

Influence of EDTA on Lead Transportation and Accumulation

by *Sedum alfredii* Hance

Dan Liu^{a,b}, Ting-Qiang Li^a, Xiao-E Yang^{a,*}, Ejazul Islam^a, Xiao-Fen Jin^a,
and Qaisar Mahmood^a

^a Key Laboratory of Environmental Remediation and Ecosystem Health,
Ministry of Education, College of Natural Resources and Environment Science,
Zhejiang University, Huajiachi Campus, Hangzhou 310029, P. R. China.
Fax: +86-571-86971907. E-mail: xyang581@yahoo.com

^b School of Tourism and Health, Zhejiang Forestry College, Lin'an 311300, P. R. China

* Author for correspondence and reprint requests

Z. Naturforsch. **62c**, 717–724 (2007); received January 5/March 12, 2007

Hydroponics and pot experiments were conducted to study the effects of ethylenediamine-tetraacetic acid (EDTA) on Pb transportation and accumulation by two contrasting ecotypes of *Sedum alfredii* Hance. In hydroponics experiments, the accumulating ecotype (AE) showed more ability to tolerate Pb toxicity compared with the non-accumulating ecotype (NAE). When treated with equimolar mixtures of EDTA and Pb, maximum Pb accumulation occurred without any phytotoxicity symptoms. Pot experiments with Pb contents of 400 mg kg⁻¹ showed that 5 mM EDTA is the optimum dose for the phytoextraction of soils contaminated with relatively low Pb levels; in contrast, increasing EDTA addition resulted in increased Pb accumulation in the shoots of AE in soils with high Pb content (1200 mg kg⁻¹). The post-harvest effects of EDTA on available Pb were strong compared with those without addition of EDTA (CK). Within the initial 7 days almost no differences of water-soluble Pb were noted in soils contaminated with both levels of Pb but after 2 weeks, water-soluble Pb started to decrease significantly compared with before. Considering the toxicity and biodegradability of synthetic chelators, it can be concluded that the chelate-assisted technique is more suitable for soils contaminated with low Pb levels and to avoid environment risks; a suitable dose of chelators must be considered before application.

Key words: EDTA, Lead, Phytoremediation