

## RINGKASAN

### ISOLASI DAN KARAKTERISASI ENZIM SELULASE DARI RAYAP (*Reticulitermes flavipes*)

Enzim selulase mampu menguraikan selulosa dengan memutus ikatan  $\beta$  (1,4) glikosida menghasilkan selobiosa kemudian diubah lagi menjadi monomer glukosa. Enzim selulase yang dihasilkan mikroorganisme dalam rayap secara ekonomi sangat berguna untuk berbagai industri.

Telah dilakukan isolasi dan karakterisasi enzim selulase dari rayap. Hasil isolasi difraksinasi dengan  $(\text{NH}_4)_2\text{SO}_4$  secara bertingkat, F1 (0-10%), F2 (10-20%), F3 (20-40%), F4 (40-60%), F5 (60-80%), dan F6 (80-100%). Karakterisasi untuk menentukan pH, temperatur, dan waktu inkubasi optimum serta pola inhibisi. Glukosa yang dihasilkan dianalisa dengan metode Nelson-Somogyi menggunakan spektrofotometer UV-Vis.

Hasil penelitian menunjukkan bahwa fraksi 4 (F4 dengan tingkat kejenuhan 40-60%) mempunyai aktivitas spesifik terbesar 102,8899 U/mg. Berdasarkan penentuan karakteristiknya enzim ini bekerja optimum pada pH 5,2 dengan aktivitas spesifik 101,7196 U/mg; temperatur 45°C dengan aktivitas spesifik 99,3539 U/mg; dan waktu inkubasi 45 menit dengan aktivitas spesifik 100,5089 U/mg terhadap substrat CMC 0,5%. Sedangkan karakteristik kinetiknya diketahui  $K_m = 2,40574$  mg/mL dan  $V_{maks} = 134,6620$  U/mg dalam waktu inkubasi optimum tanpa inhibitor  $\text{Ag}^+$ ;  $K_m = 2,59183$  mg/mL,  $K_i = 6,5523$  mg/mL dan  $V_{maks} = 106,9633$  U/mg dalam waktu inkubasi optimum dengan inhibitor  $\text{Ag}^+$ . Pengerjaan dengan inhibitor  $\text{Ag}^+$  menunjukkan karakteristik inhibisi tak bersaing dan adanya gugus sulfhidril pada rantai polipeptida enzim selulase.

## SUMMARY

### ISOLATION AND CHARACTERIZATION OF CELLULASE ENZYME FROM TERMITE (*Reticulitermes flavipes*)

Cellulase enzyme can change cellulose yields selobiose by breaking the  $\beta$  (1,4)-glycoside bond, then they are changed into monomer glucose again. Cellulase enzyme that microorganism yielded on termite in economic is very useful for industries.

Isolation and characterization of the cellulase enzyme from termite has done. The resulted isolation fractionated by  $(\text{NH}_4)_2\text{SO}_4$  in stages which are F1 (0-10%), F2 (10-20%), F3 (20-40%), F4 (40-60%), F5 (60-80%), and F6 (80-100%). Characterization work to find pH, temperature, optimum incubation time and pattern of inhibition of the enzyme reaction. The glucose as resultant has analized with Nelson-Somogyi metode by using UV-Vis spectrophotometer.

Research yields that fraction 4 (F4 with saturation degrees of 40-60%) had a biggest specific activities of 102.8899 U/mg. Characterization of the enzyme reaction provided optimum pH of 5.2 with specific activities of 101.7196 U/mg; temperature of 45°C with specific activities of 99.3539 U/mg; and incubation time of 45 minutes with spesific activities of 100.5089 U/mg for CMC 0.5% as substrate. Determination of enzyme kinetic characteristic gave  $K_m = 2.40574$  mg/mL and  $V_{maks} = 134.6620$  U/mg at optimum incubation time without  $\text{Ag}^+$  inhibitor;  $K_m = 2.59183$  mg/mL,  $K_i = 6.5523$  mg/mL and  $V_{maks} = 106.9633$  U/mg at optimum incubation time with  $\text{Ag}^+$  inhibitor. Treatment with  $\text{Ag}^+$  as inhibitor showed that it was the characteristic of noncompetitive inhibition mechanism and it indicated the presence of sulfhydril group in the cellulase enzymes polypeptide chain.

