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## DEPOLYMERIZATION OF FRACTIONATED WOOD BY HYDROTHERMAL LIQUEFACTION

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Direct thermochemical conversion of lignocellulosic biomass produces a mixture of compounds that have to be separated to produce purified building blocks. Moreover, lignin derived products have a detrimental effect on further biological conversion processes, such as fermentation. For all these reasons, it is important to develop an integrated approach for a better fractionation and valorisation of macromolecules (carbohydrates and lignin) in bio-refineries.

In this work, wood is fractionated producing cellulose-rich pulps that are converted by hydrothermal liquefaction into fermentable sugars (*Figure 1*). For this purpose, beech has been delignified either by ethanol organosolv or by sodium chlorite/acetic acid (SC/AA) treatment, obtaining delignification yields of 50 and 91 wt. % respectively. The recovered pulps were then submitted to liquefaction in hot-compressed water (HCW). Three temperatures were studied: 180, 200 and 220°C during 2 h. The same experiments were conducted on untreated beech and model cellulose (Avicel PH-101). Product yields and total carbohydrates were determined. The liquefaction products, i.e. solid residue, water soluble compounds and permanent gas, were analyzed respectively by X-ray diffraction (XRD), high performance anion-exchange chromatography with pulsed amperometric detector (HPAEC-PAD) and gas chromatography (GC). SC/AA treatment allowed a high recovery of hemicelluloses and for this reason, xylose content was significantly higher for the SC/AA pulp. The maximum yields of total carbohydrates, i.e. 13.7 and 36.8 wt.% from the organosolv and SC/AA pulp respectively, were found when the liquefaction temperature was 220°C.

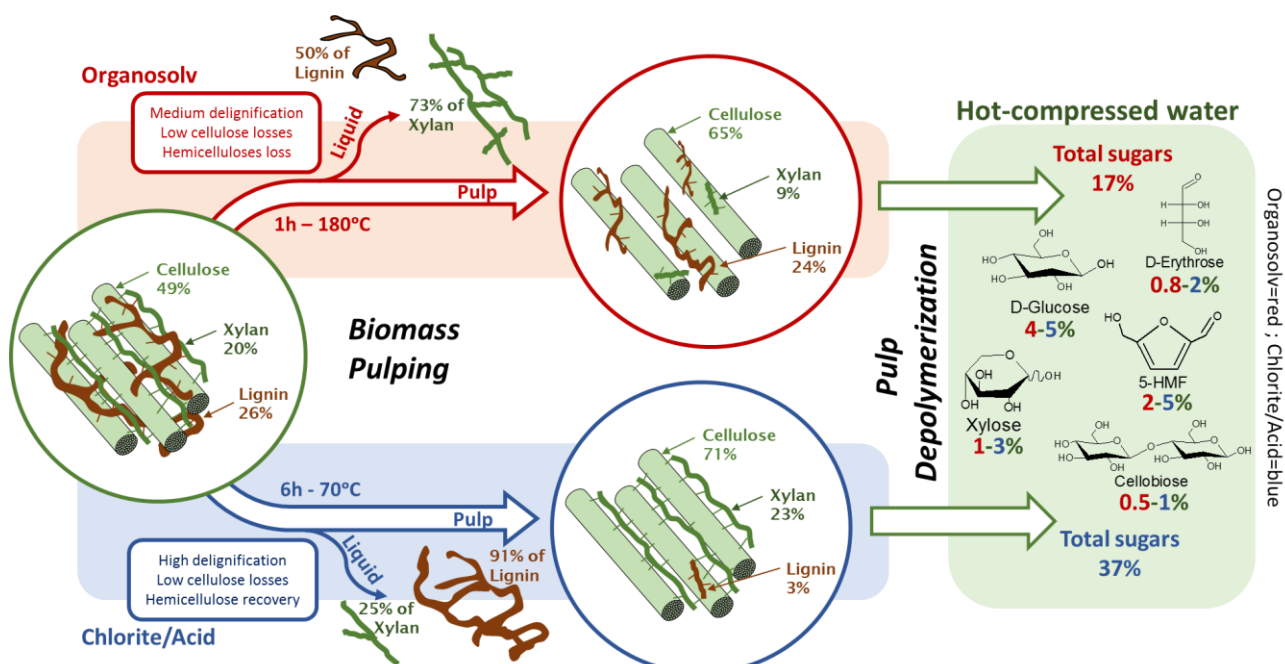


Figure 1 - Schematic representation of the hydrothermal conversion of the wood pulps. Typical yields of the most representatives compounds are indicated.