

Siriwan Gaewchingduang 2011: Enhancing Efficiency for Reducing Sugar Production from Cassava Bagasse by Pretreatment. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Science. Thesis Advisor: Assistant Professor Patthra Pengthamkeerati, Ph.D. 92 pages.

Cassava bagasse (CB) is one of major biomass wastes from starch processing industry, mainly containing starch. The objects of this study were to determine the optimal pretreatment conditions for maximizing reducing sugar production by enzyme and acid pretreatments, and to preliminarily use of pretreated CB for ethanol production. In this study, sulfuric acid had a greater capacity for hydrolyzing CB than phosphoric acid. Pretreating CB with sulfuric acid at 120°C for 60 min gave a maximum reducing sugar yield. Pretreating CB with hydrothermal pretreatment at 125°C for 30 min and hydrolyzing with cellulase (45°C for 72 hr), alpha-amylase (90°C for 2 hr), and glucoamylase (55°C for 24 hr), gave a maximum reducing sugar yield of 899.11 mg/g CB. Fermenting the obtained reducing sugar solutions from the selected enzymatic or acid hydrolysis with yeast *Saccharomyces cerevisiae* revealed that reducing sugar from enzymatic hydrolysis gave a higher reducing sugar concentration (15.57 g/l) and ethanol yield (5.11 g/l) than that from acid hydrolysis. Hence, hydrothermally pretreating CB with enzymatic hydrolysis is an interesting method to accelerate enzyme-substrate interaction and enhances ethanol production efficiency.

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