

Microbial Contaminant Degradation at Biogeochemical Interfaces

Leipzig, March 2 – 4, 2010



Helmholtz Centre for Environmental Research – UFZ, Leipzig (Germany)

Scope and Aims

Microbial degradation of pollutants in soils is mainly controlled by their bioavailability. Reduced bioavailability is a result of different soil processes such as sorption, limited availability of electron acceptors, physical separation of pollutants and potential degraders. The chemical environment in the soil, in particular the availability of water and the quantity and quality of soil organic matter, are the main drivers of microbial activity in soils.

The symposium aims at:

- Highlighting possible mechanisms of reduced bioavailability
- Assessing the possibilities to quantify and predict bioavailability in soil systems
- Revealing how microorganisms can affect bioavailability of pollutants in soils
- Evaluating the influence of the chemical activities of water and pollutants
- Assessing the influence of soil properties such as mineral surfaces, soil organic matter and water content

The meeting brings together international experts who are interested in the topic of bioavailability of pollutants and microbial activity in soils. The program includes lectures and poster presentations. The potential consequences of the limited bioavailability and chemical activity of pollutants in soils for an appropriate risk assessment of the compounds will be discussed. **We kindly invite you to participate.**

The symposium is organized by the Helmholtz Centre for Environmental Research – UFZ and the project RAISEBIO (Risk assessment and environmental safety affected by compound bioavailability in multiphase environments).

RAISEBIO

The goal of the RAISEBIO project is to investigate the reasons and consequences of limited bioavailability of pollutants in soils. For this, RAISEBIO considers matrix-compound interactions, organism-compound interactions, matrix-organism interactions as well as soil systems and residue formation.

SYMPOSIUM PROGRAM

Symposium Location

Leipziger KUBUS
Helmholtz Centre for
Environmental Research UFZ
Permoserstrasse 15
04318 Leipzig, Germany
www.leipziger-kubus.de

Venue / Accommodation

Information on the
KUBUS conference site, travel
and accommodation can
be found at:
www.ufz.de/raisebio-symposium2010

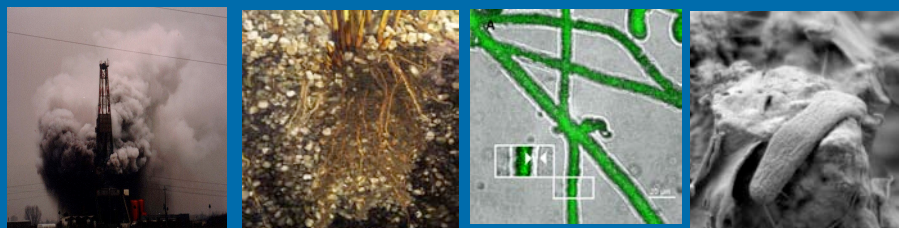
Contact

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For further information on the symposium: www.ufz.de/raisebio-symposium2010.

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SYMPOSIUM PROGRAM

Tuesday, March 2nd, 2010

- 08.00-09.00 Arrival and registration: Coffee at the reception hall
- 09.00-09.30 Welcome addresses
Matthias Kästner, UFZ / RaiseBio, Olaf Kolditz, HIGRADE, Helmholtz Centre for Environmental Research Leipzig, D
- Session 1. Bioaccessibility, Bioavailability, Biodegradability of Organic Compounds – a Systems Property?**
Chair: M. Kästner
- 09.30-10.30 Opening plenary lecture: Stability of xenobiotics in the soil environment
Andreas Schaeffer, Rheinisch-Westfälische Technische Hochschule Aachen, D
- 10.30-11.00 *Coffee break*
- 11.00-11.40 Combining genetic and stable isotope analyses for the assessment of natural attenuation at complex polluted sites
Tom Bosma, University of Utrecht, NL
- 11.40-12.00 DDT residues in subaquatic sediments: Implications of metabolism and non-extractable incorporation for their environmental impact
Jan Schwarzbauer, Rheinisch-Westfälische Technische Hochschule Aachen, D
- 12.00-12.20 Pterine-sulfonamides: promising biomarkers for bacterial uptake and effects of sulfonamide antimicrobials
Merle Richter, Eawag Zurich, CH
- 12.20-12.40 Covalent bonding of sulfonamides to humic acid does not make them bound residues
Anna Gulkowska, Eawag/ETH Zurich, CH
- 12.40-13.00 Formation and fate of “non-extractable” residues from biomass and CO₂ during the biotic degradation of pollutant in soil
Karolina Nowak, Helmholtz Centre for Environmental Research Leipzig, D
- 13.00-14.00 *Lunch*
- 14.00-14.20 Biodegradation of pharmaceuticals and biocides and their effect on microbial communities in soil and water systems
Cristobal Girardi Lavin, Helmholtz Centre for Environmental Research Leipzig, D

