

ARBUSCULAR MYCORRHIZAL FUNGI ASSISTED ZN UPTAKE BY SOLANUM NIGRUM

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For many years several chemical facilities in a well know region of Portugal – Estarreja - have conducted its wastewaters into a stream nearby (“Esteiro de Estarreja”). Therefore, the levels of Zn, among other toxic metals (as Hg, Pb and As), in the sediments of this stream, to a depth of 50 cm, are above the limits established by EC Directive 86/278/EC [1]. Nevertheless the aggravation of this situation due to the high permeability of the soils in the area, in the banks of the stream the vegetation remains proliferous. This brings up the opportunity for the application of more sustainable remediation solutions, as phytoremediation.

Arbuscular mycorrhizal fungi (AMF) are a group of soil microorganisms that form symbiotic associations with the plants roots. This relation involves the reception of carbohydrates from the plant and the plant capture of mineral nutrients from the soil in order to improve plant growth and reproduction. The role of AMF in phytoremediation of heavy metals is not clear but amongst the nutrients captured metals as Zn may be included. For this, the analysis of these rhizosphere interactions seems to be a promising patch for the optimization of the plant uptake.

In past studies, in order to determine the metals uptake potential of the plants in the mentioned area, several species present in a larger amount were screened for the uptake of zinc, among other toxic metals (as arsenic, lead and mercury). *Solanum nigrum* (black nightshade) presented itself as the one with the higher ability to accumulate zinc between the plants tested (other studied plants were *Rubus ulmifolius*, *Convolvulus* sp., *Phragmites australis*).

This work aimed to use *S. nigrum* in a growth experience under Zn and arbuscular mycorrhizal fungi exposition, consisting of black nightshade plants submitted to several Zn concentrations (in a sand matrix with applied zinc and in contaminated soil collected from the banks of “Esteiro de Estarreja”). The used matrixes were inoculated with pure and mixed cultures of 4 AMF isolated from heavy metal contaminated sites. The Zn levels present in the growth matrixes and the determined Zn accumulation in different parts of the plant (root, shoot and leaves) for the different metal and AMF exposure conditions will allow to establish a relation of the metal levels in the soils with the concentrations in the plants and its colonization by different arbuscular mycorrhizal fungi.

Acknowledgements

The authors wish to thank Câmara Municipal de Estarreja for the provision of access to the site. This work was supported by Fundação para a Ciência e a Tecnologia, research grants of Ana Marques (SFRH/BD/7030/2001) and Rui Oliveira (SFRH/BD/1464/2000).

References

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