

Thirawan Boonwong 2014: Development of Enzyme Hydrolysis Processes to Produce Fermentable Sugars of Organic Waste from Pineapple, Sugar Cane and Durian. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Miss Sujinna Karnnasuta, Ph.D. 106 pages.

This research studied on enzyme hydrolysis and detoxification process of hydrolysates of lignocelluloses from pineapple crown, durian peel and sugar cane leaves and top. The Lignocellulosic materials mainly composed of holocellulose (cellulose and hemicelluloses). So, after pretreatment of lignocellulosic feedstocks with 2.0% (w/v) sulfuric acid (H_2SO_4) and autoclaved at 121°C pressure 15 lb/in² for 15 min, reducing sugar of the pineapple crown had a high concentration (61.87 ± 0.59 g/L), durian peel (56.83 ± 0.36 g/L) and sugarcane leaves (49.00 ± 1.14 g/L) respectively. Then pretreated samples were added cellulose enzyme (Cellic[®] CTec2) and the highest concentration of total reducing sugar in each feedstock was hydrolyzed at 60 FPU/g (DS). After hydrolysis of pretreatment feedstocks, the reducing sugar yields were increased as the saccharification time increased, from 0 to 24 hour and be stable continuously at 24 hours. Sugar yield significantly different ($P < 0.05$) at 24 hours, the total reducing sugar of pineapple crown is highest (113.70 ± 0.47 g/L) and the conversion percentage of holocellulose of pineapple crown was 94.91 ± 0.54 . However, pineapple crown was suitable for cellulosic hydrolysis and ethanol productions.

Then the research focus on simultaneous saccharification and detoxification process by studying effectiveness of activated carbon dosage, acetic acid concentration loss. The acetic acid in hydrolysate lignocelluloses were absorbed by activated carbon (2.5, 5.0, 7.5 and 10.0% (w/v)). When fermented the solution was used to detoxification with activated carbon 7.5% (w/v) by *Saccharomyces cerevisiae* TISTR 5596, found to be maximal ethanol 36.91 ± 0.91 g/L at 72 hour, or 253.94 kg/ton (DW).

Student's signature

Thesis Advisor's signature