Registration

Please use the electronic on-line registration at:
www.ufz.de/raisebio-symposium2010

Registration fees

until January 31, 2010: € 250
after January 31, 2010: € 300

Fees include all conference materials, refreshments, poster social and the conference dinner.

Symposium Committee

M. Kästner
H. Harms
F.-D. Kopinke
A. Georgi
A. Miltner
M. Thullner
U. Roland
L.Y. Wick
F. Furtado
S. Furuno
M. Gharasoo
C. Girardi
J. Hanzel
C. Lammirato
K. Nowak
K. Ramus

More details of the symposium at www.ufz.de/raisebio-symposium2010.

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- 14.20-14.40 Influence of fatty acid methyl esters (FAME) on biodegradation of aliphatic and aromatic fractions of diesel fuel
Lukasz Chrzanowski, Poznan University of Technology, PL
- 14.40-15.00 Surfactant enhanced bioavailability and biodegradation of Endosulfan in agricultural soil
Namasivayam Vasudevan, Anna University, Madras, IN
- 15.00-15.30 *Coffee break*

Session 2. Microbes Affecting Bioavailability

Chair: H. Harms

- 15.30-16.10 Eucaryotic PAH metabolites resist mineralization by soil microorganisms
Anders Risbjerg Johnsen, GEUS, Danmarks Geological Survey, Copenhagen, DK
- 16.10-16.50 Direct access of sorbed hydrophobic substrates by microbes
Kilian Smith, National Environment Research Institute, Roskilde, DK
- 16.50-17.10 Interactions between higher plants and microorganisms in soil contaminated with explosives
Olga Muter, University of Latvia, Riga, LV
- 17.10-17.30 Bacterial chemotaxis toward airborne contaminant gradients
Joanna Hanzel, Helmholtz Centre for Environmental Research Leipzig, D
- 18.00-20.00 *Reception at the poster corner*

Wednesday, March 3rd, 2010

Session 2. Microbes Affecting Bioavailability cont.

Chair: H. Harms

- 09.00-09.20 Relevance of fungal networks for bioremediation of organic contaminants
Shoko Furuno, Helmholtz Centre for Environmental Research Leipzig, D
- 09.20-09.40 Influence of microorganisms on the availability of hydrophobic organic contaminants in soils
Thorsten Reemtsma, Technical University of Berlin, D

Session 3. Transport of Compounds and Microbes

Chair: L. Wick

- 09.40-10.20 Methods for visualisation of C and N fluxes in marine systems – options for transfer to soils
Marcell Kuypers, MPI, Bremen, D
- 10.20-11.00 *Coffee break*
- 11.00-11.40 Substrate bioavailability in relationship to microbial growth habits in soils
Patricia Holden, UC Santa Barbara, USA
- 11.40-12.00 Bacterial dispersal networks improve the bioavailability of organic pollutants
Thomas Banitz, Helmholtz Centre for Environmental Research Leipzig, D
- 12.00-12.20 NMR as a tool for probing the mobility of pollutants in porous media
Filipe Furtado, Helmholtz Centre for Environmental Research Leipzig, D

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- 12.20-12.40 Description of mass-transfer limited bioavailability at the pore scale
Falk Heße, Helmholtz Centre for Environmental Research Leipzig, D
- 12.40-13.00 The impact of small scale heterogeneities on bioavailability and total biodegradation of contaminants in the subsurface: a pore network simulation approach
Mehdi Gharasoo, Helmholtz Centre for Environmental Research Leipzig, D
- 13.00-14.20 Lunch / Poster session

