



UTILIZATION OF VEGETATION FOR *IN SITU* BIOREMEDIATION OF CONTAMINATED SOILS

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Abstract

Phytoremediation is the use of green plants to remove, contain, or render harmless environmental contaminants. It is a promising technology that addresses clean-up of organic solvents, PCBs, heavy metals, polyaromatic hydrocarbons, explosives and energetics, or nutrients.

The establishment of vegetation as a potential approach for the long-term management of contaminated soils may enhance the biodegradation of contaminants. Vegetation may directly aid biodegradation by accumulating, metabolizing, or volatilizing contaminants, as in the example of vegetation that hyper-accumulates metals. Nevertheless, the effect of vegetation on biodegradation might range from enhancing biodegradation to having no effect or even negative impacts. Vegetation may indirectly enhance biodegradation of contaminants through the action of rhizosphere microflora. Rhizosphere microflora are supported by exudates, such as carbohydrates and amino acids, released through plant roots and decaying vegetation. Phytoremediation may be especially suitable for shallow, contaminated soils, especially if it is used as a long-term, low-maintenance, low-cost remedial method.

The key physiological processes in phytoremediation include: stimulation of microorganism-based transformation by plant exudates and leachates, and by fluctuating oxygen regimes, slowing of contaminant transport from the vegetated zone due to adsorption and increased evapotranspiration, and plant uptake, followed by metabolism or accumulation.

Keywords: bioremediation, rhizosphere, contaminants, microbial activity, biodegradation

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