

Crude cellulase from oil palm empty fruit bunch by *Trichoderma asperellum* UPM1 and *Aspergillus fumigatus* UPM2 for fermentable sugars production

ABSTRACT

Cellulase is an enzyme that converts the polymer structure of polysaccharides into fermentable sugars. The high market demand for this enzyme together with the variety of applications in the industry has brought the research on cellulase into focus. In this study, crude cellulase was produced from oil palm empty fruit bunch (OPEFB) pretreated with 2 % NaOH with autoclave, which was composed of 59.7 % cellulose, 21.6 % hemicellulose, and 12.3 % lignin using *Trichoderma asperellum* UPM1 and *Aspergillus fumigatus* UPM2. Approximately 0.8 U/ml of FPase, 24.7 U/ml of CMCase and 5.0 U/ml of β -glucosidase were produced by *T. asperellum* UPM1 at a temperature of 35°C and at an initial pH of 7.0. A 1.7 U/ml of FPase, 24.2 U/ml of CMCase, and 1.1 U/ml of β -glucosidase were produced by *A. fumigatus* UPM2 at a temperature of 45°C and at initial pH of 6.0. The crude cellulase was best produced at 1 % of substrate concentration for both *T. asperellum* UPM1 and *A. fumigatus* UPM2. The hydrolysis percentage of pretreated OPEFB using 5 % of crude cellulase concentration from *T. asperellum* UPM1 and *A. fumigatus* UPM2 were 3.33 % and 19.11 %, with the reducing sugars concentration of 1.47 and 8.63 g/l, respectively.

Keyword: *Aspergillus fumigatus*; Cellulase; Fermentable sugar; Lignocellulosic biomass; Saccharification; *Trichoderma asperellum*