

Direct and Selective Conversion of Hemicellulose to Furfural from Various Lignocellulosic Biomass Sources

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Furfural is a useful chemical that can be derived from biomass. A direct and selective method for furfural preparation from a range of biomass sources: switchgrass, poplar wood, and pine wood was investigated. A maleic acid treatment of biomass selectively hydrolyzes the hemicellulose (xylans) producing a xylose-rich solution and a lignin-cellulose rich solid with limited xylose degradation. The lignocellulose is removed by simple filtration. Subsequent reaction of the xylose-rich solutions with excess ZnCl_2 (0.25M) produces furfural in very good yields (ca. 70%) at 200°C and 10 minutes. This method has advantages to other processes including: the use of water as a solvent, avoidance of strong Brøsted acids (*e.g.* H_2SO_4), polysaccharide hydrolysis selectivity, speed of process, and potential for scale up.