



Fraunhofer

CBP

FRAUNHOFER CENTER FOR CHEMICAL-
BIOTECHNOLOGICAL PROCESSES CBP

PROCESSING OF RAW MATERIALS



RANGE OF SERVICES

The focus in the area of raw material processing is on the extraction and pulping of biomass, especially on the fractionation of lignocellulosic feedstock into the constituents lignin, sugars and pulp. An integrated pilot plant is available for research and development of fractionation technologies. Here, up to 70 kg (DS) of wood can be processed daily.

We offer

- Scale-up of processes
- Integrated process development and optimization (energy and raw material efficiency)
- Process analytics
- Process and product expertise in the area of Organosolv pulping

Product portfolio

Supply with products from the Organosolv process

- Sulfur-free high-purity lignin
- Pulp
- Glucose
- Hemicelluloses



EQUIPMENT

- Fixed-bed reactor (400 liters, 36 bar, ATEX compliant) with forced circulation and separate supply and discharge tanks
- Precipitation tanks (up to 1200 liters, can be cooled and stirred, with continuous solvent evaporation, ATEX compliant)
- Equipment for disintegration, washing and dewatering of pulp
- Tanks for enzymatic hydrolysis and extraction of pulp with spiral agitators for high solid loadings (2 x 800 liters, pH and T control)
- Falling film evaporator for the concentration of sugar solutions
- Rectification for the recovery of solvents (1000 liters, ATEX compliant)

