



Phytoextraction of Cadmium from Contaminated Soil Using Transgenic Tobacco Plants[#]

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Abstract: Phytoremediation, the use of plants to clean up toxic metals from contaminated soil or water, represents one of the most promising, effective and technically affordable solutions. Transgenic tobacco plants, constitutively expressing Metallothionein II (MTII) genes from Chinese hamster (Ch) and *Saccharomyces cerevisiae* (Sc), were designed for phytoextraction of cadmium (Cd) contaminated soil. The recombinant proteins were targeted to the vacuole, as confirmed by immunogold labelling. In this study, transgenic and nontransgenic (*Nicotiana tabacum*, cv. Petit Havana SR-1) plants were tested for their ability to extract and accumulate Cd from soil at three different concentrations (0, 10, 20 and 30 ppm). The production of dry matter of wild type and transgenic tobacco plants was slightly affected by the treatment with Cd. Among the transgenic plants, the cV-ChMTII-GFP cassette transformed plants showed the highest dry weight. The level of Cd in the wild type and transgenic tobacco plants did not significantly differ. The results showed that the over-expressions of metallothioneins (MTs) increased plant tolerance to Cd. However, future researches are needed to confirm these findings under field conditions.

Key words: Phytoremediation, metallothionein, cadmium, vacuolar targeting, *Nicotiana tabacum*, transgenic tobacco.

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