

Saccharification and Fermentation of Sugarcane Bagasse to Ethanol

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ABSTRACT

Bioethanol is an important renewable liquid fuel which can be used directly or mixed with gasoline for the transport sector. Production of bioethanol from wasted lignocellulosic materials is an alternative low-cost way to reduce both the consumption of crude oil and environmental pollution, and avoids damage to food security. Sugarcane bagasse, obtained after crushing of the cane, is used as feedstocks for bioethanol production. Pretreatment of sugarcane bagasse by sulfuric acid prior to enzymatic hydrolysis has been studied. The study showed the optimum conditions were: acid concentration 0.25 M; treating time: for 60 minutes; temperature: 95°C. After pretreatment, the material was separated into a solid fraction and a filtrate. The dried solid fraction was further enzymatically hydrolysed by a blend of Celluclast 1.5L and Novozym 188 cellulase mixtures at 50°C, pH 4.6 for 24 hours. The effects of cellulase dosage and substrate concentration on enzymatic hydrolysis were investigated. To investigate the fermentability, the hydrolysate was then fermented with *Saccharomyces cerevisiae* BCRC 21685 at 30°C, pH 4.6 for 24~48 hours. The effect of additional glucose or evaporation, sterilization, and detoxification were investigated in fermentation step.

Keywords: Acid pretreatment, Bagasse; Bioethanol; Enzymatic hydrolysis; Fermentation