

Research Title: Utilization of Corncob for Butanol Production from *Clostridium acetobutylicum*  
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## ABSTRACT

The aims of this project were to study the composition of corn cobs, the pretreatment using sulfuric acid and sodium hydroxide as well as the optimization of enzymatic hydrolysis for the cultivation of *Clostridium acetobutylicum* DSM 792. Mostly, the compositions of corn cobs were carbohydrates (51.04%) with cellulose (31.04%) and hemicellulose (27.12%). The optimal conditions for hydrolysis of corn cobs to obtain the highest amount of reducing sugars were pretreatment with 1 M sodium hydroxide, following by adjusting pH to neutral and hydrolysis using ACCELLERASE1500 in the ratio of 0.9 mL per gram pretreated corn cobs (in acetate buffer solution 0.05M, pH 5) and incubated at 37°C for 48 hours. It has been found that the reducing sugar content was 0.71 g per g pretreated corn cobs. Reducing sugars obtained from the samples were glucose and xylose, suggesting that there were hemicellulose and cellulose in the pretreated corn cobs. After that, reducing sugar was concentrated up to 50 g/L. *Clostridium acetobutylicum* DSM 792 (10% v/v) was inoculated into GYCC medium with 50g/L reducing sugars from hydrolyzed corn cobs compared with 50 g/L glucose as a control. As a result of using hydrolyzed corn cobs as a carbon source, dry cell weight was up to 4.61 g/L within 22 hours incubation. The control experiment could increase 18.30 g/L dry cell weight at 84 hours of incubation. More several products were produced using hydrolyzed corn cobs as a carbon source including acetic acid (16.96 g/L), lactic acid (27.62 g/L), ethanol (4.44 g/l) and acetone (2.33 g/L), compared with using glucose as a carbon source.

**Keyword:** pretreatment, enzymatic hydrolysis, anaerobic fermentation, corn cobs, butanol,