

Improved Simultaneous Saccharification and Co-Fermentation of Sugarcane Bagasse for 2G-Bioethanol Production Using Thermotolerant Yeast

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ABSTRACT

Sugarcane bagasse (SCB), a major by-product of the sugar industry, is a promising second-generation (2G) feedstock for bioethanol production due to its high structural carbohydrate content. However, its efficient bioconversion is hindered by the complex lignin matrix, necessitating effective pretreatment strategies. This study optimizes liquid ammonia pretreatment by reducing ammonia concentration from 15% to 10% (v/v) while maintaining solid loading at 10% (w/v), temperature at 85°C, and retention time at 24 hours. The optimized conditions facilitated enhanced sugar recovery during enzymatic hydrolysis. Simultaneous saccharification and co-fermentation (SSCF) was conducted using thermotolerant yeast *Kluyveromyces marxianus* FKS.A1, capable of fermenting both glucose and xylose. Utilizing Cellic CTec 2 (20 FPU/g pretreated biomass), the process yielded about 275 L/Ton SCB of ethanol in 24 h. The findings demonstrate that optimizing ammonia pretreatment enhances bioethanol yield while reducing chemical input, contributing to the sustainability of 2G-bioethanol production from SCB.

Keywords: Biomass; Biofuel; Thermotolerant yeast; SSCF; Co-fermentation

How to Cite

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