

Lactate dehydrogenase in the guppy fish (*Poecilia reticulata*) as a biomarker of heavy-metal pollution in freshwater ecosystems

Abstract

Heavy metal concentrations and allozyme variations were determined in females of guppy fish (*Poecilia reticulata*) populations collected from polluted and unpolluted sites. The concentrations of Cu and Fe were significantly ($P < 0.05$) higher in guppies collected from polluted drainage compared to the unpolluted population. Higher concentrations of Cu, Fe and Zn ($P < 0.05$) were found in the surface sediment, indicating contamination by the three metals in the polluted drainage. The insignificant difference ($P > 0.05$) in the Zn concentrations between the polluted and the unpolluted populations indicated that Zn, as a major essential metal, was regulated in this freshwater fish. Seven enzyme systems EST, G6PDH, LDH, MDH, PGI, PGM, and SDH were tested. Only LDH (lactate dehydrogenase) was found to be a good biomarker for the contamination of Cu and Fe in *P. reticulata*. The zymogram of the unpolluted wild population showed the same monomorphic allele as the unpolluted domesticated guppies from a pet shop, thus, further confirming LDH in *P. reticulata* as a good biomarker of contamination by Cu.

Keyword: *Poecilia reticulata*; Allozyme; Heavy metals; Biomarker