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Helichrysum italicum growing on metalliferous areas as a potential tool in phytostabilization of metal-contaminated soils.

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Plants that colonize metalliferous soils have developed physiological mechanisms that allow to tolerate high metal concentrations. Generally, metal uptake by these plants is not suppressed, but a detoxification process occurs, as a response to different strategies: some plants (accumulators) concentrate metals in the aerial parts, while others (excluders) present low metal concentrations in the aerial parts, since metals are arrested in their roots.
In several regions of Italy (e.g. Veneto, Sardinia, Tuscany), numerous abandoned mine sites are present; On these metal-contaminated soils grow both metalliferous (e.g. Silene paradoxa) and non-metalliferous plants (e.g. Taraxacum officinale). Among them, Helichrysum italicum deserved attention since it is known as essential oil producer and is also used as a medicinal plant for its anti-inflammatory properties; for this reason, it must undergo the Drug Master File certifying the absence of chemical impurities and heavy metals.
Samples of the whole plant (roots, leaves and flowers) of H. italicum have been collected at various sites, both mined and not mined, in order to ascertain its ability to uptake and translocate metals from roots to the aerial parts. Fresh and embedded material was examined by Light microscopy and Electron Microscopy (Scanning and Transmission) to ascertain possible damages in plant morphology. Dried samples were crushed, digested with HNO_3 and analysed by ICP-OE technique for heavy metal (Cu, Fe, Mn, Zn) concentrations.
Preliminary observations on the morphology of the different samples do not show significant differences in the leaf structure. The inorganic chemical composition of H. italicum was characterized by high metal content. Preliminary results of our analyses show that H. italicum accumulate metals (Mn, Zn) in roots, but do not translocate metals to the aerial parts; therefore, it may be considered an excluder plant.
On the basis of our results, the aerial parts (leaves, flowers) of this plant can be utilized for phytotherapic preparations, since they do not bear metals. Moreover the plant, that proved able to grow on very poor substrate such as those of mine waste, can be used for phytostabilization projects in environmental restoration of metal-contaminated areas; this is in agreement with current legislation that requires restoration techniques based on on-site treatment, decreased earth movement, re-utilization of restored soil.