

HEAVY METAL DISTRIBUTION IN COASTAL AREAS OF SARONIC GULF WITH THE AID OF THE BIOLOGICAL INDICATORS *PATELLA SP.* AND *SIPHONARIA SP.*

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EXTENDED ABSTRACT

Environmental pollution appears to be one of the major problems in modern societies and the threat posed to marine ecosystems is more evident than ever. In particular, coastal areas suffer from more and more polluted effluents due to human activities. The quality of the Saronic Gulf seawater has declined due to the disposal of municipal and industrial wastes and other anthropogenic activities. Heavy metals comprise a category of severe pollutants introduced in the marine medium from both natural and anthropogenic sources. Their toxicological effects in organisms and the environment need to be investigated. Measuring heavy metal concentrations in the tissues of bioindicators can offer valuable information of an ecosystem's health, assessing the bioavailability of the pollutants. Limpets of the species *Patella* and *Siphonaria* fulfill the qualifications for their use as bioindicators.

In the present study, the levels of chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), nickel (Ni) and zinc (Zn) were determined in the soft tissues of the bioindicators *Patella sp.* and *Siphonaria sp.* collected from 11 different coastal areas along the Saronic Gulf (from Sounio to Poros island). Metals were measured by atomic absorption spectrometry. The physical characteristics of limpets (size and weight) and their heavy metal content along the coastlines of Saronic Gulf were examined as well as the comparison of their levels with other areas worldwide.

The selectivity of bioindicators was found to be significant with regard to bioaccumulation of certain metals. Thus, *Patella sp.* accumulates more chromium and iron, whereas copper, nickel and zinc are more readily accumulated by *Siphonaria sp.*. No differentiation was observed for manganese. It was found that coastal areas subjected to industrial and marine activities, as well as municipal discharges are more susceptible to heavy metal contamination. In addition, natural sources of heavy metals, such as ground deposits, are responsible for high concentration levels recorded in some sampling stations. On the other hand, areas with limited municipal, industrial and marine activities or where seawater is renewed continuously seem to be less contaminated. The differences and similarities ascertained among the sampling stations are attributed to biological parameters, such as the different species, size and weight of bioindicators.

Key words: bioindicator, biomonitoring, bioaccumulation, bioavailability, patella, siphonaria, pollution, heavy metals, Saronic Gulf