

Microwave-Assisted Inorganic Salt Pretreatment of Sugarcane Leaf Waste

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Abstract : The objective of this study was to develop a method to pretreat sugarcane leaf waste using microwave-assisted (MA) inorganic salt. The effects of process parameters of salt concentration, microwave power intensity and pretreatment time on reducing sugar yield from enzymatically hydrolysed sugarcane leaf waste were investigated. Pretreatment models based on MA-NaCl, MA-ZnCl₂ and MA-FeCl₃ were developed. Maximum reducing sugar yield of 0.406 g/g was obtained with 2 M FeCl₃ at 700W for 3.5 min. Scanning electron microscopy (SEM) and Fourier Transform Infrared analysis (FTIR) showed major changes in lignocellulosic structure after MA-FeCl₃ pretreatment with 71.5 % hemicellulose solubilization. This pretreatment was further assessed on sorghum leaves and Napier grass under optimal MA-FeCl₃ conditions. A 2 fold and 3.1-fold increase in sugar yield respectively were observed compared to previous reports. This pretreatment was highly effective for enhancing enzymatic saccharification of lignocellulosic biomass.

Keywords : acid, pretreatment, salt, sugarcane leaves

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