



**BIO** *2021*  
**REFINERY**

Biorefinery of the Future

**Cluster BIOREFINERY2021**

Phase 2

Extension of the sable biomass resources

## BIOREFINERY2021 – New approaches towards an integrated biorefinery

### Research for utilization of plant biomass

The limited availability of fossil raw materials and the increasing energy demand require a more intensive use of the great potentials of biomass in the future. In this context, especially linked conversion pathways for the energetic and substantial utilization of biomass, a so-called cascaded utilization, are a promising approach. Even plant residues and waste materials can be used for the production of energy and raw materials in integrated biorefineries by means of innovative biotechnological treatments.

### BIOREFINERY2021 – New approaches towards an integrated biorefinery

Since 2009, partners from science and industry have been working on a biorefinery model of the future under the guidance of Hamburg University of Technology (TUHH). Objectives of the BIOREFINERY2021-cluster, which is supported by BMBF, are the forced development of innovative and realistic concepts for a biorefinery and their realization in lab and pilot scale.

### BIOREFINERY2021 – Clever components

The partners from industry and science have identified two main elements for the development of an economically and ecologically beneficial biorefinery concept: Preparation of high-quality raw materials for the chemical industry and the efficient utilization of side product streams. The material use of the valuable substance lignin from lignocelluloses represents a useful opportunity to achieve these targets.

### BIOREFINERY2021 – Phase 2 – Extension of the stable biomass resources

BIOREFINERY2021 is focused on the production and analysis of lignin for the application in an everyday product. Phase 2 started on June 1st, 2013. The funding period is 2.5 years.

### BIOREFINERY2021 – Phase 2 – Consortium

The interdisciplinary networking of microbiologists, chemists, engineers and industry representatives enables the implementation of basic knowledge in innovative concepts as well as commercial realization. Partners of phase 2 are the TUHH with the institutes of "Thermal Separation Processes", "Solids Process Engineering & Particle Technology" and "Environmental Technology and Energy Economics", the "Thünen Institute for Wood Research" in Hamburg, the companies tesa SE, Hamburg, Sigmar Mothes Hochdrucktechnik GmbH, Berlin as well as TuTech Innovation GmbH, Hamburg.



## BIOREFINERY – Phase 2 – Analysis and evaluation

A three-step approach is planned for analysis and evaluation of the production of filling materials and additives for bonding agents on the basis of lignin in the context of an integrated biorefinery:

### Concept development and technical analysis

- Technical analysis of the lignin production as well as integration into a biorefinery concept in consideration of the experimental results of the optimized hot water hydrolysis with subsequent lignin pyrolysis.
- Up-scaling of the obtained results to industrial scale.
- Development of heat integration and heat supply concepts

### Cost and profitability analysis

Analysis of the developed and optimized biorefinery concepts for the material use of the lignin in bonding agents.

- Comparison of the production costs of the developed bonding agent basis products and fair market values of conventional reference products.
- Identification of the cost reduction potential of the bioethanol production by comparison of the material and the energetic use of the lignin.

### Ecological Analysis

- Analysis of the developed biorefinery concepts by means of ecological criteria under consideration of the whole lifecycle.
- On the basis of mass and energy balances from the technical analysis, ecological effects in the whole lifecycle are investigated and quantified by means of an eco-balance.



**BIO** *2021*  
**REFINERY**

Biorefinery of the Future

BIOREFINERY2021 Clustermanagement

Hamburg University of Technology  
c/o TuTech Innovation GmbH  
Harburger Schloßstraße 6-12, D-21079 Hamburg  
Phone: +49 40 76629-6344  
E-Mail [bioraffinerie2021@tutech.de](mailto:bioraffinerie2021@tutech.de)  
[www.bioraffinerie2021.de](http://www.bioraffinerie2021.de)