ABSTRACT

THE INCREASE OF STABILITY CELLULASE FROM *Bacillus subtilis* ITBCCB148 BY CHEMICAL MODIFICATION WITH GLYOXYLIC ACID

By

Rina Rachmawati Sutisna

The research aims to increase the thermal stability of enzyme cellulase obtained from locale bacteria isolate *Bacillus subtilis* ITBCCB148 using modification process with glyoxylic acid. To approach this aims, the production, isolation, purification, modificatin and characterization purified cellulase enzyme were done. The results showed that the native enzyme has a unit activity 6,9753 U/mL, purer than crude extract enzyme which has unit activity 0,5963 U/mL. The native and the modified enzyme have similar pH of 6,0 and optimum temperature of 60^oC. The modified enzymes with glyoxylic acid produced modified enzyme with modification degree of 70,54; 78,68; 68,43%. The enzyme thermal stability of the modified enzyme with modification degree of 70,54; 78,68; 68,43% at 60^oC were shown with the following data : $t_{1/2}$ = 22,35 min, k_i = 0,031 min^{-1}, ΔG_i = 102,8253 kJ $mole^{-1}$; $t_{1/2}$ = 21,00 min, k_i = 0,033 min^{-1}, ΔG_i = 102,6522 kJ $mole^{-1}$; : $t_{1/2}$ = 18,72 min, k_i = 0,037 min^{-1}, ΔG_i = 102,3354 kJ $mole^{-1}$; respectively, whereas the thermal stability of the purified enzyme has data: $t_{1/2}$ = 10,50 min, k_i = 0,066 min^{-1}, ΔG_i = 100,7330 kJ $mole^{-1}$. The chemical modification on the purified cellulase enzyme has been able to increase the stability to optimum pH and optimum temperature and the thermal stability.

Keywords : *Bacillus subtilis* ITBCCB148, cellulase, chemical modification, glyoxylic acid