



Heterologous Expression of Cu/Zn-Superoxide dismutase from *Avicennia marina* in- *Escherichia coli*.

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ABSTRACT

Superoxide dismutase is an antioxidant enzyme which protects cells from destructive effects of superoxide anion. This enzyme catalyze dismutation of anion superoxide into molecular oxygen and hydrogen peroxide. So far, efforts have been made to improve the efficiency and stability of this enzyme because of its importance in medical application. The purpose of this research is cloning, expression, purification and caractrization of a novel CuZn-SOD from *avicennia marina* (AmCuZn-SOD). For this purpose, the coding sequence of CuZn-SOD was cloned into expression vector pET-28a. Then this recombinant plasmid was transformed to *Escherichia coli* strain Rosetta (DE3). The protein was expressed as a His-tag fusion protein which was purified by affinity chromatography. The expressed protein contain 188 amino acid residues and its molecular weight is 19 kDa. The activity of this enzyme was measured presence of Cu and/or Zn as well as control medium. The stability of the enzyme was measured in the temperature range of 25-75°C and pH range of 3-12. Base on the results we found that AmCuZn-SOD has its best activity by addition of both copper and zinc ion to culture of bacteria, The optimum temperature/pH for the activity were temperature of 25°C/pH3-8. These results open new window for application of recombinant form of AmSOD in the medicine and industry.

Key words: Antioxidant Enzyme; Superoxide Dismutase; Avicennia Marina; Heterologous expression; Activity; Stability