ABSTRACT

STUDY EFFECT OF ADDITION GLYCEROL AND SORBITOL TOWARD STABILITY OF CELLULASE FROM *Aspergillus niger* L-51

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Cellulase is enzyme which has important part in bioconversion process of cellulose into glucose and often used in many industrial processes both for relating to food and non food. In industrial process, this enzyme must be able to work in extreme pH and temperature. But generally this enzyme is unstable at that condition. This research was aimed to study the effect of addition glycerol and sorbitol toward stability of cellulase from *Aspergillus niger* L-51. Sequential experiment, starting from the enzyme production, isolation, purification, and characterization before and after addition glycerol and sorbitol.

The result showed that the purified enzyme has a specific activity 5,611 U/mg, increase at 5 times than native enzyme which has specific activity 1,115 U/mg. The purified enzyme before and after addition glycerol and sorbitol have optimum pH 4,5 and optimum temperature 50^{o}C. The kinetics data showed that purified enzyme has K_M = 15,21 mg/mL and V_{max} = 2,81 µmol/mL.min. Enzyme after addition glycerol 0,5; 1; and 1,5 M have K_M with following data: 20,07 mg/mL; 18,54 mg/mL; and 19,44 mg/mL and V_{max} were shown with following data: 3,40 µmol/mL.min; 3,30 µmol/mL.min and 3,36 µmol/mL.min. Enzyme after addition sorbitol 0,5; 1; and 1,5 M have K_M with following data: 17,56 mg/mL; 16,19 mg/mL; and 17,1 mg/mL and V_{max} were shown with following data: 3,07 µmol/mL.min; 2,97 µmol/mL.min; and 3,04 µmol/mL.min. Thermal stability of purified enzyme stored for 100 min at 50^{o}C were shown by the values k_i = 0,0119 min^{-1}; $t_{1/2}$ = 58,24 min and ΔG_i = 102,24 kJ/mol. Enzyme after addition glycerol 0,5; 1; and 1,5 M have k_i value= 0,0083; 0,0076; and 0,0078 min^{-1}; $t_{1/2}$= 83,49; 91,18 and 88,85 min; ΔG_i = 103,21 kJ/mol; 103,44 kJ/mol; and 103,37 kJ/mol. While enzyme after addition sorbitol 0,5; 1; and 1,5 M have k_i value= 0,0082; 0,0075; and 0,0077 min^{-1}; $t_{1/2}$ = 84,51; 92,4 and 90 min; ΔG_i = 103,24 kJ/mol; 103,48 kJ/mol; and 103,41 kJ/mol. Addition glycerol and sorbitol on cellulase from *Aspergillus niger* L-51 can increase the thermal stability of enzyme based on the decrease of k_i value and the increase of $t_{1/2}$ and ΔG_i.

Key words: *Cellulase, glycerol, sorbitol, Aspergillus niger L-51*