



The impact of mining activities on the hypersaline Mar Menor lagoon

M. Dassenakis^{a*}, G. Garcia^b, E. Diamantopoulou^a, J.D. Girona^b, E.M. Garcia-Marin^b,
G. Filippi^a, V. Fioraki^a

^aDepartment of Chemistry, Laboratory of Environmental Chemistry, National and Kapodistrian University of Athens, Greece
Tel. +30 2107274269; Fax +30 210 7274945; email: edasenak@chem.uoa.gr

^bAgricultural Science and Technology Department, Soil Science and Agricultural Chemistry Unit,
Technical University of Cartagena, Spain

Received 25 February 2009; Accepted 9 July 2009

ABSTRACT

Mar Menor lagoon is one of the largest hypersaline coastal lagoons in the Mediterranean Sea. The lagoon is threatened by environmental degradation due to the urban growth around it, the intensive agriculture in its watershed and the remains of mining activities in the nearby Cartagena-La Unión area. The present study aims at estimating the levels of zinc and lead in the water column, sediments and marine flora and fauna of Mar Menor lagoon. The ranges of the total concentrations in the water column were 9.36–28.7 mg/L for Zn, 1.61–12.6 mg/L for Pb and 3.01–29.70 mg/L for Mn. Zinc was mostly found in the dissolved phase (70%) whereas lead and manganese in the suspended phase (63–76%). Highest values were measured at stations closer to streams flowing through drainage basins including agricultural zone and the mining remains. Concerning sediments, the values were very high especially at the southern part, indicating transport of suspended matter from currents. The metal content in the sediments is higher than the content in particulate matter and there is an increased bioavailability of Zn and Pb. Zinc and lead were measured in the thallus of four marine flora species. Maximum zinc concentration was measured in *Cymodosea nodosa* (132 mg/g) and maximum lead in *Acetabularia acetabulum* (93.5 mg/g) in samples from the southern lagoon. From the two benthic fauna species studied, it was observed that heavy metals accumulate mostly in the animal flesh. The highest concentration of Zn and Pd was measured in the flesh of the mollusk *Ostrea edulis* with values of 1,856 and 51.0 mg/g respectively. These values reveal the effect of heavy metal pollution in the lagoon ecosystem.

Keywords: Zinc; Lead; Manganese; Ferrum; Mar Menor; Lagoon; Marine flora; Benthic fauna

* Corresponding author.