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A biorefinery-based approach for the production of ethanol from enzymatically hydrolysed cotton stalks

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Abstract

Cotton post-harvest residue/cotton stalk (CS) - a major agro-residue in south asian countries was evaluated as a feed stock for bioethanol production. The common thermochemical pretreatment strategies based on dilute acid and alkali and different combinations of biomass hydrolyzing enzymes were evaluated for saccharification of CS biomass. A hydrolytic efficiency of 80% was achieved for alkali treated biomass using cellulase supplemented with beta glucosidase. Recycling of undigested/residual biomass and /or enzyme supported same final sugar concentration as for fresh hydrolytic experiments. Fermentation was carried out using a novel, inhibitor-resistant strain of *Saccharomyces cerevisiae* where 76% of theoretical maximum efficiency was attained. Material balances were derived for the entire process from biomass pre-processing to hydrolysis.

Keywords: *Cotton stalk, cotton residue, biofuel, bioethanol, Saccharomyces cerevisiae, alkaline pre-treatment.*

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