

## **Acetylcholine receptor-based biosensor derived from Asian swamp eel, *Monopterus albus* for heavy metals biomonitoring**

### **ABSTRACT**

Cholinesterase-based biosensor well known as a sensitive method to detect the existence of harmful dissolved compounds in any type of water source, especially the river. This alternative biosensor can be used to determine the level of pollution of the water in a short period of time as well as to evaluate the low cost and simple service. The aim of this study was to exceed the effectiveness of acetylcholinesterase source extracted from the brain tissue of Asian swamp eel; *Monopterus albus* as a potential environmental biosensor. Purified acetylcholinesterase exposed to a different type of metal ions and mercury showed the highest percentage of inhibition at 62.9% followed by chromium at 59.22% while silver, arsenic, cadmium, cobalt, copper, nickel, zinc and lead at not more than 50% (approximately 37-50%). Metal ions such as mercury, zinc, chromium and copper showed exponential decay type inhibition curves with calculated half maximal inhibitory concentration; IC<sub>50</sub> in the ascending sensitivity order 0.005, 0.595, 0.687 and 1.329 mgL<sup>-1</sup>, respectively. Field trial works exhibited that the acetylcholinesterase was applicable in sensing heavy metals pollution from the river which closed to the industrial and agricultural sites at near real-time and verified using ICP-OES. This study proves the potential use of acetylcholinesterase sourced from *M. albus* as a biomonitoring tool to assess the contamination level of the river.