



Are plants growing at abandoned mine sites suitable for phytoremediation of contaminated soils?

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Plants growing on abandoned mine sites are of particular interest in the perspective to remediate contaminated soils by phytoremediation, a low cost and environmental friendly technique which uses metal-accumulator plants to clean up moderately contaminated areas. The choice of plants is a crucial aspect for the practical use of this technique, given the ability to accumulate metals in their tissues, being genetically tolerant to high metal concentrations. Up today, more than 400 native plants that hyperaccumulate metals are reported, Brassicaceae being the family with the largest number of hyperaccumulator species. For example, *Alyssum bertoloni* is well known as Ni accumulator, as well as *Thlaspi caerulescens* for Zn and *Brassica napus* for Pb.

However, metal hyperaccumulation is not a common phenomenon in terrestrial higher plants, and many of the European hyperaccumulator plants are of small biomass, and have a slow growth rate. Therefore, there is an urgent need for surveying and screening of plants with ability to accumulate metals in their tissues and a relatively high biomass.

Sample Metal Mean (ppm) Range (ppm)

Waste soils

ENTISOLS Cu 3527 62-10200

Pb 301 30-830

Zn 798 110-1950

Proximal soils

INCEPTISOLS Cu 1081 16-3400

Pb 623 45-1900

Zn 792 420-1300

Distal soils

ALFISOLS Cu 193 80-340

Pb 267 160-430

Zn 672 410-890

Wild plants (e.g. fescue, plantain, common reed, mint, marigold, dandelion, moon plant, rock-rose, willow) were found to be metal-tolerant and to accumulate high levels of As, Cd, Cr, Cu, Pb, Zn in their tissues (both roots

and aerial parts), although at different extent in response to their metabolic activity, physiology, and to soil and environmental characteristics.

In conclusion, the evaluation of metal uptake by plants, combined with geobotanical observations, is an useful tool to find tolerant plant populations to be used in revegetation programs aimed at reducing the environmental impact of contaminated areas.