

Glutathione S-transferase as a Biomarker of Marine Pollution in Moroccan Coasts

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Abstract

The aim of this work is to study, as a biomarker of pollution, the glutathione S-transferases of three species of Mollusks living in the Moroccan coasts (Atlantic and Mediterranean ones): *Donax trunculus*, representative of sandy beach, *Mytilus galloprovincialis* and *Perna perna* which characterize rocky substrate. Two types of sites were considered: a reference site (Cap Ghir) and a polluted one (Anza). GST characteristics were studied using CDNB as substrate. The optimal temperature occurred at 30 °C for the two species of mussels and at 25 °C for *D. trunculus*. The activity was sensitive to pH variation. The highest activity was found at pH 7.5, in all cases. Organ distribution of the enzyme was different in the organisms studied. In both *Mytilidae* species, the highest activity was noted in digestive gland, followed by mantle in *M. galloprovincialis* and muscle in *P. perna*. In *D. trunculus*, the maximal activity was recorded to visceral mass. The Michaelis constants were determined: Km values were 702.4, 403.4 and 660 µM; Vm values were 22.2, 21.2 and 333 nmoles/min/mg P respectively for *M. galloprovincialis*, *P. perna* and *D. trunculus*. Seasonal variations showed highest activity in summer and autumn and lowest ones in the winter and spring, in the two sites studied. These variations are in relation with the reproductive cycle: the periods of maximal and minimal activities coincide respectively with gametogenesis and spawning periods. These data demonstrate that seasonal variations must be considered in any monitoring programs using GST activity as a biomarker of pollution. A comparative study was conducted in the two sites studied in order to show link between seawater contamination and GST activity. Effectively, the activity was significantly induced in the contaminated site (Anza) compared to reference one (Cap Ghir), in the three species. These results indicate that GST activity is sensitive to pollutants in sea water and validate the enzyme in these species as biomarker of marine pollution ecosystems.