

ABSTRACT

THE INCREASE OF α - AMYLASE STABILITY FROM *Aspergillus niger L-51* BY CHEMICAL MODIFICATION WITH CITRACONIC ANHYDRIDE

By

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This research was aimed to study the effect of chemical modification on the thermal stability of α -amylase from local fungi isolate *Aspergillus niger L-51* which. To achieve this aim, isolation purification, and chemical modification of the enzyme were performed. Enzyme was purified by ammonium sulphate fractionation and dialysis, and followed by chemical modification with citraconic anhydride. The α -amilase activity was measured by *Fuwa* method and *Mandels* method, protein concentration was measured by *Lowry* method, while the modification degree was measured by using trinitrobenzen sulfonac acid (TNBS). The results showed that the optimum temperature of the native enzyme was 50°C; optimum pH= 5.5; $K_M = 5.614$ mg/ml substrate, and $V_{maks} = 175.438$ $\mu\text{mol/ml.minute}$. The thermal stability of the native enzyme has data of: $t_{1/2} = 60.261$ min, $k_i = 0.0115$ min^{-1} , $\Delta G_i 102.318$ kJ mole^{-1} . The modified enzymes with citraconic anhydride with modification degree of 32; 49; and 61% showed the optimum temperature and optimum pH, K_M , V_{maks} , $t_{1/2}$, k_i , ΔG_i i.e: 50°C, 5.5, 6.734 mg/mL substrate, 156.250 $\mu\text{mol/mL.minute}$, 77.865 minute, 0.0089 minute^{-1} , 102.968 kJ mole^{-1} ; 50°C, 5.5, 5.124 mg/mL substrate, 135.135 $\mu\text{mol/mL.minute}$, 79.655 minute, 0.0087 minute^{-1} , 103.029 kJ mole^{-1} ; 50°C, 5.5, 4,107 mg/mL substrate, 126.582 $\mu\text{mol/mL.minute}$, 84.512 minute, 0.0082 minute^{-1} , 103.032 kJ mole^{-1} , respectively. While based on the decrease of k_i values, the chemical modification on the native α -amylase has been able to increase the thermal stability up to 1.2 – 1.4 times compared to that of the native one.

Keywords : *Aspergillus niger L-51*, α -amylase, chemical modification, citraconic anhydride