Assessment of Monopterus albus liver as a source of Cholinesterase for the detection of heavy metals

ABSTRACT

Heavy metals pollution has now become a serious environmental problem worldwide especially in Malaysia River. As a precaution, continuous environmental monitoring is needed to minimize heavy metal to the ecosystem. Inhibitive enzyme assay based on enzyme including cholinesterase has been introduced as a rapid, cheap and reliable method to assess the level of contamination in the river. In this study, the Asian swamp eel, Monopterus albus, was selected and determined of the sensitivity level towards heavy metals. The liver of M. albus was extracted and purified using ion exchange chromatography of which DEAE sepharose as the matrix of the column. Based on the Ellman assay, cholinesterase was obtained at 4.86 purification fold with the percentage recovery of 30.32 %. The enzyme works optimally at pH 9 (0.1 M Tris-HCl buffer) and 25 oC, while BTC; 369x103 U.mg-1 was selected as a the preferable substrate which shows highest catalytic efficiencies compared to ATC and BTC at 1457 x 103, 1220 x 103 and 488 x 103 Vmax.Km-1, respectively, Cholinesterase was tested with eight metal ions at the concentration of 5 ppm and the ascending order of inhibition is as followed; arsenic = chromium \leq plumbum \leq copper \leq argentum = nickel < mercury. From this study, the ability of cholinesterase partially purified from the liver tissue of M. albus has the potential to be an assay for heavy metals.