Investigation of the stability of uricase from *Aspergillus flavus* and its stabilization by Glucose

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Abstract

Uricase or urate oxidase is an enzyme that converts uric acid (with low solubility) to 5-hydroxyisourate and finally to allantoin. At high levels of uric acid, the possibility of developing some diseases like gout and kidney stones will be increased. Therefore, uricase can be used as drug enzyme to reduce the levels of uric acid in blood. The low stability of proteins (such as drug enzymes) is a challenge in their usages. Using of additives is one of the approaches which can be utilized for the protein stabilization. In this study, *E. Coli* BL21 (DE3) was transformed by pET28a (+) vector carrying *Aspergillus flavus* uricase gene. The recombinant protein was expressed and then purified via a Ni-NTA agarose chromatography column. After the enzyme purification, the thermal stability of the purified enzyme was evaluated and then it was stabilized by additives. The results showed that the activation and purification process of the enzyme was successful. The thermal stability results indicated that uricase maintains its stability up to 20 °C and then loses its stability. The half-life of enzyme was 30 min at 40 °C. The results of enzyme stabilization by 20% (v/w) concentration of glucose and sorbitol as well as by 20 % (v/v) of glycerol showed that glucose had the most stabilization effect on the uricase among the additives. The stability (half life) of enzyme was increased more than two times in the presence of glucose. Finally, it can be concluded that the additives like glucose which increase the surface tension have the most stabilization effect on the uricase enzyme stability.

**Keywords:** Uric acid, Uricase, Stabilization, Additives, Glucose.