

## Potential of Castor Bean (*Ricinus Communis* L.) for Phytoremediation of Soils Contaminated with Heavy Metals

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**Abstract :** The aim of this research was to investigate the potential for the use of *Ricinus communis* L. (castor oil plant) to remediate metal-polluted sites. This study was performed in industrially polluted soils containing high concentrations of Zn, Pb and Cd, situated at different distances (0.3, 2.0 and 15.0 km) from the source of pollution - the Non-Ferrous Metal Works near Plovdiv, Bulgaria. On reaching commercial ripeness, the castor oil plants were gathered and the contents of heavy metals in their different parts - roots, stems, leaves and seeds, were determined after dry ashing. Physico-chemical characterization, total, DTPA extractable and water-soluble metals in rhizospheric soil samples were carried. Translocation factors (TFs) were also determined. The quantitative measurements were carried out with ICP. A Soxhlet extraction was used for the extraction of the oil, using hexane as solvent. The oil was recovered by simple distillation of the solvent. The residual oil obtained was investigated for physicochemical parameters and fatty acid composition. Bioaccumulation factor and translocation factor values (BAF and TF > 1) were greater than one suggesting efficient accumulation in the shoot. The castor oil plant may be preferred as a good candidate for phytoremediation (phytoextraction). These results indicate that *R. communis* has good potential for removing Pb from contaminated soils attributed to its fast growth, high biomass, strong absorption and accumulation for Pb. The concentrations of heavy metals in the oil were low as seed coats accumulated the highest concentrations of Cd and Pb. In addition, the result of the fatty acid composition analysis confirms the oil to be of good quality and can be used for industrial purposes such as cosmetics, soaps and paint.

**Keywords :** castor bean, heavy metals, phytoremediation, polluted soils

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