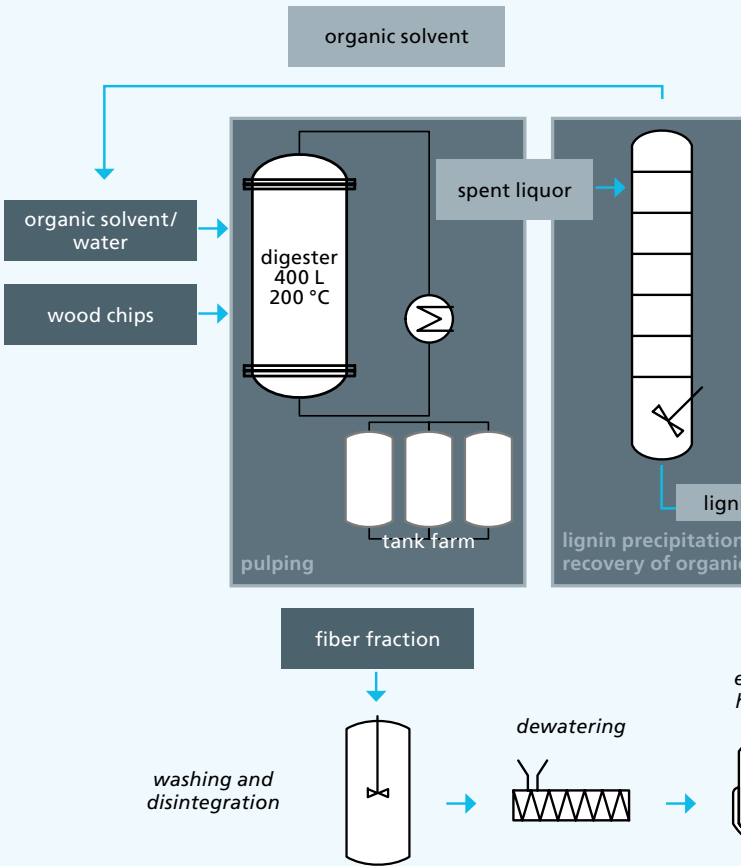


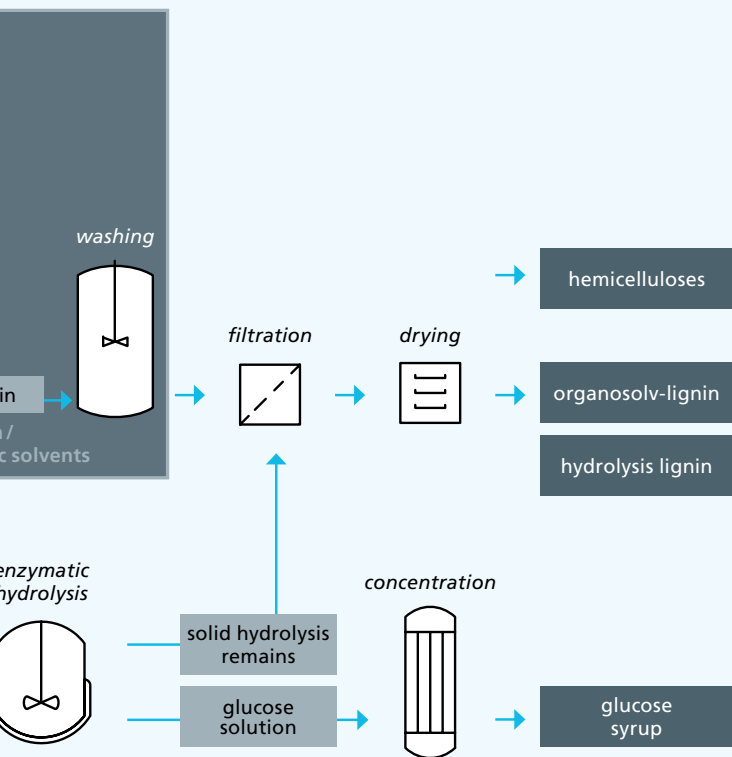
CORE COMPETENCE ORGANO SOLV

1. Pulping of lignocellulosic feedstock is carried out in a 400 liter fixed-bed reactor at temperatures up to 200°C, during which lignin and hemicelluloses are dissolved in the ethanol-water mixture.
2. Additional tanks and heat exchangers allow efficient displacement washing of pulp at reaction conditions.
3. Lignin is precipitated from the black liquor by addition of water or by distillation of ethanol, filtered, washed and dried.
4. From the filtrate, ethanol is completely recovered by distillation while the hemicellulosic sugars remain in aqueous solution.
5. The pulp is disintegrated, washed and dewatered. If necessary, the pulp can be mixed with enzymes and hydrolyzed at high solid loadings in specially designed stirred reactors. Glucose solution is obtained after a subsequent filtration step and concentrated to a syrup for stabilization using falling-film evaporation.



PROCESS SCHEME







REFERENCES

Pulping and extraction

- Soda pulping in cooperation with the Technische Universität Dresden as part of the ERA-IB2 project »Products from lignocellulose«
- FABIOLA™: low temperature process based on aqueous acetone, developed by the Energy Research Center of the Netherlands ECN
- Alkaline ethanol-based Organosolv digestion of wheat straw on behalf of the Annikki GmbH, Raaba-Grambach, Austria, developer and owner of the process
- Alkaline extraction of hemicellulose from paper pulp in cooperation with the University of Hamburg in the framework of the FP7-funded CarboPrec project

Variety of starting materials

- Beech wood
- Spruce
- Waste wood
- Eucalyptus
- Wheat straw
- Miscanthus

CONTACT

Fraunhofer Center for Chemical-Biotechnological Processes CBP

Am Haupttor (Gate 12, Building 1251)

06237 Leuna

Germany

www.cbp.fraunhofer.de

Dr. Fabian Steffler

Group Manager Biomass Fractionation

Phone +49 3461 43-9124

fabian.steffler@igb.fraunhofer.de

Dr. Ireen Gebauer

Project Manager Biomass Fractionation

Phone +49 3461 43-9133

ireen.gebauer@cbp.fraunhofer.de

Marlen Verges

Project Manager Biomass Fractionation

Phone +49 3461 43-9129

marlen.verges@cbp.fraunhofer.de