Assay for heavy metals using an inhibitive assay based on the acetylcholinesterase from Channa striatus

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 striped snakehead (Channa striatus) wastes from aquaculture industry as an inhibitive assay for heavy metals. We discovered that the AChE was inhibited almost completely by Hg2+, Ag2+ and Cu2+ during an initial screening. When tested at various concentrations, the heavy metals exhibited exponential decay type inhibition curves. The calculated IC50 for the heavy metals Hg2+, Ag2+, Pb2+, Cu2+ and Cr6+ were 0.08432, 0.1008, 0.1255, 0.0871, and 0.1771, respectively. The IC50 for these heavy metals are comparable and some are lower than the IC50 values from the cholinesterases from previously studied fish. The assay can be carried out in less than 30 minutes at ambient temperature.

Keyword: Channa striatus; Acetylcholinesterase; Heavy metals; Inhibitive assay