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Ethanol production in a simultaneous saccharification and fermentation process with interconnected reactors employing hydrodynamic cavitation-pretreated sugarcane bagasse as raw material

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Abstract

In this study, sugarcane bagasse (SCB) pretreated with alkali assisted hydrodynamic cavitation (HC) was investigated for simultaneous saccharification and fermentation (SSF) process for bioethanol production in interconnected column reactors using immobilized *Scheffersomyces stipitis* NRRL-Y7124. Initially, HC was employed for the evaluation of the reagent used in alkaline pretreatment. Alkalis (NaOH, KOH, Na₂CO₃, Ca(OH)₂) and NaOH recycled black liquor (successive batches) were used and their pretreatment effectiveness was assessed considering the solid composition and its enzymatic digestibility. In SSF process using NaOH-HC pretreatment SCB, 62.33% of total carbohydrate fractions were hydrolyzed and 17.26 g/L of ethanol production (0.48 g of ethanol/g of glucose and xylose consumed) was achieved. This proposed scheme of HC-assisted NaOH pretreatment together with our interconnected column reactors showed to be an interesting new approach for biorefineries.

Keywords: Hydrodynamic cavitation; Alkaline pretreatment; Sugarcane bagasse;

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