

The use of *Lates calcarifer* as a biomarker for heavy metals detection

ABSTRACT

Fish are ubiquitous organisms that have many features that designate their potential as a biomarker of heavy metals pollution. Thus, an investigation was done to detect the effect of heavy metals on cholinesterase (ChE) activity from *Lates calcarifer* organs which were gill and muscle. Ammonium sulphate precipitation was performed along with ion exchange chromatography to purify the enzyme. In the substrate specificity study, ChE from *L. calcarifer* gills was capable of breaking down acetylthiocholine iodide (ATC) at a faster rate compared to the other two synthetic substrates, which are butyrylthiocholine iodide (BTC) and propionylthiocholine iodide (PTC). In contrast, the muscle ChE has a higher affinity towards PTC. The maximum activity of ChE observed at the temperature ranging from 20 to 30 °C in Tris-HCl buffer pH 8. ChE from the two organs of *L. calcarifer* showed an inhibitive reaction towards heavy metals, but with different effects. ATC from gills showed 50 % inhibition by Cu, Hg and Pb, while PTC from muscle showed 50 % inhibition by Pb. The variation of inhibitory effect that was shown by ChE from *L. calcarifer* organs can be further studied in designing a biosensor kit that is sensitive towards heavy metal.

Keyword: Biomarker; Biosensor; Cholinesterase; Heavy metals