

BiBAH – Biobased Black-Liquor Aero- and Hydrogels

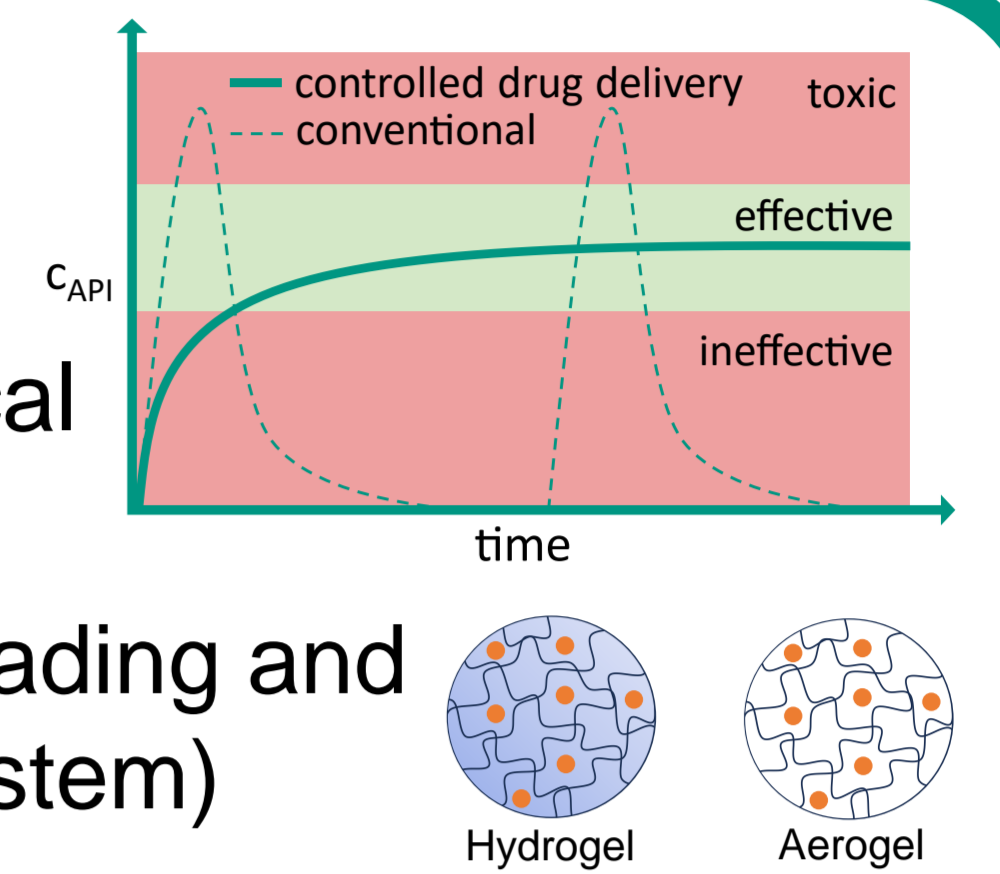
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Concept

- Material instead of thermal use
- Production of bio-based high-tech products
- Possible integration into the existing Kraft process in consideration of energy supply

