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BIOBASED PHENOLS: ELECTROCHEMICAL DEGRADATION OF LIGNIN

S. Gutom, A. Popp, Dr. H. Strittmatter, Dr. L. Vieira, Prof. Dr. V. Sieber
Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB | Bio, Electro and Chemocatalysis BioCat, Straubing branch
Schulgasse 11a | 94315 Straubing | Germany | Phone +49 9421 187-350 | harald.strittmatter@igb.fraunhofer.de | www.igb.fraunhofer.de

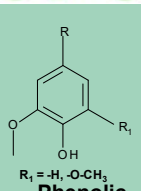
Lignin Biorefinery Approach using Electrochemical Flow
Call: CE-SPIRE-02-2018: Processing of material feedstock using non-conventional energy sources

Liberate

Organosolv Lignin

Reaction mixture
- **High boiling solvent**
- **NaOH**

Electrochemical Flow Cell
(Condias)



R_1 = -H, -O-CH_3

Phenolic Mixture
Monomers and Oligomers

Project goals:

- **Development of a continuous process for the production of a bio-based substitute for fossil phenol by electrochemical degradation of lignin**
  - Selection of the most suitable quality of organosolv lignin
    - Lignin from hard wood
    - Lignin from soft wood
    - Wheat straw lignin
  - Optimization of reaction parameters by Design of Experiment (DOE). Relevant parameters:
    - Current density
    - Reaction temperature
    - Residence time
    - Lignin concentration
    - Development of a continuous process for the production of a bio-based substitute for fossil phenol
  - Development of a work-up procedure
- **Pilot Plant trials**

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Test of different qualities of organosolv lignin:

Table 1: Product yield of different lignins. BEC = Beech, SPR = Spruce, WHS = Wheat Straw, PWS = Pretreated Wheat Straw

GC analysis of volatile products

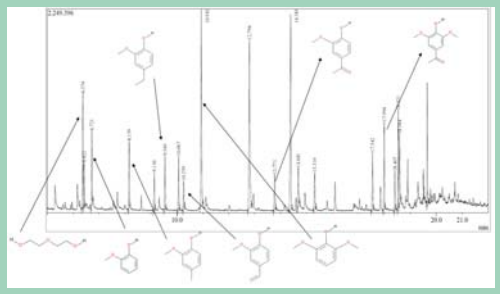

Figure 1: GC-MS of the product mixture obtained by electro-chemical degradation of lignin