

EMEC 1 ∞

CHEMISTRY TOWARDS AN INFINITE ENVIRONMENT

18th European Meeting on Environmental Chemistry

Porto 26-29th November 2017



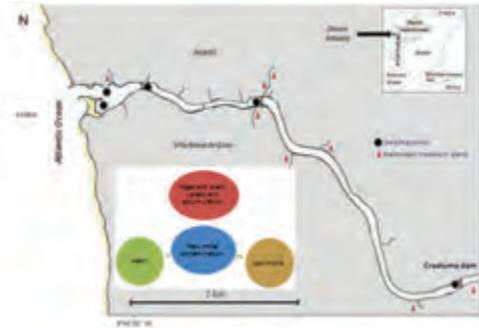
BOOK
OF ABSTRACTS



Assessment Of Trace Metal Contamination of Water, Sediments and Flora From Douro River Estuary, Portugal

PP Env Monit #55

C. Ribeiro^{1,2*}, C. Couto^{1,3*}, A.R. Ribeiro^{1,4}, A.S. Maia^{1,5}, M. Santos¹, M.E. Tiritan^{1,2,6}, E. Pinto³, A.A. Almeida³, (1) CESPU, IINFACTS, Portugal, (2) CIIMAR/CIMAR, UP, Portugal, (3) LAQV/REQUIMTE, FFUP, Portugal, (4) Present affiliation: LSRE-LCM, FEUP, Portugal, (5) CBQF, ESB-UCP, Porto, Portugal, (6) LQOF FFUP, Portugal, *claudia.ribeiro@iucs.cespu.pt



Human activities are major sources of pollutants released into the aquatic environment. Most of these pollutants are considerably toxic and have the potential of accumulation in organisms [1]. Among them are trace metals due to their high persistence and low degradability in the environment [2]. The aim of this study regards the presence, distribution, sources and biotic accumulation of trace metals in water, sediments and local flora from Douro River estuary. The Douro River is one of the largest of the Iberian Peninsula, with a watershed shared between Spain and Portugal. The estuary is located between two densely populated cities and is highly impacted by anthropogenic activities, such as industry and agriculture. For this purpose, estuarine water samples and sediments were collected at five sampling points along the estuary at low tide to evaluate spatial distribution, possible sources and accumulation of trace elements into the estuary. Algae and plants were collected on the riverside at the same sampling points. Water, sediments and flora tissues were digested by a microwave-assisted digestion procedure and analysed by ICP-MS for their trace elements concentration (Li, Be, Al, V, Cr, Co, Ni, Cu, Zn, Se, Mo, Ag, Cd, Sb, Ba, Tl, Pb and U). Physicochemical parameters, such as pH, conductivity, dissolved oxygen, nitrates, nitrites, ammonium, orthophosphates were also determined in waters and sediments for evaluation of anthropogenic impact and influence on metals availability. Results showed high levels of nitrates and ammonium, above the limits set in the Portuguese legislation (Decreto-Lei n^o 236/98, up to 50 mg L⁻¹ and 0.5 mg L⁻¹, respectively). All

selected trace elements were detected in water and sediments. Water levels for most trace elements were lower than the limits established by the EU for drinking water quality [3]. Nevertheless, Al and Pb (up to 924.7 and 55.5 µg L⁻¹, respectively) were above the maximum permissible values of 200 µg L⁻¹ for Al and 10 µg L⁻¹ for Pb [3]. This is of high concern since surface water of Douro River is used for irrigation of local rural activities and for the production of drinking water. Highest metals levels were found at the mouth and at sampling stations located near discharges of wastewater treatment plants. Aluminum was one of the most abundant elements in water and sediments. Mean values for Al were up to 924.7 µg L⁻¹ in water and 12,400 µg Kg⁻¹ in sediments. Considering local flora, all trace metals were also found, showing uptake and accumulation of these trace elements in plants and algae. Highest values were found in roots and leaves tissues. Similarly to water and sediments, Al was the most abundant element found in plants and algae. Al concentration was higher in roots and leaves of various species compared with surrounding sediments and water demonstrating a possible bioaccumulation of these element in local flora. Data shows the occurrence of trace metal in estuarine water from Douro river estuary and their accumulation in sediments and biota.

Acknowledgements

This work was supported by FCT, Ministério da Ciência, Tecnologia e Ensino Superior (MCTES), under Project PTDC/SAU-ESA/108871/2008, and CESPU, through Projects MYCO-CESPU-2016 and ChiralDrugs-CESPU-2017.

References

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