

ZINC UPTAKE BY SOLANUM NIGRUM WITH THE ASSISTANCE OF ARBUSCULAR MYCORRHIZAL FUNGI

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The region of Estarreja, in Portugal, is known for its strong industrial complex, composed essentially by chemical facilities. For many years, several of these industries have discharged its solid residues in an improvised park in the surrounding area and conducted its wastewaters into a stream nearby ("Esteiro de Estarreja"). Therefore, the levels of Zn, among other toxic metals – as mercury, lead and arsenic -, 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, in the banks of the stream, the vegetation remains proliferous, which brings up the opportunity for the application of a more sustainable remediation solution, as it is phytoremediation.

Arbuscular mycorrhizal fungi (AMF) are soil microorganisms that form symbiotic associations with the plants roots. This association works through the aid that AMF offer to the plants by capturing mineral nutrients from the soil (which may include metals as Zn), participating in the improvement of the plant growth and reproduction. Plants function in this association is accomplished by the offering of carbohydrates. 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.

In past studies, in order to seize the tolerance/resistance potential of the indigenous flora of the above mentioned area, several plant species present in a larger amount were screened for the uptake of zinc (as well as for lead, arsenic and mercury). Between the plants tested, *Solanum nigrum* (black nightshade) presented itself as the one with the higher ability to accumulate zinc.

This work aim was to use *S. nigrum* in a growth experience under Zn and arbuscular mycorrhizal fungi exposition. The experiment consisted of black nightshade plants submitted to several Zn concentrations (in a sand matrix with zinc applied to the 0, 100, 500 and 1000 ppm metal concentrations and in a contaminated soil collected from the banks of "Esteiro de Estarreja") and inoculated with cultures of AMF isolated from heavy metal contaminated sites (4 different pure cultures and 1 consisting of a mix of all the isolates). The determination of the Zn levels present in the growth matrixes and in the plants roots, shoots and leaves for the different metal and AMF exposure conditions will allow to establish a relation of the metal contamination 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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