

Assessment of acetylcholinesterase (AChE) from *Oreochromis mossambicus* (Cuvier, 1831) as a source of enzyme for insecticides detection

ABSTRACT

In this work we assess the potential of acetylcholinesterase (AChE) from *Oreochromis mossambicus* (Toman) as a sensitive test for the presence of insecticides. The partial purification and characterization of a soluble AChE from *Oreochromis mossambicus* brain tissues using affinity chromatography gel (procainamide-Sephacryl S-1000) showed that the partially purified AChE was most active on acetylthiocholine (ATC) but had low activities on propionylthiocholine (PTC) and butyrylthiocholine (BTC), indicating that the partially purified fraction was predominantly AChE. Soluble AChE was partially purified 9.27-fold with a 91.12% yield. The partially purified AChE displayed the highest activity on ATC at pH 7 and at 30°C using 0.1 M Tris buffer. The enzyme exhibited Michaelis-Menten kinetic constants, K_m , for ATC, BTC and PTC at 36, 77 and 250 μM , respectively, and the maximum velocities, V_{max} , were 18.75, 0.12 and 0.05 $\mu\text{mol}/\text{min}/\text{mg}$ protein, respectively. Moreover, the AChE from *Oreochromis mossambicus* presented comparable sensitivity to carbamates and organophosphates insecticides than that from *Electrophorus electricus* and many other fish AChE by comparing half maximal inhibitory concentration values. Therefore, the enzyme is a valuable source for insecticides detection in Malaysian waters at lower cost.

Keyword: AChE; *Oreochromis mossambicus*; Affinity chromatography; Characterization