



INTISARI

ISOLASI DAN PENGUJIAN AKTIVITAS EKSTRAK KASAR SELULASE DARI *Paenibacillus* spp

Endang Pamulatsih, M. Saifur Rohman, Triwibowo Yuwono

*Jurusan Mikrobiologi Pertanian, Fakultas Pertanian
Universitas Gadjah Mada, Yogyakarta*

Selulase merupakan salah satu kelompok enzim hidrolase yang mampu menghidrolisis ikatan β -1,4-glikosidik pada rantai selulosa. Penelitian ini bertujuan untuk mengetahui aktivitas ekstrak kasar selulase *Paenibacillus cellulositrophicus* SBT1 dan *Paenibacillus* sp. SBT8 yang diisolasi dari usus rayap. Aktivitas enzim diuji menggunakan metode CMCase dengan reagen *Dinitrosalicylic Acid* (DNS). Reagen DNS akan mengikat gula pereduksi dan membentuk warna indikator yang spesifik sehingga dapat terdeteksi pada spektrofotometer dengan panjang gelombang 540 nm. Pada penelitian ini juga dilakukan pengujian pengaruh faktor lingkungan seperti pH, temperatur, dan keberadaan ion logam terhadap aktivitas ekstrak kasar selulase *Paenibacillus cellulositrophicus* SBT1 dan *Paenibacillus* sp. SBT8. Hasil penelitian menunjukkan bahwa kedua isolat mampu mensekresikan jenis selulase tertentu ke dalam medium CMC. Isolat *Paenibacillus cellulositrophicus* SBT1 memiliki aktivitas selulolitik yang lebih tinggi dibandingkan isolat *Paenibacillus* sp. SBT8. Aktivitas selulase ekstraselular yang dihasilkan *Paenibacillus cellulositrophicus* SBT1 menunjukkan hasil tertinggi pada kondisi pH 3-5, temperatur 35°C, dan penambahan ion logam Zn^{2+} 50 mM, sedangkan aktivitas selulase yang dihasilkan oleh *Paenibacillus* SBT8 menunjukkan hasil tertinggi pada kondisi pH 3-5, temperatur 35°C, dan penambahan ion logam Mg^{2+} 0,5-50 mM.

Kata kunci: selulase, *Paenibacillus cellulositrophicus* SBT1, *Paenibacillus* sp. SBT8, CMC, DNS



ABSTRACT

ISOLATION AND CELLULASE ACTIVITY ASSAY FROM *Paenibacillus* spp

Endang Pamulatsih, M. Saifur Rohman, Triwibowo Yuwono

*Department of Agricultural Microbiology, Faculty of Agriculture
Universitas Gadjah Mada, Yogyakarta*

Cellulase is a hydrolytic enzyme that specifically cleaves β -1,4-glycosidic bonds of cellulose. The objective of this work was to measure the cellulase activity from *Paenibacillus cellulositrophicus* SBT1 and *Paenibacillus* sp. SBT8 that was previously isolated from termite's gut. Enzymatic activity was measured by dinitrosalicylic acid (DNS) method using CMC as the substrate for assay. The effect of temperature, pH, and metal ions on enzymatic activity were also examined. The results showed that both *Paenibacillus* produce extracellular cellulose in minimal medium supplemented with 1% of CMC. The total protein produced by *Paenibacillus cellulositrophicus* SBT1 and *Paenibacillus* sp. SBT8 were 18,6 and 24,8 mg/L, respectively. Enzymatic activity assay indicated that cellulase activity from *Paenibacillus cellulositrophicus* SBT1 was higher than that of *Paenibacillus* sp. SBT8. It is observed that, under the condition used in this work, both cellulases showed the broad range of temperature for enzymatic activity. The effect of pH on the cellulase activity indicated that both cellulases were active at acidic pH. The addition of metal ion as a cofactor apparently did not affect the enzymatic activity of both cellulases.

Key words: cellulase, *Paenibacillus cellulositrophicus* SBT1, *Paenibacillus* sp. SBT8, CMC, DNS