

Optimization of cellulase production by *Aspergillus Terreus* under submerged fermentation using response surface methodology.

ABSTRACT

Oil palm empty fruit bunch (OPEFB) is one of the most important wastes from the oil palm industry which can be treated and utilized as a main carbon source in fermentation. The ability of newly isolated *Aspergillus terreus* to produce cellulases in submerged fermentation with OPEFB fibre as carbon source was investigated. Response surface methodology based on central composite design (CCD) was chosen to optimize the composition of four medium constituents viz, OPEFB fibers (5-15 g/L), yeast extract (3-9 g/L), CaCl₂ (1-5 mM), MgSO₄ (3-7mM) and to optimize the level of two environmental condition agitation speed (200-300 rpm) and temperature (28-32°C). A second order model was proposed to assess the effect of these 6 variables. Based on the proposed model, the optimized conditions for the maximum cellulase production was 13.90 g/L OPEFB fiber, 8 g/L yeast extract, 3.5 mM CaCl₂, 7 mM of MgSO₄, 225 rpm of agitation and 29°C temperature. The optimized values obtained by the statistical analysis gave 14.25U/ml of CMCase, 1.13 U/ml of FPase, and 9.86 U/ml of β -glucosidase and 5.2 g/l of Cell concentration. In fermentation using the optimized conditions, the fungi cell concentration, CMCase, FPase and β -glucosidase activity was 5.2 g/l, 14.25 U/ml, 1.13 U/ml and 9.86 U/ml, respectively.

Keyword: Response Surface Methodology; Optimization; Cellulase; *Aspergillus terreus*; Oil palm empty fruit bunch fiber.