Contribution of the plant/rhizosediment system to the phytoremediation of metals

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Salt marshes have an important ecological role. However, they receive important anthropogenic inputs of contaminants and their great sensitivity makes them very difficult to clean.

It is already known that phytoremediation is a low damaging and high cost-effective method for the recovery of contaminated areas. Some salt marsh plants have already shown to have potential for metal phytoremediation in estuarine areas (e.g [1]), being important to study strategies to enhance that potential, an aim embraced in the PHYTOBIO project. In the frame of that project, the aim of this work was to evaluate how the plants *Juncus maritimus and Phragmites australis* responded to a Cd contamination, evaluating both short term and long term exposure, and how metal was distributed between plant and sediment after the contamination.

For that, plants of both species from Rio Lima estuary were sampled together with the sediment involving their roots, placed in vessels and maintained in greenhouses, exposed to natural environmental and light conditions. Similar vessels were prepared with uncolonized sediments. A nutritive saline solution was added twice a day to all vessels through an automated irrigation system to mimic the tides and maintain plants at optimum nutritional conditions. After 2 weeks of acclimation, vessels were spiked with a saline cadmium solution (20 mg L^{-1} of Cd, as CdCl2). Solution was in contact with the system sediment/root plant for about 6h, being half of the vessels dissembled afterwards. The other lot of vessels was maintained in the greenhouses, in the abovementioned conditions, during 2 months. For vessels dissemble, plants aboveground tissues were separated from plant belowground structures, which in turn were carefully separated from the sediment. Samples were put to dry until constant weight after which cadmium was determined. Cadmium determinations were carried out, according to Almeida *et al.* [1], in sediments and in plants' roots, rhizomes, steams and leafs.

Results showed that both plants were able to uptake, in a short period of time, a considerable amount of cadmium, indicating that *J. maritimus and P. austra-*

lis have potential for cadmium phytoremediation in salt marsh areas. Most cadmium was accumulated in plants belowground tissues. For *J. maritimus* no metal translocation to the aboveground structures was observed, whereas for P. australis an eight fold increase on aboveground cadmium levels was observed, indicating different plants response to cadmium contamination.

The long term response of plants to cadmium contamination is still being evaluated and will be presented afterwards.

References

[1] Almeida C. M. R., Mucha A. P., Vasconcelos M. T. S. D. (2004). Influence of the sea rush Juncus maritimus on metal concentration and speciation in estuarine sediment colonized by the plant. Environmental Science and Technology 38: 3112-3118.

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