

Assay for heavy metals using an inhibitive assay based on the acetylcholinesterase from *Clarias batrachus*

ABSTRACT

Acetylcholinesterase (AChE) is usually used as an inhibitive assay for insecticides. A lesser-known property of AChE is its inhibition by heavy metals. In this work, we evaluate an AChE from brains of *Clarias batrachus* (catfish) exposed to wastes from aquaculture industry as an inhibitive assay for heavy metals. We discovered that the AChE was inhibited completely by Hg^{2+} , Ag^{2+} , Pb^{2+} , Cu^{2+} , Cd^{2+} , Cr^{6+} and Zn^{2+} during initial screening. When tested at various concentrations, the heavy metals exhibited exponential decay type inhibition curves. The calculated IC_{50} (mg/L) for the heavy metals Ag^{2+} , Cu^{2+} , Hg^{2+} , Cr^{6+} and Cd^{2+} were 0.088, 0.078, 0.071, 0.87 and 0.913, respectively. The IC_{50} for these heavy metals are comparable, and some are lower than the IC_{50} values from the cholinesterases from previously studied fish. The assay can be carried out in less than 30 minutes at ambient temperature.

Keyword: *Clarias batrachus*; Acetylcholinesterase; Heavy metals; Inhibitive assay