

Optimization of Culture Medium for Extracellular Lipase Production by *Cordyceps brongniartii* Using Experimental Design

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Lipases are enzymes belonging to the group of hydrolases that present as main function to catalyze the hydrolysis of triacylglycerols in fatty acids, mono and diacylglycerols and glycerol. Besides their natural function, these enzymes can catalyze esterification, interesterification and transesterification reactions in the presence of organic solvents and little amount of water. These enzymes possess enormous biotechnological potential, especially in detergent, food and cosmetic industries and the biodiesel production. The aim of this study was to optimize the culture medium composition in order to increase the lipase production in Khanna liquid medium using experimental designs. Optimal concentrations of peptone, canola oil and D-glucose in the submerged fermentation medium were identified for the maximum lipolytic production from *Cordyceps brongniartii*. A central composite design was applied to study the effects of three factors in five different concentrations: peptone (0.27-0.93% w/v), canola oil (1.36-4.64% v/v) and D-glucose (0.2-2.8% w/v). The data analyses were performed by response surface methodology using the software STATISTICA 6.0. The fermentation occurred at 30°C, 100rpm, for 72h. The crude extracellular samples were used for enzymatic assays using p-nitrophenylpalmitate as substrate. An equation was fitted to experimental data taking into account only the factors with significance higher than 5%. The results showed that D-glucose was the factor with highest influence on the lipases production and its effect was negative. Oil and peptone concentrations did not affect the lipases production, however, the D-glucose interaction with these two factors showed a significant positive influence.

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Key words: Lipases; *Cordyceps brongniartii*; Optimization; Experimental Design.