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TRACE ELEMENTS EXTRACTION FROM METAL CONTAMINATED SOILS- IMPLICATION FOR RECLAMATION OF GOLD MINE AREAS

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Abstract

Trace elements (TEs) in contaminated soils are considered as primary jeopardy issues in developing countries which can cause major concerns for this industry and also menace the surrounding ecosystems, human health and wildlife, so urgent reclamation methods are required. The present research aims to evaluate potential phytoremediation capability of selected plant species *Tamarix Spp.*, *Haloxylon Spp.* and *Malcolmia Africana* to grow in TE contaminated soils. Muteh Gold mine, a widespread mountainous area with mineralized soil and nine discovered ore deposits, two active gold mines and smelting sites, is located in the central part of Iran. In this research, three plant species are selected and cultivated in two main areas of the mine; Senjede mine and tailing dam. Then the plant tissues and rhizosphere soils are sampled and prepared for TEs analysis. The translocation factors (TF), bioconcentration factors (BCF) and biological accumulation coefficients (BAC) are determined in order to evaluate the phytoextraction potential of plants. Analysis of soils in different sites shows that Copper (Cu), Zinc (Zn), Lead (Pb) and Nickel (Ni) concentrations are up to 476, 88, 45 and 41 mg kg^{-1} for total metals. The highest concentration of Cu was found in *Tamarix Spp.* (141 mg kg^{-1}). According to the results of TF, BCF and BAC, we can conclude that *Tamarix Spp.* with TF of 3.27, 1.461 and 1.173 can be a temporary accumulator of Cu, Pb, and Zn respectively. Generally, *Tamarix Spp.* and *Haloxylon Spp.* might be suitable candidate species for phytoremediation to clean-up soils from contaminations.

Key words: gold mine, phytomining, phytoremediation, phytotoxicity, trace elements

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