

ABSTRAK

Urease merupakan enzim yang berfungsi sebagai katalis proses hidrolisis urea menjadi amonia dan karbon dioksida. Urease memiliki banyak manfaatnya sehingga perlu dilakukan eksplorasi dan peningkatan efisiensinya. Tujuan dari penelitian ini adalah ekstraksi urease dari biji semangka, karakterisasi, uji aktivitas antibakteri terhadap *Escherichia coli*, dan penentuan nilai Konsentrasi Hambat Tumbuh Minimum (KHTM) enzim urease. Penelitian diawali dengan ekstraksi enzim urease dari biji semangka sehingga diperoleh ekstrak enzim urease. Karakterisasi enzim urease dilakukan meliputi penentuan kondisi optimum: konsentrasi substrat, pH, dan suhu serta pengaruh penambahan senyawa tiol sistein dan 2-merkaptotanol terhadap aktivitas urease dari biji semangka. Aktivitas urease diuji dengan metode Nessler menggunakan spektrofotometer UV-Vis pada λ 500 nm. Urease diuji potensi aktivitas antibakterinya terhadap *E. coli* dengan metode difusi sumuran. Hasil penelitian menunjukkan aktivitas optimum urease diperoleh pada konsentrasi substrat 0,25 M, pH 7, suhu 35 °C dengan nilai aktivitas enzim urease 58,193 U/mL. Aktivitas enzim urease menurun dengan meningkatnya penambahan konsentrasi sistein. Aktivitas enzim urease meningkat dengan meningkatnya penambahan konsentrasi 2-merkaptotanol dan menurun setelah penambahan konsentrasi lebih dari 0,008 M. Enzim urease dari biji semangka memiliki aktivitas antibakteri terhadap *Escherichia coli*. Aktivitas antibakteri terbesar diperoleh pada konsentrasi 100% dengan zona hambat sebesar 15,335 mm dan nilai KHTM enzim urease yang diperoleh adalah 1% dengan zona hambat sebesar 1,05 mm.

Kata kunci: antibakteri, biji semangka, karakterisasi, urease

ABSTRACT

Urease is an enzyme that functions as a catalyst for the hydrolysis of urea into ammonia and carbon dioxide. Urease has many benefits so it is necessary to explore and improve its efficiency. The present study aimed to extract urease from watermelon seeds, characterized, do antibacterial test against Escherichia coli, and determine the Minimum Inhibitory Concentration (MIC) of urease. The study began with extracting the urease from watermelon seeds to obtain the urease extract. Characterization of the urease was carried out including the determination of the optimum conditions: substrate concentration, pH, temperature, and the effect of the addition of thiol compounds cysteine and 2-mercaptoethanol against urease activity. The activity of urease was tested by the Nessler method using spectrophotometer UV-Vis at λ 500 nm. Urease then tested for its potential antibacterial activity against E. coli using agar well diffusion method. The results showed that the optimum activity of urease was obtained at a substrate concentration of 0,25 M, pH 7, temperature 35 °C with the value of 58,193 U/mL. The activity of the urease decreases with the addition of cysteine concentration. The activity of the urease increases with the addition of 2-mercaptoethanol concentration and then decreases after the addition of a concentration of more than 0,008 M. Urease from watermelon seeds has an antibacterial activity against Escherichia coli. The greatest antibacterial activity was obtained at a concentration of 100% with an inhibition zone of 15,335 mm and the MIC value of urease extract was 1% with an inhibition zone of 1,05 mm.

Keywords: antibacterial, characterization, urease, watermelon seeds