

THE USE OF SOLANUM NIGRUM FOR THE UPTAKE OF ZINC ASSISTED BY DIFFERENT ARBUSCULAR MYCORRHIZAL FUNGI

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

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). Between the plants tested, *Solanum nigrum* (black nightshade) presented itself as the one with the higher ability to accumulate zinc.

Arbuscular mycorrhizal fungi (AMF) are a group of soil microorganisms that form symbiotic associations with the plants roots in order to improve plant growth and reproduction by capturing mineral nutrients from the soil (which may include metals as Zn) and receive carbohydrates from the plant. The role of AMF in phytoremediation of heavy metals is not clear and the analysis of these rhizosphere interactions seems to be a promising patch for the optimization of the plant uptake.

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”) and 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 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.

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References

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