Structural characterization of solid residue obtained from hydrothermal pretreatment of sunflower stalk followed by enzymatic hydrolysis

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Recently, the production of fermentable sugar from lignocellulosic biomass represents one of the main feedstocks for new generation bio-fuel, chemical and polymer production. During fermentable sugar production, solid residue is inevitably generated but, unlike sugar, is being utilized as a low-grade boiler fuel. To improve cost-effectiveness and optimize biomass uses effective valorization of solid residue is also needed. Solid residue is mainly composed of lignin is the second most abundant natural phenolic macromolecule. Therefore, solid residue potentially serves as a source for phenolic based chemicals. The objectives of this study were to structurally characterize solid residue obtained from hydrothermally pretreated lignocellulosics followed by enzymatic hydrolysis. In addition, efficient solvent extraction was performed to prepare high purity lignin fractions. As expected, lignin content in solid residue pretreated at 200°C is higher than that of pretreated solid at 180°C. The yields of organic solvent soluble fractions are in a range between 31 and 36% depending on solvent used for extraction. In particular, the fraction contained high amount of lignin.