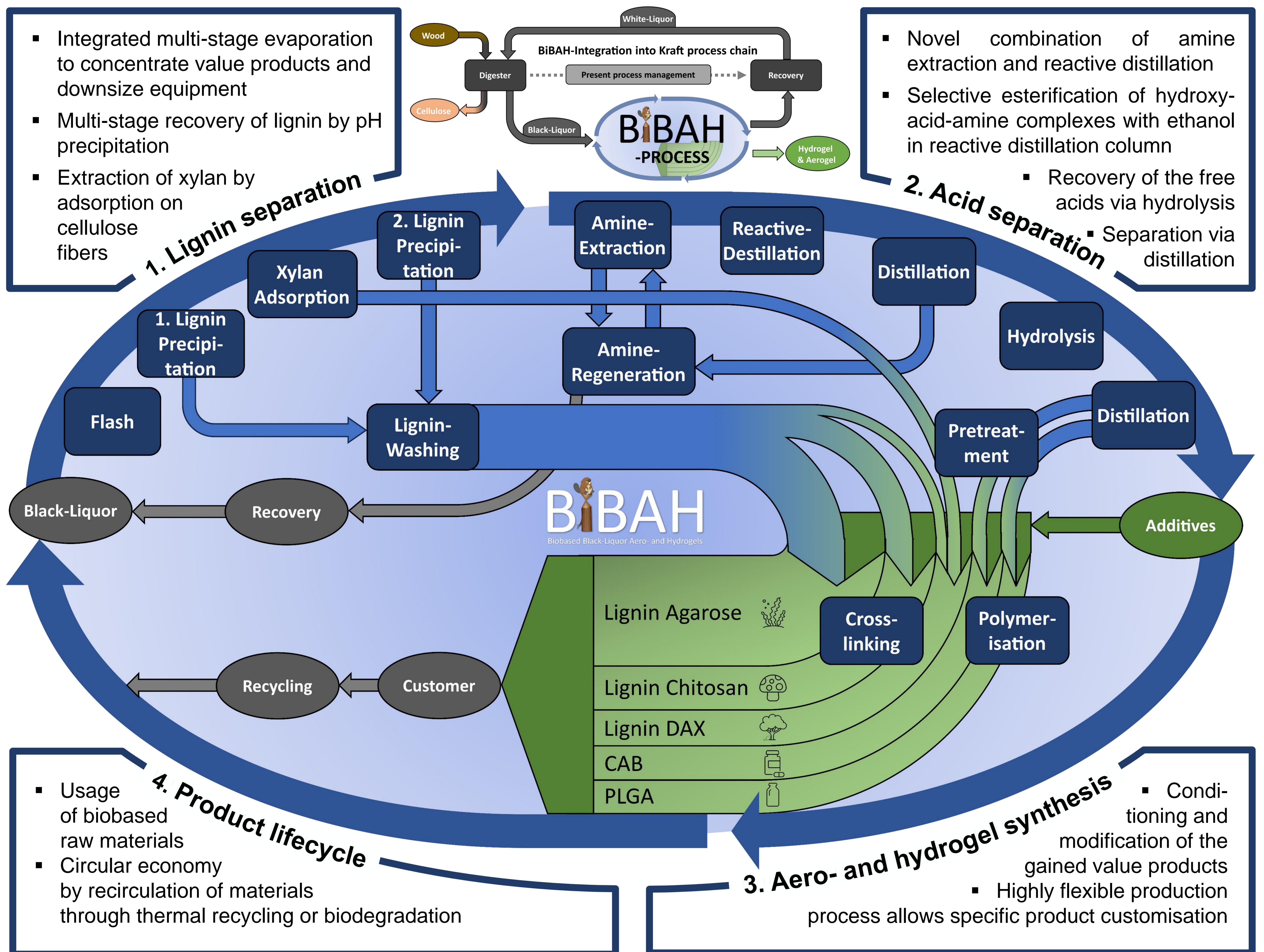
Products

- High-value hydro- and aerogels for medical appliances
- Cross-linked polymer from biological chain formers
- Controlled swelling/shrinking for loading and releasing of APIs (drug delivery system)



- Integrated multi-stage evaporation to concentrate value products and downsize equipment
- Multi-stage recovery of lignin by pH precipitation
- Extraction of xylan by adsorption on cellulose fibers

- Novel combination of amine extraction and reactive distillation
- Selective esterification of hydroxy-acid-amine complexes with ethanol in reactive distillation column
 - Recovery of the free acids via hydrolysis
 - Separation via distillation



- Usage of biobased raw materials
- Circular economy by recirculation of materials through thermal recycling or biodegradation

- Conditioning and modification of the gained value products
- Highly flexible production process allows specific product customisation

Key indicators

- 56 % material utilization of black-liquor
- 63 kt/a production capacity
- 52 % CO₂-reduction compared to combustion
- 291 mio. € investment costs
- 167 mio. €/a profit before depreciation and amortization
- 2 years pay-off period
- High market growth: CAGR: 6 %¹ resp. 19 %²

¹ <https://www.precedenceresearch.com/hydrogel-market>; ² <https://www.alliedmarketresearch.com/aerogel-market>

Highlights

- No wastewater treatment necessary
- Selective acid separation due to novel reactive distillation
- Sustainable and biobased medical products
- Flexible production lines with the possibility of entering new markets
- Customer specific solutions for drug delivery systems