The Isolation, Immobilization, and Characterization of Urease from The Seeds of Winged Bean (Psophocarpus tetragonolobus (L.) DC.

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Abstract	Urease has been utilized in the field of health and industry. Urease is commonly used in the form of free enzyme, so that the utilization is limited. Urease efficiency can be improved using immobilization enzyme. This research aimed to do the urease isolation, immobilization, and characterization from the winged bean seeds. This research was started by determining the amino-acid content of winged bean seeds using the Liquid chromatography-mass spectrometry (LCMS). The winged bean seeds were germinated and extracted. The obtained crude extractÃ¢Â€Â™s activity was determined using Nessler reagent and measured using UV-Vis spectrophotometer with the wavelength of 500 nm. The urease of winged bean seeds was immobilized using the alginate matrix. The optimization of urease-immobilized beads could be made through the variations of natrium alginate concentration and beads formation periods in solution CaCl2. Characterization free and immobilized urease were made using the variations of urea substrate concentration, pH, temperature, and also the repeated utilization of immobilized urease. Winged bean seeds are rich with essential amino acid, such as leucine, isoleucine, histidine, phenylalanine, and valine. The urease obtained from the winged bean seeds had the optimum activity in the germination period of 8 days. The urease immobilization showed the optimum condition in the natrium alginate concentration of 5% (w/v) and beads formation period in solution CaCl2 for 60 minutes. The characterization results of free urease and immobilization had the optimum condition at the urea substrate of 0.2 M, and pH 7. Free urease had the optimum temperature of 35 oC, while the immobilized urease had the optimum temperature of 40 oC. The immobilized urease had the utilization stability up to 5 times with the relative activity of 48%. The EDX analysis results showed that the alginate did not contain N, while alginate urease beads contained N as much as 12%.
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