

Optimization of Dilute Acid Pretreatment of Rapeseed straw for the Bioethanol Production using Severity index

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Biological conversion of biomass into fuels and chemicals requires hydrolysis of the polysaccharide fraction into monomeric sugars. In this study, dilute sulfuric acid used as a catalyst for the pretreatment of rapeseed straw. The purpose of this study is to optimize the pretreatment process in a 15ml bomb tube reactor and investigate the effects of the acid concentration, temperature and reaction time on the hemicellulose removal and consequently on the production of sugars (xylose, glucose and arabinose) as well as on the formation of by-products (furfural, 5-hydroxymethylfurfural formic acid and acetic acid). Confirm effect that reaction time, reaction temperature and acid concentration gets in pretreatment because uses Severity index and did so that optimize Rapeseed straw pretreatment condition. The obtained optimum conditions were: acid concentration of pH 1.251 H₂SO₄, temperature of 141.7 °C with a reaction time of 21min. Under these conditions, 82.37% of the total XMG was recovered and the hydrolysate contained glucan 1.403 g/L, XMG 10.142 g/L, formic acid 0.673 g/L, acetic acid 2.899 g/L, 5-HMF 0.087 g/L and furfural 0.515 g/L.