

Biochemical biomarkers: fish cholinesterase biosensor for heavy metals detection in aquatic pollution monitoring

ABSTRACT

Recently, the contamination of heavy metals towards the environment especially in aquatic system has drastically increased. Heavy metals are able to transform into persistent metallic compound in which it can be accumulated within the organisms' body system, disrupting the food chain and eventually threatened the human life. The occurrence of heavy metals spillage in the rivers and lakes are due to the careless disposal of excess heavy metals used for human activities. The accumulation of heavy metals in water system will affect all aquatic organisms especially fish. The toxicity of copper in fish can be determined by several changes in the fish under treatment with heavy metals sub-lethal concentration, LC50 within 96-hours period of acute exposure. Therefore, fish can be considered as a high potential biomarker for monitoring heavy metals pollution in aquatic system. Several selective organs are highly sensitive to the xenobiotic pollution and express changes to the exposure. One of the most potential biomarker is the biochemical biomarker of cholinesterase (ChE) inhibition by heavy metals in fish has been well studied in pollution monitoring recently. Thus, this paper gives an overview of the manipulation of fish as a biomarker of heavy metals through enzymatic reaction which have proven to be very useful in the environmental pollution monitoring.

Keyword: Biomarker; Biosensor; Cholinesterase; Fish toxicity; Heavy metal pollution