ABSTRAK

Enzim protease dapat diisolasi dari mikroba. Salah satu mikroba penghasil protease yang banyak diteliti adalah dari genus *Bacillus* sp karena mempunyai aktivitas proteolitik yang tinggi. Penelitian ini bertujuan untuk mengisolasi dan mengkarakterisasi enzim protease ekstraseluler dari bakteri *Bacillus subtilis* B46 dan ekstrak kasar enzim protease tersebut digunakan untuk menghidrolisis protein susu kambing Peranakan Etawa. Bakteri *B.subtilis* B46 diuji aktivitas proteolitiknya secara kualitatif dan ditentukan waktu pertumbuhan fase eksponensial dengan metode turbidimetri. Enzim protease dikarakterisasi meliputi pengaruh variasi suhu, pH, EDTA dan ion logam terhadap aktivitasnya menggunakan metode Kunitz. Kadar protein enzim dihitung menggunakan metode Lowry. Hidrolisis susu kambing dilakukan dengan variasi waktu inkubasi 10-60 menit. Hasil penelitian menunjukkan bahwa bakteri *B.subtilis* B46 memiliki aktivitas proteolitik dengan indeks proteolitik sebesar 1,19. Waktu pertumbuhan fase eksponensial *B.subtilis* B46 yaitu selama 9 jam dengan jumlah bakteri sebanyak 720 CFU/mL. Aktivitas enzim protease tertinggi diperoleh dengan waktu inkubasi selama 12 jam dengan nilai aktivitas sebesar $4{,}65\times10^{-2}$ U/mL. Kadar protein enzim protease sebesar $8{,}95\times10^{-2}$ mg/mL. Enzim protease menunjukkan aktivitas optimum pada suhu 50 °C dan pH 8 dengan nilai aktivitas sebesar $5{,}6\times10^{-2}$ U/mL. Aktivitas enzim protease meningkat dengan penambahan ion logam Ca^{2+} dan Mg^{2+} serta dihambat dengan penambahan EDTA, ion logam Zn^{2+}, Co^{2+}, dan Cu^{2+}. Enzim protease *B.subtilis* B46 mampu menghidrolisis protein susu kambing Peranakan Etawa dengan derajat hidrolisis sebesar 31,47% terhadap fraksi kasein dan sebesar 29,14% terhadap fraksi *whey* dengan lama waktu hidrolisis optimum selama 60 menit.

Kata kunci: *B.subtilis* B46, Enzim protease, Hidrolisis, Susu Kambing Peranakan Etawa

ABSTRACT

Protease enzymes can be isolated from microbes. One of the most studied protease-producing microbes is from the genus Bacillus sp because it has high proteolytic activity. This study aims to isolate and characterize the extracellular protease enzyme from the bacterium Bacillus subtilis B46 *and the crude extract of the protease enzyme is used to hydrolyze the protein of Etawa goat's milk. The proteolytic activity of B.subtilis* B46 *was tested qualitatively and the growth time of the exponential phase was determined using the turbidimetric method. Protease enzyme was characterized including the effect of temperature variations, pH, EDTA and metal ions by looking at the activity value of the protease enzyme using the Kunitz method. The protein content of enzyme was calculated using the Lowry method. The hydrolysis of goat's milk was carried out by varying the incubation time of 10-60 minutes. The results showed that the bacterium B.subtilis* B46 *had proteolytic activity with a proteolytic index of 1.19. The growth time of the exponential phase of B.subtilis* B46 *was 9 hours with the number of bacteria as much as 720 CFU/mL. The highest protease enzyme activity was obtained with an incubation time of 12 hours with an activity value of* 4.65×10^{-2} *U / mL. The protein content of the protease enzyme was* 8.95×10^{-2} *mg / mL. The protease enzyme shows optimum activity at 50 ° C and at pH 8 with an activity value of* 5.6×10^{-2} *U / mL. The protease enzyme activity increased with the addition of* Ca^{2+} *and* Mg^{2+} *metal ions and was inhibited by the addition of EDTA, metal ions* Zn^{2+}, Co^{2+}, *and* Cu^{2+}. *The protease enzyme from B.subtilis* B46 *was able to hydrolyze the Etawa goat milk protein with the degree of hydrolysis of 31.47% for the casein fraction and 29.14% for the whey fraction with the optimum hydrolysis time of 60 minutes.*

Keywords: *B.subtilis* B46, *Etawa Goat Milk, Hydrolyze, Protease enzymes*