

Investigation of Inhibition Kinetics of Some Heavy Metals on Glucose-6-Phosphate Dehydrogenase Enzyme from Turbot Gill Tissue

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Aim of the study: Glucose-6-phosphate dehydrogenase (G6PD) catalyzes the first and rate-limiting reaction of pentose phosphate pathway producing NADPH, involved in the transformation of glucose into ribose, which is necessary for various biosynthetic reactions. Erythrocytes use pentose phosphate pathway in the production of NADPH; and in case of G6PD deficiency, NADPH levels significantly decreases. Thus, inhibition of G6PD activity may cause several deficiencies within the body.

Material and Methods: In this study, G6PD enzyme of Turbot (*Psetta maxima*) gill tissue was partially purified and effects of some heavy metals on enzyme activity was examined. The homogenate of turbot gill was initially prepared for the purification of the total G6PD enzyme from the extract. Ammonium sulfate precipitation and dialysis steps were performed. Enzyme activity was measured spectrophotometrically at 340 nm.

Results: Optimum values of ionic strength, pH and substrate concentrations for turbot gill G6PD were examined. Inhibitory effects of some common heavy metals, namely Ag^{+1} , Cr^{+3} , Ba^{+2} , and Zn^{+2} on the enzyme were also investigated. Each of the heavy metals showed inhibitory effect on enzyme activity. I_{50} values of tested heavy metals were determined as 0.03 mM, 2.5 mM, 0.97 mM, and 0.8 mM, respectively.

Keywords: Glucose-6-phosphate dehydrogenase, inhibitor, heavy metal, turbot.