



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2003DE27B

Title: The Role of Urea as the Sole Ni Source in the Uptake of Ni in *Allysum* Hyperaccumulating Species

Project Type: Research

Focus Categories: Geochemical Processes, Non Point Pollution, Toxic Substances

Keywords: phytoremediation, metal contaminated soils, water quality

Start Date: 06/01/2003

End Date: 02/28/2004

Federal Funds: \$ 1500.00

Matching Funds: \$3000.00

Congressional District: at large

Principal Investigators: Sparks, Donald L.

Abstract: In recent decades, phytoremediation has received much attention as a means of amending soils with high metal concentrations, specifically, nickel (Ni), zinc (Zn), and cobalt (Co). This relatively new technique has opened a broad spectrum of research opportunities ranging from genetic engineering of hyperaccumulating plant species to the physiology and fate of toxic metals within plants, to metal cation and conjugate base land amendment strategies that promote heavy metal uptake by the plant. These fields may very well provide the means of making phytoremediation an effective, economic means of hazardous metal clean-up. Recent studies suggest that Ni is a crucial factor in the uptake of a urea-based nitrogen (N) source. This is due to the important role of Ni in the metalloenzyme urease—a relationship first discovered in 1975. While the presence of Ni has proven to increase urea uptake and metabolism, little attention has been given to the reciprocal relationship—that is, the importance of the N source on the uptake of Ni. This research seeks to examine if such a relationship exists. If so, this process may be used to enhance the uptake of Ni in hyperaccumulating species in response to increased urease activity. The significance of this process could lead to new land amendment techniques involving the application of fertilizers that could greatly increase the effectiveness and affordability of phytoremediation techniques for Ni contaminated soils.

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Last Modified: Wed May 28, 2003 4:26 PM

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