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Influence of mycorhization and soil organic matters on lead and antimony transfers to vegetables cultivated in urban gardens: environmental and sanitary consequences

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The European Environment Agency estimates that c.a. 250 000 sites required clean up and that about 100 000 ha could have been contaminated by metals in Europe. Numerous remediation techniques have been therefore tested and phytoremediation appears as a sustainable and low cost in situ technique particularly for large-scale remediation of polluted arable soils. Arbuscular Mycorrhizal Fungi (AMF) are already used in phytoextraction or phytostabilisation of many metal(loid)s (GU ET AL., 2013, SHARMA AND SHARMA, 2013). However, while plant inoculation with AMF will mostly result of an increase of the plant biomass, the response for lead accumulation in shoots is contrasted (LEBEAU ET AL., 2008). Furthermore, nothing is actually known for Sb transfer to plants phytoremediation-assisted AMF. Yet recently, many researches concern the accumulation of Sb in the environment, its (eco)toxicity and the risk of bioaccumulation in vegetables (FENG ET AL., 2013), especially in some China areas where Sb mining activities have widely contaminated arable lands (WU ET AL., 2011).

Our research project, which is part of a national program for urban gardens (JASSUR, http://www.agence-nationale-recherche.fr), focused on polluted soils in associative urban gardens with both geogenic and anthropogenic origins for Pb and Sb. The impact of Pb and Sb on AMF density and diversity was studied using morphological and biomolecular approaches. The role of AMF symbiosis with Lettuce (Lactuca sativa L.) on Pb and Sb compartmentalization, speciation and phytoavailability was investigated. The influence of soil organic matters on these processes was examined. Eventually, the part of metal(loid)s available for humans in case of ingestion of lettuces unfit for human consumption (FOUCAULT ET AL., 2013; XIONG ET AL., 2013) will be assessed in relation with the influence of AMF symbiosis and organic matter.

Key Words: Mycorrhiza, Antimony, Compartmentation, Speciation, Edible Plants, Urban Agriculture.

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