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CELLULOSIC ETHANOL FROM STEAM-TREATED SUGARCANE BAGASSE

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ABSTRACT

Production of cellulosic ethanol from acid-catalysed steam-treated sugarcane bagasse (195°C, 7.5 min, 9.5 mg H₃PO₄/g of dry bagasse) was investigated using unwashed (STB-UW) and water-washed (STB-WW) substrates. Separate hydrolysis and fermentation (SHF) of STB-WW gave better results than STB-UW. The percentage of saccharification was 82.81±1.85% for STB-WW and 45.27±1.21% for STB-UW, revealing the favorable effect of water-washing on the conversion of cellulose to glucose and cellobiose. However, the inhibitory effect of pretreatment by-products was even more pronounced on yeast growth. Ethanol production was 23.5±0.96 g.L⁻¹ and 0.9±0.25 g.L⁻¹ for STB-WW and STB-UW, respectively. Hence, high yields of hydrolysis and fermentation were only achievable when the pretreated material was subjected to a pre-washing step to remove most of the water-soluble compounds that are generated during pretreatment.