

One-pot furfural production using choline chloride-dicarboxylic acid based deep eutectic solvents under mild conditions

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ABSTRACT

The performances of various anhydrous and aqueous choline chloride-dicarboxylic acid based deep eutectic solvents (DESs) were evaluated for furfural production from oil palm fronds without any additional catalyst. The effects of different carbon chain length dicarboxylic acids and water content in each DES on furfural production were investigated. Oil palm fronds, DES and water (0–5 ml) were mixed and reacted in an oil bath (60–300 min). Reacted oil palm fronds had the potential to be reused as cellulose-rich-valuable by-products. At 100 °C, aqueous choline chloride-oxalic acid (16.4 wt% H₂O) produced the highest furfural yield of 26.34% and cellulose composition up to 72.79% in the reacted oil palm fronds. Despite operating at suitable reaction duration for dicarboxylic acid with longer carbon chain length, aqueous choline chloride-malonic acid and aqueous choline chloride-succinic acid performed poorly with furfural yield of less than 1%.

KEYWORDS:

Biorefinery; Oil palm fronds; Oxalic acid; Malonic acid; Succinic acid