Session 4. Water and Compound Chemical Activity in Soil and Sediment

Chair: F.-D. Kopinke

- 14.20-15.00 Chemical activity of hydrophobic organic pollutants - partitioning techniques and new findings
Philipp Mayer¹, Fredrik Reichenberg¹, Franziska Schramm², Anne Winding¹, ¹Aarhus University, Roskilde, DK; ²Helmholtz Centre for Environmental Research, Leipzig, D
- 15.00-15.40 Impact of dissolved organic matter and the fate of pollutants in water compartments
Frank-Dieter Kopinke, Anett Georgi, Helmholtz Centre for Environmental Research Leipzig, D
- 15.40-16.00 Influence of dissolved humic substances on the mass transfer of organic pollutants through boundary layers between water and air
Ksenia Ramus, Helmholtz Centre for Environmental Research Leipzig, D
- 16.00-16.20 Coffee break
- 16.20-16.40 In-situ Mass Distribution Quotient (iMDQ) – A new factor to compare bioavailability of chemicals in soils?
Reiner Schroll, Helmholtz Centre Munich, D
- 16.40-17.20 Liquid distribution controls substrate diffusion and bacterial motility in the vadose zone
Arnaud Dechesne, Technical University of Denmark, Lyngby, DK
- 17.20-17.40 Heterogeneous diffusion of two nutrients shape growth and dispersal patterns of competing bacterial species grown on partially saturated rough surfaces
Gang Wang, ETH Zurich, CH
- 17.40-18.00 Flagellar motility and differential gene expression of *Pseudomonas putida* KT2440 under partially hydrated conditions: a study with the novel Pressurized Porous Surface Model (PPSM)
Gamze Gulez, Technical University of Denmark, Lyngby, DK
- 19:30 Symposium Dinner (incl. in reg. fee), Event hall "Da Capo", Oldtimer museum (shuttle busses)



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Thursday, March 4th, 2010

Session 5. Interactions on Mineral Surfaces in Soils

Chair: U. Roland

- 09.00-09.40 Interactions of extracellular enzymes and pathogenic proteins with soil mineral surfaces
Hervé Quiquampoix, L'Institut National de la Recherche Agronomique (INRA), Montpellier, F
- 09.40-10.20 Aggregate-scale spatial heterogeneity in reductive transformation of iron and selenium resulting from coupled biogeochemical and physical processes
Celine Pallud, UC Berkeley, USA
- 10.20-11.00 *Coffee break*
- 11.00-11.20 Interactions between β -glucosidase from *Aspergillus niger* and soil minerals: adsorption and effects on catalytic activity
Carlo Lammirato, Helmholtz Centre for Environmental Research Leipzig, D

Session 6. Structure and Properties of Soil Organic Matter

Chair: A. Miltner

- 11.20-12.00 To which extent do intermolecular interactions in soil organic matter control the entrapment of contaminants?
Gabriele Schaumann, University of Koblenz – Landau, D
- 12.00-12.40 Using microbial exoenzymes to determine patterns of soil microbial carbon and nutrient acquisition in soils
Michael Weintraub, University of Toledo, Ohio, USA
- 12.40-14.00 *Lunch / Poster session*
- 14.00-14.40 Soil carbon-climate coupling: stoichiometric constraints on organic matter decomposition
Nick Ostle, Centre for Ecology & Hydrology, Lancaster, UK
- 14.40-15.00 Growth of *Streptomyces mirabilis* P16B1 in heavy metal contaminated soil and impact to soil organic matter
Eileen Schütze, Institute for Microbiology, Friedrich Schiller University of Jena, D
- 15.00-15.40 Bioavailability, microbial activity and residue formation – All lessons learned?
Matthias Kästner, Helmholtz Centre for Environmental Research Leipzig, D
- 15.40-16.00 Final discussion and conclusions
- 16.00-16.30 *Coffee break*
- 16.30 End of symposium