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Effects of EDTA and DTPA on Lead and Zinc Accumulation of Ryegrass

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Author(s)

Hua-Yin Zhao, Li-Jin Lin, Qiao-Lun Yan, Yuan-Xiang Yang, Xue-Mei Zhu, Ji-Rong Shao

ABSTRACT

The tailing ponds of lead-zinc mines are artificial environment pollution sources, and also important dangerous sources of heavy metal contamination in lead-zinc mining areas. To study the effects of Ethylene Diamine Tetracetic Acid (EDTA) and Diethylene Triamine Penlaacetic Acid (DTPA) on phytoremediation of lead-zinc mining area soil, two chelators (EDTA and DTPA) were used in enrichment plant ryegrass to improve the uptake of Pb and Zn from soil. The results showed that when the doses of 0, 0.5, 1 and 2 mmol/kg EDTA and DTPA were used, the biomass of ryegrass (*Lolium multiflorum* Lam.) and its nutrient (N, P, K, Ca and Mg) content increased, whereas EDTA and DTPA with a dose of 4 mmol/kg decreased the biomass of ryegrass and its nutrient (N, P, K, Ca and Mg) content. EDTA and DTPA significantly enhanced the contents of Zn and Pb in ryegrass as compared with the control. As for Pb, the content of Pb in root and shoot reached a maximum of 2730.54 and 2484.42 mg/kg respectively when the dose of EDTA and DTPA was 2 mmol/kg. In the case of Zn, the content of Zn in root and shoot reached a maximum of 2428.37 and 2010.43 mg/kg respectively. The total Pb and Zn accumulations and translocation ratio in ryegrass had also been enhanced. The results indicated that EDTA and DTPA had great potential to be used for ryegrass to remedy Pb and Zn contamination soil of lead-zinc mining area, but should be used cautiously because of their environmental risks.

KEYWORDS

EDTA, DTPA, Enrichment Plant, Ryegrass, Lead and Zinc

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