

ABSTRACT

THE STABILITY INCREASE OF CELLULASE FROM THE *Aspergillusniger* L-51 FUNGI WITH IMMOBILIZATION USING BENTONITE

By

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The aim of this research is to increase the stability of cellulase from *Aspergillusniger*L-51 using immobilization method by bentonite. Several procedures were performed to achieve the aim, which were production, isolation, purification, immobilization using bentonite and characterization of the purified enzyme before and after immobilization which include determinations of optimum temperature, K_M and V_{max} .values, the repeat use of immobilized enzyme and thermal stability. The results showed that the specific activity of the purified cellulase was 20.9993 U/mg, increased of 8.6 times compared to that of the crude extract which has 2.4401 U/mg. The characters of purified cellulase were optimum temperature 60°C; $K_M = 38.368$ mg/mL substrate; $V_{max} = 3.075$ $\mu\text{mol/mL}\cdot\text{min}$; $k_i = 0.037$ min^{-1} ; half-life ($t_{1/2}$) = 18 minutes and $\Delta G_i = 103.914$ kJ/mol. The characters of the immobilized cellulase were optimum temperature 65°C; $K_M = 12.764$ mg/mL substrate; $V_{max} = 0.834$ $\mu\text{mol/mL}\cdot\text{min}$.; $k_i = 0.036$ min^{-1} ; half-life ($t_{1/2}$) = 19 minutes and $\Delta G_i = 103.991$ kJ/mol, respectively. Based on the decrease of k_i value, increase of $t_{1/2}$ and ΔG_i , it is proven that the immobilization method could be used to increase the stability of cellulase.

Key words :*Aspergillus niger* L-51, cellulase, immobilization, bentonite