World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:9, No:06, 2015

Assessment of Diagnostic Enzymes as Indices of Heavy Metal Pollution in Tilapia Fish

Authors : Justina I. R. Udotong, Essien U. Essien

Abstract : Diagnostic enzymes like aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) were determined as indices of heavy metal pollution in Tilapia guinensis. Three different sets of fishes treated with lead (Pb), iron (Fe) and copper (Cu) were used for the study while a fourth group with no heavy metal served as a control. Fishes in each of the groups were exposed to 2.65 mg/l of Pb, 0.85 mg/l of Fe and 0.35 mg/l of Cu in aerated aquaria for 96 hours. Tissue fractionation of the liver tissues was carried out and the three diagnostic enzymes (AST, ALT, and ALP) were estimated. Serum levels of the same diagnostic enzymes were also measured. The mean values of the serum enzyme activity for ALP in each experimental group were 19.5±1.62, 29.67±2.17 and 1.15±0.27 IU/L for Pb, Fe and Cu groups compared with 9.99±1.34 IU/L enzyme activity in the control. This result showed that Pb and Fe caused increased release of the enzyme into the blood circulation indicating increased tissue damage while Cu caused a reduction in the serum level as compared with the level in the control group. The mean values of enzyme activity obtained in the liver were 102.14±6.12, 140.17±2.06 and 168.23±3.52 IU/L for Pb, Fe and Cu groups, respectively compared to 91.20±9.42 IU/L enzyme activity for the control group. The serum and liver AST and ALT activities obtained in Pb, Fe, Cu and control groups are reported. It was generally noted that the presence of the heavy metal caused liver tissues damage and consequent increased level of the diagnostic enzymes in the serum.

Keywords : diagnostic enzymes, enzyme activity, heavy metals, tissues investigations
Conference Title : ICSEA 2015 : International Conference on Sustainable Environment and Agriculture
Conference Location : New York, United States
Conference Dates : June 04-05, 2015