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Production of bioethanol from empty fruit bunches cellulosic

biomass and Avicel PH-101 cellulose

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**Abstract** Cellulosic ethanol production was carried out using empty fruit bunches (EFB) via simultaneous saccharification and fermentation (SSF) method. The EFB was pretreated with alkaline treatment using 0.2 M of sodium hydroxide (NaOH) solution followed by mild acid hydrolysis using 3 % of sulfuric acid (H2SO4), and enzymatic saccharification using derived cellulose, *Trichoderma reesei* prior to fermentation using *Saccharomyces cerevisiae*. Acid hydrolysis-pretreated samples shows the best substrates to be used in fermentation since it can produce the highest amount of glucose and highest percentage of saccharification with 5.3 mg/mL and 48 %, respectively. The EFB hydrolyzate obtained was subjected to fermentation under anaerobic condition. It was found that the highest ethanol yield was 0.42 mg/mL from acid hydrolyze sample. Optimization of SSF was conducted on filter paper unit (FPU), pH and mass loading effect for bioethanol production. Highest ethanol productions from cellulose (Avicel PH-101) are 3.1, 3.7, and 4.6 mg/mL using FPU 217, pH 4, and a 5.0-g cellulose loading accordingly.