

ABSTRAK

Salah satu mikroorganisme penghasil protease yang banyak diteliti adalah dari genus *Bacillus* sp karena mempunyai aktivitas proteolitik yang tinggi. Tujuan dari penelitian ini adalah mengetahui potensi bakteri *B. subtilis* B211 dalam menghasilkan protease ekstraseluler dan menguji aktivitas antioksidan protein hidrolisat hasil hidrolisis susu kambing oleh enzim protease. Bakteri *B. subtilis* B211 diuji aktivitas proteolitiknya secara kualitatif, ditentukan waktu pertumbuhan, dan kurva produksi proteasenya. Karakterisasi enzim protease meliputi pengaruh variasi suhu dan pH terhadap aktivitas protease. Hidrolisis susu kambing dilakukan dengan variasi waktu inkubasi 10-60 menit. Uji aktivitas antioksidan susu kambing menggunakan metode DPPH. Hasil penelitian menunjukkan bahwa bakteri *B. subtilis* B211 memiliki indeks proteolitik sebesar 1,127. Waktu pertumbuhan eksponensial *B. subtilis* selama 9 jam dengan jumlah bakteri sebanyak 306 CFU/mL. Aktivitas enzim protease tertinggi didapatkan pada waktu inkubasi optimum selama 12 jam dengan nilai aktivitas sebesar 0,859 U/mL. Kadar protein enzim diperoleh sebesar 1,72 U/mL. Enzim protease menunjukkan aktivitas optimum pada suhu 45 °C dan pH 8. Enzim protease *B. subtilis* B211 dapat menghidrolisis protein susu kambing Peranakan Etawa dengan derajat hidrolisis kasein sebesar 56,46% dan *whey* sebesar 38,80% dengan lama waktu hidrolisis optimum 60 menit. Protein hidrolisat yang diinkubasi 10 menit memiliki presentase inhibisi tertinggi terhadap radikal bebas DPPH. Nilai AAI protein hidrolisat dari kasein adalah 0,018 dan *whey* sebesar 0,017 yang menunjukkan aktivitas antioksidan lemah.

Kata kunci: antioksidan, *Bacillus subtilis*, peptida bioaktif, susu kambing

ABSTRACT

One of the most studied protease-producing microorganisms is from the genus *Bacillus sp* because it has high proteolytic activity. The purpose of this study was to determine the potential of *B. subtilis* B211 bacteria in producing extracellular proteases and to test the antioxidant activity of hydrolyzed protein hydrolyzed goat milk by protease enzymes. Bacteria *B. subtilis* B211 were tested for their proteolytic activity qualitatively, growth time was determined, and protease production curve was determined. The characterization of protease enzymes includes the effect of temperature and pH variations. Hydrolysis of goat's milk was carried out with variations in incubation time of 10-60 minutes. Goat milk antioxidant activity test using DPPH method. The results showed that the bacteria *B. subtilis* B211 had a proteolytic index of 1.127. The exponential growth time of *B. subtilis* was 9 hours with the number of bacteria as much as 306 CFU/mL. The highest protease enzyme activity was obtained at the optimum incubation time of 12 hours with an activity value of 0.859 U/mL. Enzyme protein content was obtained at 1.72 U/mL. The protease enzyme showed optimum activity at 45 °C and pH 8. The protease enzyme *B. subtilis* B211 could hydrolyze the protein of Etawa Crossbreed goat's milk with a casein hydrolysis degree of 56.46% and whey by 38.80% with an optimum hydrolysis time of 60 minutes. Protein hydrolyzate which was incubated for 10 minutes had the highest percentage of inhibition against DPPH free radicals. The AAI value of protein hydrolyzate from casein was 0.018 and whey was 0.017 which showed weak antioxidant activity.

Keyword: antioxidant, *Bacillus subtilis*, bioactive peptide, goat milk