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Integration of facile deep eutectic solvents pretreatment for enhanced enzymatic hydrolysis and lignin valorization from industrial xylose residue

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Highlights

Xylose residue was valorized into cellulose and lignin by DESs pretreatment.

Betaine/lactic acid system exhibited outstanding delignification efficiency of 81.6%.

Enzymatic digestibility was significantly increased from 55.3% to 96.8%.

The lignin had high purity, low molecular weight and polydispersity.

Abstract

In this study, a novel biomass pretreatment process using three kinds of deep eutectic solvents (DESs) was developed to improve saccharification efficiency and lignin valorization. The major components of xylose residue including cellulose and lignin fractions were released, recovered and utilized. Pretreatment with betaine/lactic acid system at 120 °C for 2 h was found to be the optimal conditions with prominently increased enzymatic digestibility (from 55.3% to 96.8%). The efficient conversion was mainly ascribed to the significant delignification efficiency of 81.6% after betaine/lactic

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