ABSTRAK

Urease merupakan enzim yang berperan penting sebagai katalis hidrolisis urea menjadi amoniak (NH_3) dan karbon dioksida (CO_2). Urease telah banyak digunakan untuk mendeteksi kadar urea dalam darah atau urin. Enzim urease telah diisolasi dari kacang-kacangan atau polong-polongan, salah satu jenis kacang-kacangan atau polong-polongan yang berpotensi sebagai sumber urease adalah biji kedelai hitam. Tujuan penelitian ini adalah melakukan ekstraksi, fraksinasi, dan karakterisasi enzim urease dari biji kedelai hitam. Biji kedelai hitam diekstraksi dan diperoleh ekstrak kasar enzim urease. Ekstrak kasar enzim difraksinasi menggunakan amonium sulfat dengan perbedaan tingkat kejenuhan (15, 30, 45, 60%). Fraksi yang memiliki aktivitas spesifik tertinggi dikarakterisasi meliputi suhu inkubasi, pH, volume enzim, waktu penyimpanan pada suhu 4 ºC, dan karakterisasi berat molekul dengan SDS-PAGE. Uji aktivias enzim urease ini menggunakan metode Nessler. Hasil penelitian menunjukkan bahwa aktivitas spesifik tertinggi diperoleh pada fraksi dengan tingkat kejenuhan amonium sulfat 60% (F60) dan tingkat kemurnian 3,5 kali dibandingkan ekstrak kasarnya. Hasil karakterisasi F60 menunjukkan bahwa aktivitas optimum diperoleh pada suhu inkubasi 35 ºC dan pH 7, aktivitas urease pada suhu 4 ºC masih stabil sampai penyimpanan hari ke 5 dengan nilai aktivitas sisa 58%, dan terdapat empat polipeptida pada F60 dengan berat molekul 10, 23, 32, dan 81 kDa.

Kata kunci: amonium sulfat, biji kedelai hitam, karakterisasi, pemurnian parsial, SDS-PAGE, urease

ABSTRACT

Urease is an enzyme that plays an important role as a catalyst for the hydrolysis of urea into ammonia (NH_3) and carbon dioxide (CO_2). Urease has been widely used to detect urea levels in blood or urine. The urease enzyme has been isolated from beans or legumes, one type of beans or legumes that has the potential as a source of urease is black soybean seeds. The purpose of this study was to extract, fractionate, and characterise the urease enzyme from black soybean seeds. Black soybean seeds were extracted and crude extract of urease enzyme was obtained. The enzyme crude extract was fractionated using ammonium sulphate with different levels of saturation (15, 30, 45, 60%). Fractions with the highest specific activity were characterised including incubation temperature, pH, enzyme volume, storage time at 4 ºC, and molecular weight characterisation by SDS-PAGE. This urease enzyme activity test used the Nessler method. The results showed that the highest specific activity was obtained in the fraction with 60% ammonium sulphate saturation level (F60) and a purity level of 3.5 times compared to the crude extract. The characterisation results of F60 showed that the optimum activity was obtained at an incubation temperature of 35 ºC and pH 7, urease activity at 4 ºC was still stable until day 5 storage with a residual activity value of 58%, and there were four polypeptides in F60 with molecular weights of 10, 23, 32, and 81 kDa.

***Keywords**: ammonium sulfate, black soybean seeds, characterisation, partial purification, SDS-PAGE, urease*