

Physiological parameters and secondary metabolites in dandelion (*Taraxacum officinale* Weber) grown on contaminated urban solid runoff

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Abstract:

The soil material eroded by urban runoff and collected in the gutters can contain contaminants. *Taraxacum officinale* is a very ubiquitous species of degraded soil found in urban environment and. It can grow in very shallow spaces between the cracks in the pavements. This study represents a preliminary approach to verify the presence of metals in the soil-like material collected by urban runoff, the metal uptake by dandelion, and therefore check the possible alteration of some of its physiological parameters in order to understand the mechanism of its adaptation. The run off was collected in three sites in the town of Pisa and analyzed for Pb, Cu, Ni, Zn after nitric-perchloric microwave digestion by Atomic Absorption Spectroscopy. The total values of Pb and Zn exceeded the limits for residential areas respectively in two and three sites. Trials were set up growing dandelion seedlings on the soil runoff material in floating cultivation. Polyphenols, antioxidants, sulphhydryl groups and chlorophyll were measured in dandelion leaves grown on the contaminated material and on the control. The phenolic compound content was extracted with methanol, and was assayed quantitatively at A765 with Folin-Ciocalteu reagent, whereas 'antioxidant power' was determined using the FRAP method. Chlorophylls a (Chla) and b (Chlb) were extracted from young leaf discs (10 mm) with N,N-dimethylformamide (DMF) and determined spectrophotometrically. The first two parameters (polyphenols and antioxidants) were higher in the run off samples compared to the control in one case, sulphhydryl groups showed no difference, and chlorophyll was lower in the run off samples. These results indicate that dandelion can survive in case of plant stress by simply altering its physiological parameters.

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