

## **An alternative inhibitive assay using *Monopterus albus* (Asian swamp eel) acetylcholinesterase for metal ions detection**

### **ABSTRACT**

Introduction: Cholinesterase-based biosensor well known as a sensitive method to detect the existence of harmful dissolve compound in any types of water sources especially river. Methods: This method can be applied as a preliminary screening to determine the contamination level of the river in a short of time as well as low cost and easy to operate. The aim of this study to assess the use of acetylcholinesterase source from the brain tissue of Asian swamp eel; *Monopterus albus* as a potential environmental biosensor. Results: Purified acetylcholinesterase was exposed with a different type of metal ion, and mercury show the highest inhibition which capable of lowering the enzyme activity to 0.018U followed by copper (1.280U), chromium (4.675U) and zinc (4.803U) at 10 ppm. Metal ions show exponential decay type inhibition curves with calculated half maximal inhibitory concentration; IC<sub>50</sub> in the ascending sensitivity order of copper, chromium, zinc and mercury at 1.329, 0.687, 0.595 and 0.004 ppm, respectively. Field trial works exhibited that the enzyme was applicable in sensing heavy metals pollution from the river which closes to the industrial and agricultural sites at near real time and verified using ICP-OES. Conclusion: This study proves the potential use of acetylcholinesterase source from *M. albus* as a biomonitoring tool to evaluate the contamination level of the river.