

Coordinator:
Team at TUHH:

Prof. Dr. An-Ping Zeng
 Prof. Dr. An-Ping Zeng, Dipl.-Ing. T. Kaeding,
 Dipl.-Ing. D. Tjahjasari, O. Aydogan M.Sc.,
 Dr. M. Bizukojc, Dr. J. Sun



Project term:
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Description:

About 10% of technical glycerol is produced as by-product in the manufacture of biodiesel. The fast growth of biodiesel industry leads to overcapacity of glycerol production, driving its price down. The plentiful availability and low price turn raw glycerol into an ideal platform substrate.

This project aims at developing an integrated bioprocess in which low-quality glycerol is converted to 1,3-propanediol, while byproducts are used for biogas and fertilizer production. Downstream processing of the products is also integrated to develop a process with high overall efficiency, which leads to a bio-refinery with minimum waste output and low energy consumption.

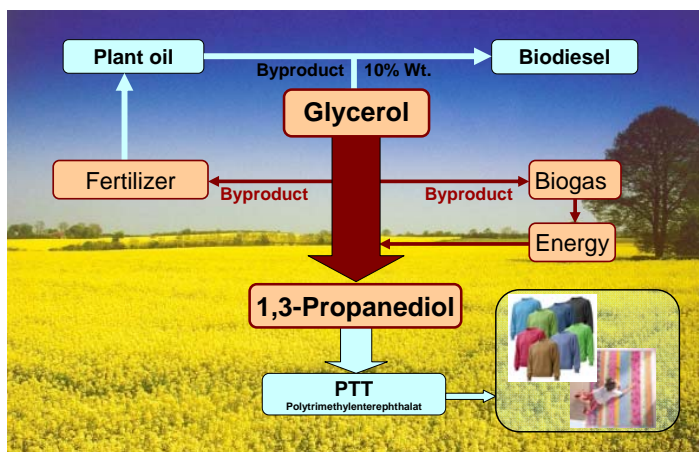


Fig. 1: Bio-refinery of glycerol to value added products.

One of the major objectives at TUHH is the development of a new integrated bioconversion process in which 1,3-propanediol and biogas are produced simultaneously. This objective is partly realized in our recent preliminary results (refer to the report “Bioconversion of industrial glycerol to 1,3-propanediol using microbial community from anaerobic sludge”).

Another objective is the downstream processing of 1,3-propanediol, the most energy consuming and therefore cost intensive part of the whole process. Miniplant technology is established to investigate the process integration and to implement new alternative unit operations e.g. reverse osmosis or pervaporation (refer to the report “Propanergy – miniplant technology in 1,3-propandiol production”).

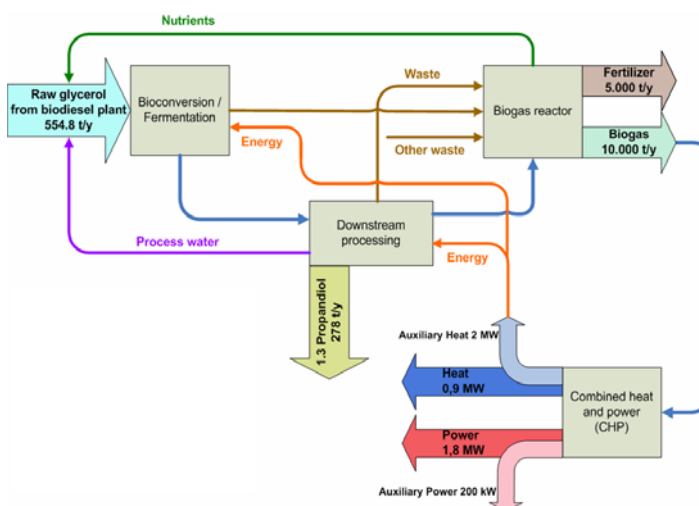


Fig. 2: Concept of an integrated process for new use of glycerine in biorefinery

Based on the results at TUHH, a pilot plant is to be set up by our industrial partners at the end of the project.

For further information on this project, please visit:

<http://www.propanergy.eu> 

References

- Z.-L. Xiu and A.-P. Zeng (2008). Present state and perspective of downstream processing of biologically produced 1,3-propanediol and 2,3-butanediol. *Appl Microbiol Biotechnol.* 78(6):917-26
- E. Grothe (2000). *Konzeption und Wirtschaftlichkeit der industriellen Glycerinvergärung zu 1,3- Propandiol*, VDI, Düsseldorf, Germany

Contact: Prof. Dr. An-Ping Zeng

Institute of Bioprocess and Biosystems Engineering, Hamburg University of Technology
 Denickestrasse 15, D-21073 Hamburg, Germany.
 Phone: +49-40-42878-4183 Email: aze@tuhh.de Web: www.tuhh.de/ibb