CHANGES IN THE ACTIVITY OF GST ENZYME ON MUSSEL (*MYTILUS GALLOPROVINCIALIS*) EXPOSED TO ANTIFOULING AGENT ZINC PYRITHIONE

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Abstract
Zinc pyrithione (Zpt) is widely used in various areas ranging from medicine to the treatment of skin diseases, from cosmetic industry, anti-dandruff shampoo to paint industry as an antifouling material. According to our results we can assumed that although there is significant differences in GST enzyme activity between experiment groups (0.02 ppm and 0.04 ppm) no correlation in the manner of dose response as increasing concentrations did not stimulated GST enzyme activity probably a higher concentration of ZnPT caused toxic effects on the hepatocytes and gills of mussels *M. galloprovincialis*.

Keywords: Bivalves, Mediterranean Sea

Introduction
Zinc pyrithione is widely used in various areas ranging from medicine to the treatment of skin diseases, from cosmetic industry, anti-dandruff shampoo to paint industry as an antifouling material (1). At the same time, it is necessary to evaluate zinc pirition as an ecotoxicologic material since it is an alternative biosit to tribütilin (TBT). Zinc pyrithione rapidly accumulated in the tissues of the exposed mussels, proportionately to both exposure concentration and time, identifying the gills and digestive gland as important targets in the biological pathway of the contaminants. Monitoring of biomarkers in sentinel organisms is very essential for assessing the ecosystems health and further more mussels which are highly important among the aquatic organisms can be one of the most suitable organisms for bioexperiences and toxicologic researches. *M. galloprovincialis* is a very sensitive 'early warning' tool for various kind of pollutants such as POP's, heavy metals and micropollutants of a marine environment. Changes in enzyme activity is a good biomarker for assessing the pollutant effects on organisms (2). Glutathione –S- transferase enyzme one of the member of antioxidant defence system takes important part in detoxification of pollutants. Numerous studies with the observing changes in GST enzyme activities has been used by many researchers (3, 4).

Methods and Results
To assess changes in GST enzyme activity mussels were exposed to the two concentrations (0.02 and 0.04 ppm) of Zpt. GST enzyme activity was 0.098 µ mol/min/mg protein so it increased compared with control group (0.075) at low concentration (0.02 ppm) but in higher concentration GST activity did not increase (0.083 – 0.038 in hepatopancreas and gill respectively) compared with 0.02 ppm. According to our results we can assumed that although there is significant differences in GST enzyme activity between experiment groups (Table1)

Tab. 1. The results of GST enzyme activity of hepatopancreas and gill tissue of mussel (*Mytilus galloprovincialis*)

Conc. (mg/L)	Protein (mg/mL)	GST Activity (µmol/mL/min)	GST Specific Activity (µmol/min/mg) protein
Control Hepato	11.926 ± 0,92	0,894± 0,04	0,075
0.02 ppm	7,476± 0,39	0,733± 0,02	0,098
0.04 ppm	9,151± 0,50	0,762± 0,04	0,083
Control Gill	9,038 ± 1,51	0,526 ± 0,02	0,058
0.02 ppm	2,888 ± 0,75	0,437 ± 0,01	0,151
0.04 ppm	7,876 ± 0,10	0,300 ± 0,03	0,038

in hepatopancreas and gill no correlation in the manner of dose response as increasing concentrations did not stimulated GST enzyme activity probably a higher concentration of ZnPT caused toxic effects on the hepatocytes and gills of mussels *M. galloprovincialis* (Fig1).

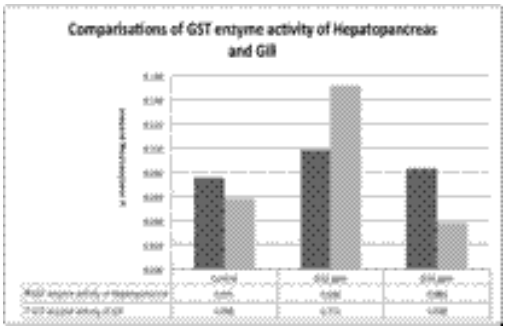

Fig. 1. Comparison of GST enzyme activity of hepatopancreas and gill in mussel (*Mytilus galloprovincialis*)

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