Geophysical Research Abstracts
Vol. 19, EGU2017-17592, 2017
EGU General Assembly 2017

Translocation and accumulation of trace metals from the rhizosphere to the tomato and topinambur plants in a contaminated area of South Italy

Stefania Papa (1), Giovanni Bartoli (1), Marta Álvarez-Romero (2), Raúl Zornoza (2), Petronia Carillo (1), and Antonietta Fioretto (1)

(2) University of Córdoba - UCO, Department of Agricultural Chemistry and Soil Science, Faculty of Science, Córdoba, Spain (marta.alvarez.romero@gmail.com), (1) Dep. Environmental, Biological and Pharmaceutical Sciences and Technologies - University of Campania “Luigi Vanvitelli” - Via Vivaldi, 43 - 81100 – Caserta, Italy.

According to a survey of the Italian Environmental Monitoring Agency (ARPA), there are different critical sites in Campania region (South Italy) (e.i. legal or illegal landfills, countryside lands, abandoned farms, parking lots and regular streets). Literature data show that about half of the lead, cadmium and mercury contents, ingested through food, is due to the plant products (fruit, vegetables and grains) (Kachenko and Singh 2006; Liu et al 2012; Chang et al 2014; Wong et al 2002). In the health protection programs, the knowledge of heavy metals translocation from soils to plants used as food are very important with research on metal uptake by plants of food interest cultivated in contaminated soils. The goal of this work was to evaluate the translocation and accumulation of trace metals from the rhizosphere to the different parts of the plant (roots, stems, leaves, fruit) of Topinambur (Helianthus tuberosus) and tomato (Solanum lycopersicum) sampled in the coast area of Castel Volturno (Campania region, South Italy). This area is one of the critical sites according to a survey of the Environmental Monitoring Agency ARPA. In addition to these measures, malondialdehyde (MDA) activity was assayed to evaluate the stress state of the plant.
The results showed that the trace metals concentration determinated in different organs of each species studied were more present in the roots than the other plant’s parts, suggesting a probable block at root level. The only exception were Cu and Hg in tomato and topinambur plants respectively, that were mainly present in the leaves.
The metals block at the root induced no alteration of MDA. However, the correlation between this activity and Cd, Pb, V and Hg seemed to attest to a possible synergy.

Keywords: "Helianthus tuberosus", "Solanum lycopersicum", trace metal, traslocation

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