Hamburg-Harburg.  
 Denickestrasse 15, D-21073 Hamburg, Germany.  
 Phone: +49-40-42878-4183 Email: [aze@tu-harburg.de](mailto:aze@tu-harburg.de) Web: [www.tu-harburg.de/ibb](http://www.tu-harburg.de/ibb)