Evaluation of Rapidly Biodegradable Chelating Agents for Lead Phytoextraction. (S11-elless162633-Oral)

Authors:

- M.P.Elless Edenspace Systems Corporation
- A.L.Ulery New Mexico State University
- R.Parra New Mexico State University
- M.J.Blaylock Edenspace Systems Corporation

Abstract:

Due to its insolubility in soils, lead phytoextraction from contaminated soils requires a chelator such as EDTA to enhance its availability for plant uptake. The Pb-EDTA complex is mobile and stable in most soils, due to its slow degradation, and is thus prone to leach from sandy soils and threaten the quality of shallow ground waters. The objective of this research was to determine the biodegradation rates of several chelating agents that might lessen the risk associated with mobilized lead. Batch and column experiments were conducted for 14 days using lead-contaminated soil to compare the lead extraction efficiency and degradation rate of each Pb-chelate complex to Pb-EDTA. Results indicate that Pb-citrate complexes had the fastest degradation rate (half-life of 5 to 7 days) but extracted the least lead, whereas EDTA extracted the most lead but possessed the slowest degradation rate (half-life > 14 days). Lead complexes with nitrilo triacetic acid and glutamic acid-based chelators had degradation rates similar to citrate but extracted approximately 50% of the lead that EDTA extracted, suggesting that these chelates may be alternatives to EDTA for lead phytoextraction.

Corresponding Author Information:

Mark Elless Edenspace Systems Corporation 15100 Enterprise Court, Suite 100 Chantilly, VA 20151 phone: 703-961-8700 fax: 703-961-8939 e-mail: elless@edenspace.com

Presentation Information:

Presentation Date: Tuesday, November 12, 2002 Presentation Time: 1:30 pm

Keywords:

chelating agents, EDTA, phytoextraction, lead