

ABSTRAK

Bakteri penghasil protease yang banyak diteliti adalah dari genus *Bacillus* sp karena mempunyai aktivitas proteolitik yang tinggi. Tujuan penelitian adalah mengetahui potensi bakteri *B. subtilis* B209 dalam menghasilkan enzim protease ekstraseluler dan mengetahui aktivitas antioksidan protein hidrolisat dari hidrolisis susu kambing oleh protease. Bakteri *B. subtilis* B209 diuji aktivitas proteolitiknya secara kualitatif, ditentukan kurva pertumbuhan, dan kurva produksi. Karakterisasi enzim protease meliputi pengaruh suhu dan pH terhadap aktivitas protease. Hidrolisis protein susu kambing etawa dilakukan dengan variasi waktu 10-60 menit. Uji aktivitas antioksidan dilakukan dengan metode DPPH. Hasil penelitian menunjukkan bahwa bakteri *B. subtilis* B209 memiliki indeks proteolitik sebesar 1,075. Waktu pertumbuhan eksponensial *B. subtilis* B209 selama 12 jam dengan jumlah bakteri sebanyak 212 CFU/mL. Aktivitas enzim protease tertinggi diperoleh pada waktu inkubasi optimum selama 18 jam dengan nilai aktivitas sebesar 0,360 U/mL. Kadar protein enzim protease diperoleh sebesar 3,49 mg/mL. Enzim protease menunjukkan aktivitas optimum pada suhu 35° C dan pH 7. Enzim protease *B. subtilis* B209 dapat menghidrolisis protein susu kambing peranakan etawa dengan derajat hidrolisis kasein sebesar 1,49% dan whey sebesar 11,30% dengan lama waktu hidrolisis 60 menit. Protein hidrolisat yang diinkubasi 10 menit memiliki persentase inhibisi tertinggi terhadap radikal bebas DPPH. Nilai AAI protein hidrolisat dari kasein adalah 0,019 mg/mL dan whey sebesar 0,017 mg/mL yang tergolong rendah.

Kata kunci: antoksidan, *Bacillus subtilis*, enzim protease, susu kambing etawa

ABSTRACT

The most studied protease-producing bacteria are from the genus *Bacillus sp* because it has high proteolytic activity. The aims of this study were to determine the potential of *B. subtilis* B209 bacteria in producing extracellular protease enzymes and to determine the antioxidant activity of protein hydrolysates from the hydrolysis of goat's milk by proteases. Bacteria *B. subtilis* B209 were tested for their proteolytic activity qualitatively, growth curve and production curve were determined. The characterization of protease enzymes includes the effect of temperature and pH on protease activity. Protein hydrolysis of Etawa goat's milk was carried out with a time variation of 10-60 minutes. The antioxidant activity test was carried out using the DPPH method. The results showed that *B. subtilis* B209 had a proteolytic index of 1.075. The exponential growth time of *B. subtilis* B209 was 12 hours with the number of bacteria as much as 212 CFU/mL. The highest protease enzyme activity was obtained at the optimum incubation time of 18 hours with an activity value of 0.360 U/mL. The protein level of the protease enzyme was obtained at 3.49 mg/mL. The protease enzyme showed optimum activity at a temperature of 35° C and pH 7. The protease enzyme *B. subtilis* B209 can hydrolyze the protein of Etawa crossbreed goat milk with a hydrolysis degree of 1.49% for casein and 11.30% for whey with a 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 0.019 mg/mL and whey was 0.017 mg/mL which is relatively low.

Keywords: antioxidant, *Bacillus subtilis*, protease enzymes, Etawa goat's milk