

Utilization of oil palm decanter cake for cellulase and polyoses production

ABSTRACT

The abundance of oil palm decanter cake (OPDC) is a problem in oil palm mills. However, this lignocellulosic biomass can be utilized for cellulase and polyoses production. The effectiveness of chemical and physical pretreatment in reducing the lignin content was studied by saccharification using a Celluclast 1.5 L and scanning electron microscope. Physicochemical pretreatment of OPDC with 1% (w/v) NaOH and autoclaving at 121°C for 20 min increased potential polyoses produced to 52.5% and removed 28.7% of the lignin content. The optimized conditions for cellulase production by a locally isolated fungus were a time of 120 h, a substrate of untreated OPDC, a spore concentration of 1×10^7 spore/mL, a temperature of 30°C, and a pH between 7.0 and 7.5. *Trichoderma asperellum* UPM1 produced carboxymethylcellulase (CMCase), -glucosidase and filter paper activity (FPase) in the following concentrations: 17.35, 0.53, and 0.28 U/mL, respectively. *Aspergillus fumigatus* UPM2 produced the CMCase, -glucosidase and FPase in the following amounts: 10.93, 0.76, and 0.24 U/mL. The cellulases from *T. asperellum* UPM1 produced 2.33 g/L of polyoses and the cellulases from *A. fumigatus* UPM2 produced 4.37 g/L of polyoses.

Keyword: *Aspergillus fumigatus* UPM2; Cellulase; Oil palm decanter cake (OPDC); Polyoses; Pretreatment; *Trichoderma asperellum* UPM1