

## ABSTRAK

Penyakit degeneratif yang disebabkan oleh radikal bebas memunculkan pengembangan senyawa antioksidan dan antiinflamasi alami, salah satunya dari peptida bioaktif. Peptida bioaktif dapat diperoleh salah satunya melalui hidrolisis enzimatis menggunakan protein ikan lele (*Clarias gariepinus*). Tahapan penelitian meliputi isolasi protein ikan lele, produksi ekstrak kasar enzim protease dari bakteri *Bacillus subtilis* B209, serta karakterisasi suhu dan pH. Protein ikan lele dihidrolisis menggunakan ekstrak kasar enzim variasi waktu 10, 20, 30, 40, 50, dan 60 menit pada kondisi optimum dan ditentukan nilai derajat hidrolisis serta diuji aktivitas antioksidannya dengan metode DPPH (1,1-diphenyl-2-picrylhydrazyl). Protein hidrolisat dengan persentase inhibisi tertinggi ditentukan nilai IC<sub>50</sub>, AAI (*Antioxidant Activity Index*), aktivitas antiinflamasi, SDS-PAGE, dan uji hemolisis. Hasil penelitian menunjukkan aktivitas optimum enzim bekerja pada suhu 45 °C dan pH 8. Nilai derajat hidrolisis tertinggi tercapai pada waktu hidrolisis 60 menit sebesar 65,823%. Persentase inhibisi tertinggi terhadap radikal DPPH sebesar 35,61% terjadi pada waktu inkubasi 10 menit dengan nilai IC<sub>50</sub> sebesar 1,4364 mg/mL dan AAI sebesar 0,013. Aktivitas antiinflamasi ditunjukkan dengan persentase inhibisi sebesar 26,61%. Keberadaan pita protein analisis SDS-PAGE yakni PIL pada 11; 35-48; dan 180 KDa, sementara PHL-10 pada <11 KDa. Persentase hemolisis diperoleh sebesar 4,93% yang menunjukkan bahwa protein hidrolisat ikan lele sedikit lisis terhadap sel darah merah.

**Kata kunci:** antiinflamasi, antioksidan, enzim protease, ikan lele, protein hidrolisat

## ABSTRACT

Degenerative diseases caused by free radicals have led to the development of natural antioxidant and anti-inflammatory compounds, one of which is bioactive peptides. Bioactive peptides can be obtained through enzymatic hydrolysis using catfish protein (*Clarias gariepinus*). The research stages included isolation of catfish protein, production of protease enzyme crude extract from *Bacillus subtilis* B209 bacteria, and characterization of temperature and pH. Catfish protein was hydrolysed using enzyme crude extract for various a times of 10, 20, 30, 40, 50, and 60 minutes at optimum conditions and the degree of hydrolysis was determined and tested for antioxidant activity using the DPPH (1,1-diphenyl-2-picrylhydrazyl) method. Protein hydrolysate with the highest inhibition percentage were determined for  $IC_{50}$ , AAI (Antioxidant Activity Index), anti-inflammatory activity, SDS-PAGE, and hemolysis test. The results showed that the optimum activity of the enzyme worked at a temperature of 45 °C and pH 8. The highest degree of hydrolysis was achieved at a hydrolysis time of 60 minutes at 65,823%. The highest percentage of inhibition against DPPH radicals of 35,61% occurred at an incubation time of 10 minutes with an  $IC_{50}$  value of 1,4364 mg/mL and AAI of 0,013. Anti-inflammatory activity shown with a percentage inhibition of 26.61%. The existance of protein bands in SDS-PAGE analysis, namely PIL at 11; 35-48; and 180 KDa, while PHL-10 at <11 KDa. The percentage of hemolysis obtained was 4,93%, indicating that catfish protein hydrolysate slightly lysed red blood cells.

**Keywords:** anti-inflammatory, antioxidant, catfish, protease enzyme, protein hydrolysate