

Division VI – Chemistry & the Environment Project 2004-003-2-600

Biophysico-chemical Processes of Metals and Metalloids in Soil Environments

1. INTRODUCTION

Pollution induced by heavy metals in soils is a very dangerous environmental problem because, as compared with other kinds of pollution (atmosphere and water), the soil environment has a much lower ability to recover. Furthermore, over 99% of pollutants are bound with soil and sediment particles. The behaviour of heavy metals and metalloids depends on physico-chemical and biological factors associated with soil microbial activities. These interactions influence the speciation of the elements, their binding and their transfer from soil constituents to the soil solution and to plants.

2. PROJECT OBJECTIVES

To publish a treatise on the fundamentals of interactions of heavy metals and metalloids with biotic and abiotic soil components and on their mobility, bioavailability and toxicity in soil environments (including the rhizosphere) and the significance for novel remediation strategies for polluted soils.

The treatise consists of multidisciplinary critical evaluations of the state-of-the-art on the biophysico-chemical processes of metals and metalloids in terrestrial ecosystems. It will be valuable to scientists interested in soil chemistry and mineralogy, soil biochemistry and microbiology, plant nutrition, physiology and environmental sciences.

The book chapters are classified into 3 groups:

- i) Fundamentals on the interactions of heavy metals and metalloids with biotic (microorganisms) and abiotic (phyllosilicates, organic matter, oxides, organomineral complexes) soil components;
- ii) Mobility, bioavailability and toxicity of heavy metals and metalloids in soil environments, including the rhizosphere;
- iii) Remediation of polluted soils.



An arsenic polluted site. Rio Tinto - Spain

3. PROJECT TASK GROUP

Task Group Members

- Antonio Violante, Italy (Chair)
- Pan Ming Huang, Canada
- Geoffrey Michael Gadd, UK

Collaborating Organizations

- International Union of Soil Sciences



4. MILESTONES

July 1, 2004 - All the Chapter authors were informed to initiate the project.

August 31, 2004 - Receipt by editor of the detailed table of contents for chapter manuscripts by the Editor.

November 2, 2004. A round table meeting has been organized for exchange of comments and coordination of the book chapters in Seattle, WA (USA).

April 30, 2005 – Receipt of all chapter manuscripts by the Editor.

November 2, 2005. –A task group meeting will be during the ASA-CSSA-SSSA conference, Salt Lake City, UT.

February 28, 2006. – Finalising book and approval by IUPAC

March 31, 2006. – Submission to publisher

December 31, 2006 – Publication of the book as IUPAC Series volume by John Wiley & Son, Hoboken, NJ. USA.

5. OTHER ACTIVITIES

The task group is organizing a Symposium for the 18th World Congress of Soil Science which will be held in Philadelphia (USA), July 9-15, 2006. Entitled “Soil Physicochemical-Biological Interfacial Interactions: Impacts on Transformations and Bioavailability of Metals and Metalloids”, this Symposium is a showcase for the IUPAC book and chapter authors will give invited presentations.

This book is the 8th in the IUPAC Series on fundamental biophysical processes published by Wiley.

6. FURTHER INFORMATION

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Project Description on IUPAC Web Site:

<http://www.iupac.org/projects/2004/2004-003-3-600.html>