

Phytoextraction of copper from gold mine tailings by *Sinapis alba*

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Abstract

Phytoextraction is a cost effective method of land reclamation, which uses plants as solar driven pumps to remove heavy metals, from contaminated soil. The capacity of a plant to uptake metals is often limited by the bioavailability of the metal in the soil solution. Metal bioavailability can be increased by the addition of a chelator such as Ethylenediaminetetraacetic acid (EDTA) to the growing medium. White mustard (*Sinapis alba*) was used to investigate: 1) the effects of various EDTA concentrations on the uptake of Cu and Fe in the above ground biomass of *S. alba* and 2) the effects of EDTA on plant growth and physiology. *S. alba* seeds were planted in a mix of peat and gold mine tailings containing high amounts of Cu and Fe. After four weeks, the plants were treated with 0, 0.5, 1.0, or 2.0 mmol EDTA / kg soil. Measures of germination, survival, growth parameters (height and biomass), transpiration and photosynthesis and leaf chlorophyll content were recorded over 8 weeks. Plants were harvested at two-week intervals, freeze dried and prepared for Cu and Fe analysis by ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry). Discussion will be provided to address the effects of EDTA on Cu and Fe uptake from mine tailings and the suitability of *Sinapis alba* for phytoextraction of copper.

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