

BE2020/MASIII
BIOENERGY 2020+ GmbH/Mixed Alcohols III
Programme: COMET – Competence Centers for Excellent Technologies
Programme line:K1-Centres
COMET subproject, duration and type of project:
MAS III, 10/2015 – 10/2017, multi-firm

Wood as feedstock for the chemical industry

BIOENERGY 2020+ successfully completed a research project regarding mixed alcohol synthesis with an international consortium. This is a further step from laboratory towards industry, to use regional available biomass as feedstock for production of goods for the chemical industry and of transportation fuel.



Background and process steps

BIOENERGY 2020+ is working since 2009 on advanced conversion technologies to produce chemicals from wood. In Güssing research and development on synthesis are done, aiming for the production of e.g. diesel, kerosene, methane, hydrogen, and alcohols. National Partners are REPOTEC, an experienced biomass power plant engineering company, Vienna University of Technology and Graz University of Technology. In the USA, the conditions for alcohol as fuel blend are beneficial and there is a strong interest in the cooperation on this topic. The related project opened the US-market for BIOENERGY 2020+, which led to a further internationalization of the research center.

The process in a nutshell: Wood gas is conditioned, compressed and fed into the synthesis reactor. A special catalyst, which is developed and provided by the partner Albemarle, is used. This catalyst is widely resistant against sulfur and other catalyst-poisons and therefore ensures the long-term operation stability of the process at high conversion rates. The outlet stream from the synthesis reactor is cooled, the alcohols are condensed and can be separated as liquid product.



Successful Scale-Up-Demonstration

BIOENERGY 2020+ operates a lab-scale mixed alcohol unit with real wood gas. Wood gas is converted to a mixture of alcohols, this process is therefore called mixed alcohol synthesis. The produced alcohols are suitable feedstock for chemical industry and transportation fuel. In the third mixed-alcohol-synthesis project, BIOENERGY 2020+ achieves a long term testing (1020 hours of operation) and a model based control system. The Californian project partner West Biofuels could successfully demonstrate the scale-up, an optimized pilot unit was build and commissioned. Knowledge about the long-term stability and the influence of the larger scale are important research findings to get the mixed-alcohol-synthesis to industrial use.

The project partners of the international consortium were Albemarle Corporation (the Netherlands/USA), REPOTEC GmbH & Co KG, TU Graz, TU Wien, UC San Diego (California, USA) und West Biofuels (California, USA). The project manager of the two year project was Matthias Binder from BIOENERGY 2020+. The project was funded within the COMET program which is managed by the Austrian Research Promoting Agency (FFG).



Fig. 1: Pilot plant Mixed Alcohols; © Matt Hoffman, West Biofuels



Impact and effects

State of the art feedstock for wood gas production is forest wood chips, future feedstock could be any biomass residue or waste. This results in a low carbon footprint and there is no competition between food and fuel.

There are currently negotiations on a follow up project and there is great international interest to continue.

Matthias Binder: „Our goal is to utilize regional biomass as feedstock for chemicals and fuel.

We are proud that, due to the research findings, we are getting closer to achieving this ambitious goal.”

Contact and information

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Project partners

Organisation	Country
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UC San Diego	USA
West Biofuels	USA
REPOTEC GmbH & Co KG	Austria
TU Wien/TU Graz	Austria

Further information on COMET – Competence Centers for Excellent Technologies: www.ffg.at/comet

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