Geophysical Research Abstracts
Vol. 13, EGU2011-6844, 2011
EGU General Assembly 2011

Trace element content in plants collected in Portman bay (SE, Spain).

Carmen Perez-Sirvent (1), Maria Jose Martínez-Sanchez (1), Mari Luz Garcia-Lorenzo (1), Manuel Hernandez-Cordoba (2), and Jose Molina-Ruiz (3)

(1) University of Murcia, Agricultural Chemistry, Geology and Pedology, Murcia, Spain, (2) University of Murcia, Departement of Analytical Chemistry, Murcia, Spain, (3) University of Murcia, Department of Geogrpahy, Murcia, Spain

The remediation of heavy metal-contaminated sites using hyperaccumulating plants represents a promising alternative to currently used methods. The potential of Limonium carthaginens was examined to determine its tolerance and ability to accumulate metals for phytoremediation purposes, in polluted soils.
For this study, sediment samples were collected from Portman Bay (Murcia, SE Spain). Portman bay is situated close to the mining region of La Unión. The entire area around the bay was subject to mining from the time of the Roman Empire to 1991. Since 1957, the wastes from mining operations were discharged directly into the sea in the inner part of the bay, while later on, they were also discharged to sea at a distance of the shore. These wastes mainly consisted in ore materials (galena, pyrite and sphalerite), phylosilicates, in addition to siderite, iron oxides and sometimes alteration products such as jarosite, alunite, kaolinite and greenalite. These materials have suffered a concentration process by floatation with sea water and as a result of the discharge, the whole of the bay has filled up with wastes which also extend into the Mediterranean itself.
To determine the total trace element content, an acid digestion was carried out in soil samples and in the lyophilized vegetable samples. In order to evaluate the phytoextraction potential of the selected plants, the transfer factor (TF) and the bioconcentration factor (BCF) were calculated.
Average trace element content in root samples was 392.6 mg kg-1 for Zn, 138.4 mg kg-1 for Pb, 3.3 mg kg-1 for Cd, 910.2 mg kg-1 for Fe, 8.5 mg kg-1 for As, 11.1 mg kg-1 for Cu and 75.2 mg kg-1 for Mn. On the other hand, average trace element content in leaf samples was 297 mg kg-1 for Zn, 137.8 mg kg-1 for Pb, 2.9 mg kg-1 for Cd, 900.8 mg kg-1 for Fe, 2.7 mg kg-1 for As, 8.1 mg kg-1 for Cu and 28.6 mg kg-1 for Mn. Limonium carthaginens could be considered as a tolerant species but not as hyperaccumulator, since tolerant species tend to restrict the transfer from roots to leaves, whereas the hyperaccumulator species transfer trace elements to the aerial biomass (BCF and TF values lower than 1).