

## Aplikasi Urease dari Biji Kacang Tolo (*Vigna unguiculata ssp unguiculata L.*) untuk Biosensor Urea

<b>Title</b>	Aplikasi Urease dari Biji Kacang Tolo ( <i>Vigna unguiculata ssp unguiculata L.</i> ) untuk Biosensor Urea
<b>Author Order</b>	2 of 4
<b>Accreditation</b>	2
<b>Abstract</b>	<p>Penggunaan urease dalam analisis urea yang digabungkan dengan suatu transduser disebut biosensor urea. Tujuan penelitian adalah menentukan kadar urea dengan metode biosensor urea berbasis urease biji kacang tolo yang diamobilisasi pada matrik alginat dan dideteksi secara kolorimetri menggunakan indikator bromtimol biru. Penelitian dimulai dengan isolasi urease dari biji kacang tolo (<i>Vigna unguiculata ssp unguiculata L.</i>), kemudian diamobilisasi menggunakan metode penjebakan dengan natrium alginat, setelah mencampur larutan urease dengan natrium alginat, ditetaskan dalam larutan CaCl<sub>2</sub> sampai terbentuk urease alginat. Beads urease alginat direaksikan dengan urea menghasilkan ion amonium, selanjutnya ditambahkan indikator bromtimol biru dan perubahan warnanya diukur menggunakan spektrofotometer. Kinerja analitis biosensor urea ditentukan melalui penentuan waktu reaksi enzimatik, keberulangan analisis, keberulangan pembuatan dan pengujian senyawa pengganggu dengan konsentrasi urea 4mM, serta penentuan linearitas, batas deteksi, dan batas kuantifikasi dengan konsentrasi urea 0.05; 1; 3; 7; dan 15 mM. Hasil penelitian menunjukkan beads urease alginat bisa digunakan berulang sampai 8 kali. Kinerja analitis beads urease alginat menghasilkan respon yang linier pada rentang 0.05-15 mM dengan koefisien korelasi sebesar 0.9981, batas deteksi sebesar 0.8 mM dan batas kuantifikasi sebesar 2.67 mM. Keberulangan pembuatan beads urease alginat menghasilkan nilai koefisien variasi sebesar 6%. Analisis tidak terganggu dengan keberadaan asam askorbat 0.05 mM dan asam urat 0.4 mM. <b>Keywords:</b> Amobilisasi urease, beads alginat, biosensor, biji kacang tolo, spektrofotometri.</p> <p>The use of urease in the urea analysis which combined with a transducer is called urea biosensor. Research aimed to determine urea level using urea biosensor method based on urease from black-eyed pea that immobilized on alginate matrix and detected by colorimetric using bromothymol blue indicator. The research began with urease isolation from black-eyed pea (<i>Vigna unguiculata ssp unguiculata L.</i>), and then it immobilized utilizing the trapping method with sodium alginate, after mixing urease solution with sodium alginate, it is dripped in CaCl<sub>2</sub> solution until alginate urease beads formed. Alginate urease beads reacted with urea to produce ammonium ion, then it added with indicator bromothymol blue, and the color changes were measured using a spectrophotometer. The analytical performance of urea biosensor is determined by enzymatic reaction time, repeated analysis, repeatability of fabrication and calibration of disturbing compound with concentration of urea 4 mM, also linearity, limit of detection and limit of quantification with concentration of urea 0.05, 1, 3, 7 and 15 mM. The results showed that alginate urease beads could repeatedly be used until eight times. The analytical performance of alginate urease beads including a linear response in the range of 0.05 mM-15 mM with the correlation coefficient of 0.9981, the detection limit of 0.8 mM and the quantification limit of 2.67 mM. The repeatability of fabrication alginate urease beads produced the coefficient of variation value of 6%. The presence of 0.05 mM ascorbic acid and 0.4 mM uric acid was not disrupted the analysis. <b>Keywords:</b> urease immobilization, alginate beads, biosensor, black-eyed pea, spectrophotometry.</p>
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