

Bioremediation of Mercury

Current Research and Industrial Applications



Edited by: Irene Wagner-Döbler

Microbial Communication, Helmholtz-Centre for Infection Research, 38124 Braunschweig, Germany

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Mercury is a heavy metal with extreme toxicity, the ability to biomagnify, and long range atmospheric transport of its gaseous form. Past and present industrial uses of mercury have resulted in the pollution of soils, groundwater, rivers and marine ecosystems worldwide, the clean-up of which, using standard technology, is either not feasible or is prohibitively costly. A low cost and environmentally friendly alternative is bioremediation: the use of microbes or plants (phytoremediation) to remediate contaminated sites.

In this timely book, established mercury experts review the latest research in this area, including the genetic engineering of bacteria and plants. The gap between laboratory research and field application is bridged using case studies: An abandoned chlor-alkali electrolysis factory in Kazakhstan, a former PVC plant in Albania, and the Madeira River Basin in the Amazon region. The remaining chapters cover: the mercury-cell process of the chlor-alkali electrolysis industry; a pilot plant for wastewater bioremediation; and a comparison of the efficiency of microbial bioremediation to clean-up three types of industrial wastewater. The book covers the complete range from laboratory scale research to full scale industrial operation and shows a multitude of options for future mercury bioremediation technologies.

Essential reading for research scientists, graduate students, and other specialists interested in mercury bioremediation, the book is also recommended reading for environmental microbiologists, chemists and engineers.

Chapter 1. Current Research for Bioremediation of Mercury. *Irene Wagner-Döbler*

Chapter 2. Former Chlor-alkali Factory in Pavlodar, Kazakhstan: Mercury Pollution, Treatment Options, and Results of Post-demercuration Monitoring. *Mikhail A. Ilyushchenko, Vladimir Y. Panichkin, Paul Randall, and Rustam I. Kamberov*

Chapter 3. Vlora, an Abandoned PVC Factory at the Mediterranean Coast: Mercury Pollution, Threat to Humans, and Treatment Options. *Pranvera Lazo and Jaroslav Reif*

Chapter 4. Land Use Change and Mercury Mobilization in the Amazon: The Madeira River Basin Case Study. *L.D. Lacerda and W.R. Bastos*

Chapter 5. Mercury in the Chlor-alkali Electrolysis Industry. *Pawel Gluszczyk, Katarzyna Fürch and Stanislaw Ledakowicz*

Chapter 6. Long-term Operation of a Microbiological Pilot Plant for Clean-up of Mercury Contaminated Wastewater at Electrolysis Factories in Europe. *Johannes Leonhäuser, Harald von Canstein, Wolf-Dieter Deckwer and Irene Wagner-Döbler*

Chapter 7. Microbiological Treatment of air Scrubber Solutions From a Waste Incineration Plant and Other Mercury Contaminated Waste-Water: A Technology in Search of an Application. *Johannes Leonhäuser, Wolf-Dieter Deckwer and Irene Wagner-Döbler*

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