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Organosolv pulping has originally been developed for the production of paper pulp as environmentally benign alternative to the conventional Kraft process. An important advantage of Organosolv is its applicability to a wider range of feedstocks, including Si-containing agricultural residues. The ECN Organosolv process has been particularly developed for producing enzymatically digestible cellulose and high-purity lignin, requiring different process conditions, feedstock pretreatment, and pulp post-treatment[1,2].

Ten potential feedstocks were ranked on nine criteria in order to determine the most attractive feedstocks. The feedstocks that ranked highest were wheat straw, softwood, and bagasse.

These feedstocks have been fractionated in a batch reactor under various conditions, followed by determination of optimum processing conditions for each feedstock. A balance was sought between optimum conditions regarding pulp purity and glucose yield and high-purity lignin production.

For process evaluation of an organosolv based process converting wheat straw into furans, furfuryl alcohol and lignin was modelled. The lignin was used as a substitute for phenol in wood boards and was found to be the largest product flow (on mass basis). Lignin valorization beyond its mere combustion value is key to development of an economic process. Furthermore, efficient solvent recycling and heat integration of the process were found to be crucial to develop an economic organosolv-based biorefinery.

For the scale-up of the Organosolv process, some key design issues have been established and will be discussed.

1. J. Wildschut et al. (2013) Bioresource Technology, 135, 58

2. A.J.J.E Eerhart et al. (2014) RCS Advances 4 (7), 3536

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