ABSTRACT

Pretreatment may result in the formation of inhibitory phenolic compounds that may obstruct the cellulolytic bioconversion of substrate into fermentable saccharides. The halophyte *Atriplex crassifolia* was subjected to pretreatment by novel deep eutectic solvents (DES). The eutectic mixture was composed of choline chloride and lactic acid in a 1: 2 molar ratio. After pretreatment the lignocellulosic biomass was subjected to compositional analysis. The maximum cellulosic, hemicellulosic content and maximum delignification was found as 60.4%, 20.2% and 6.5% respectively. The pretreated substrate was subjected to different strategies (washing with distilled water, treatment with organic solvents i.e. ethanol, propanol, methanol and acetone, treatment with alkali [$Ca(OH)_2$] and treatment with activated charcoal) for the elimination of phenolic compounds. Maximum reduction in TPC was observed in a substrate treated with methanol i.e. 125 ± 0.05 mg gallic acid equivalent (GAE) per g dry weight (DW) of substrate. Upon optimization of reaction parameters (incubating 0.5g of substrate with 20 mL of methanol at 30 °C for 40 minutes) the minimum TPC of 60 ± 0.05 mg GAE/g DW was observed. After removal of inhibitory phenolic compounds, the substrate was subjected to enzymatic saccharification by commercial cellulases. Upon optimization of reaction parameters (incubating 80 U of enzyme with 200 mg of pretreated substrate for 6 hours at 75°C) an enhanced saccharification rate of 25.6% was observed. The reducing sugar slurry obtained from the saccharified biomass may be used for the generation of eco-friendly biofuels and other value added products.