

ABSTRAK

Kacang kedelai merupakan sumber protein nabati yang cukup tinggi dengan kandungan protein sebesar 34% dalam setiap 100 gramnya, sehingga berpotensi untuk menghasilkan peptida bioaktif yang memiliki aktivitas antioksidan. Enzim yang digunakan untuk hidrolisis protein kacang kedelai yaitu protease dari bakteri *Bacillus subtilis* B298. Tujuan penelitian ini adalah mengetahui: aktivitas spesifik fraksi-fraksi protease, kondisi optimum fraksi protease F15, pengaruh waktu hidrolisis terhadap derajat hidrolisis dan aktivitas antioksidan protein hidrolisat kacang kedelai serta IC_{50} , AAI (*Antioxidant Activity Index*) dan persentase hemolisis dari fraksi protein hidrolisat dengan aktivitas antioksidan tertinggi. Tahap penelitian yang dilakukan adalah produksi isolat protein kacang kedelai dan produksi ekstrak kasar enzim protease, kemudian ekstrak kasar enzim protease difraksinasi bertingkat dengan ammonium sulfat lalu karakterisasi suhu dan pH enzim terhadap fraksi protease dengan aktivitas spesifik tertinggi. Hidrolisis dilakukan dengan menginkubasi isolat protein kacang kedelai dengan variasi waktu 10, 20, 30, 40, 50, dan 60 menit pada kondisi optimum. Protein hidrolisat yang didapat, ditentukan derajat hidrolisisnya, lalu diuji aktivitas antioksidannya dengan metode DPPH dan uji hemolisis. Hasil penelitian menunjukkan bahwa F15 memiliki aktivitas spesifik tertinggi sebesar 0,859 U/mg yang optimum bekerja pada suhu 45 °C dan pH optimum 8. Nilai derajat hidrolisis tertinggi didapatkan pada waktu hidrolisis 60 menit sebesar 61,422%. Persentase inhibisi tertinggi terhadap radikal DPPH didapatkan pada waktu inkubasi 10 menit sebesar 63,1%. Nilai AAI protein hidrolisat kacang kedelai yaitu 0,119 menunjukkan aktivitas antioksidan lemah. Persentase hemolisis yang didapatkan sebesar 3,8% menunjukkan bahwa protein hidrolisat kacang kedelai sedikit lisis terhadap sel darah merah.

Kata kunci: antioksidan, *B.subtilis*, fraksinasi protease, kacang kedelai, protein hidrolisat

ABSTRACT

Soybeans are a fairly high source of vegetable protein with a protein content of 34% in every 100 grams, so they have the potential to produce bioactive peptides that have antioxidant activity. The enzyme used for hydrolysis of soybean protein is protease from the bacteria Bacillus subtilis B298. The aim of this research is to determine: the specific activity of the protease fractions, the optimum conditions of the F15 protease fraction, the effect of hydrolysis time on the degree of hydrolysis and antioxidant activity of soybean hydrolyzed protein as well as IC50, AAI (Antioxidant Activity Index) and the percentage of hemolysis of the hydrolyzed protein fraction with activity. highest antioxidant. The research stages carried out were the production of soybean protein isolate and the production of a crude extract of the protease enzyme, then the crude extract of the protease enzyme was fractionated in stages with ammonium sulfate and then the temperature and pH characterization of the enzyme for the protease fraction with the highest specific activity. Hydrolysis was carried out by incubating soybean protein isolate for varying times of 10, 20, 30, 40, 50 and 60 minutes at optimum conditions. The hydrolyzed protein obtained was determined by the degree of hydrolysis, then tested for antioxidant activity using the DPPH method and hemolysis test. The research results showed that F15 had the highest specific activity of 0,859 U/mg which was optimal for working at a temperature of 45 °C and an optimum pH of 8. The highest value of the degree of hydrolysis was obtained at a hydrolysis time of 60 minutes of 61,422%. The highest percentage of inhibition against DPPH radicals was obtained at an incubation time of 10 minutes with 63,1%. The AAI value of soybean hydrolyzed protein is 0,119 indicating weak antioxidant activity. The percentage of hemolysis obtained was 3,8%, indicating that the hydrolyzed soybean protein slightly lysed red blood cells.

Keywords: antioxidant, B.subtilis, protease fractionation, soybeans, protein hydrolyzate