

August 15, 2004

ENVIRONMENTAL Science & Technology

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E. coli SAMPLING Reliability at a Frequently Closed Beach

The U.S. Congress Needs Advice about
Science and Technology

Role of the Bacterial Organomercury Lyase
in Controlling Methylmercury Accumulation

PUBLISHED BY
THE AMERICAN
CHEMICAL SOCIETY

Policy Analysis

4241

***Escherichia coli* Sampling Reliability at a Frequently Closed Chicago Beach: Monitoring and Management Implications**

Richard L. Whitman and Meredith B. Nevers

Frequently closed beaches may require both extensive and intensive *E. coli* sampling.

Characterization of Natural and Affected Environments

■ 4247

Factors Affecting the Presence of Dissolved Glutathione in Estuarine Waters

Degui Tang, Martin M. Shafer, Dawn A. Karner, Joel Overdier, and David E. Armstrong

Nanomolar levels of thiol glutathione in estuarine waters are documented; roles of copper in regulating biological release and preservation of thiols are refined.

4254

Effect of Surface Tarp on Emissions and Distribution of Drip-Applied Fumigants

Sharon K. Papiernik, Scott R. Yates, Robert S. Dungan, Scott M. Lesch, Wei Zheng, and Mingxin Guo

Volatilization of soil-applied fumigants is greatly reduced by tarping the soil surface with a virtually impermeable film (compared to standard high-density polyethylene); most of the emissions are from untarped furrows.

■ 4263

Molybdenum Scavenging by Iron Monosulfide

George R. Helz, Trent P. Vorlicek, and Mani D. Kahn

Iron monosulfide is demonstrated to be an effective but probably transient scavenging agent for molybdenum, which is a useful paleoredox indicator in anoxic waters.

4269

The Roles of Food and Water in the Bioaccumulation of Organochlorine Compounds in High Mountain Lake Fish

Jordi Catalan, Marc Ventura Ingrid Vives, Joan O. Grimalt, and Jordi Girona

Organochlorine concentrations in high mountain lake fish exhibit net gill loss and gut uptake but only reach pseudostationary state for compounds with $\log(K_{ow}) < 6$.

■ 4276

Total Potential Source Contribution Function Analysis of Trace Elements Determined in Aerosol Samples Collected near Lake Huron

S. R. Biegalski and P. K. Hopke

Total potential source contribution function analysis is used to determine the geographic location of sources that contribute aerosols to the Great Lakes atmosphere.

4285

Mercury Speciation and Microbial Transformations in Mine Wastes, Stream Sediments, and Surface Waters at the Almadén Mining District, Spain

John E. Gray, Mark E. Hines, Pablo L. Higuera, Isaac Adatto, and Brenda K. Lasorsa

An evaluation is given of mercury contamination around the world's largest mercury mine using total mercury, methylmercury, and Hg^{2+} data and microbial mercury methylation and methylmercury demethylation studies.

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1. Effective now, titles must be included in the Reference section of *ES&T* research papers.
2. Effective January 1, 2005, all *ES&T* research papers must be submitted via the Web (<https://paragon.acs.org/paragon/index.jsp>). Email submissions or paper copies will not be accepted.

■ 4293

PBDEs, PBBs, and PCNs in Three Communities of Free-Ranging Killer Whales (*Orcinus orca*) from the Northeastern Pacific Ocean

Sierra Rayne, Michael G. Ikonomou, Peter S. Ross, Graeme M. Ellis, and Lance G. Barrett-Lennard

Concentrations and patterns of PBDEs, PBBs, and PCNs are determined in free-ranging killer whales from three distinct communities in the northeastern Pacific Ocean.

Environmental Processes

4300

Anaerobic Microbial Reductive Dechlorination of Tetrachloroethene to Predominately *trans*-1, 2-Dichloroethene

Benjamin M. Griffin, James M. Tiedje, and Frank E. Löffler

A novel microbial reductive dechlorination pathway produces predominantly *trans*-DCE from PCE and TCE.

■ 4304

Role of the Bacterial Organomercury Lyase (MerB) in Controlling Methylmercury Accumulation in Mercury-Contaminated Natural Waters

Jeffra K. Schaefer, Jane Yagi, John R. Reinfelder, Tamara Cardona, Kristie M. Ellickson, Shoshana Tel-Or, and Tamar Barkay

Induction of bacterial enzyme organomercury lyase in the microbial biomass in mercury-contaminated natural waters limits methylmercury production by enhancing degradation of this potent neurotoxin.

4312

Interaction of Eu(III)/Cm(III) with Alumina-Bound Poly(acrylic acid): Sorption, Desorption, and Spectroscopic Studies

G. Montavon, T. Rabung, H. Geckeis, and B. Grambow

Complexation behavior of poly(acrylic acid) with respect to trivalent metal ions (curium and europium) is compared when it is free in solution or adsorbed on alumina.

4319

Product Study of the Gas-Phase BrO-Initiated Oxidation of Hg^0 : Evidence for Stable Hg^{1+} Compounds

Farhad Raofie and Parisa A. Ariya

The first experimental product analysis of BrO oxidation of elemental mercury is detailed, and evidence is provided for stable $Hg(I)$ and $Hg(II)$ compounds.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

▶ This issue contains a news story about this research.

4327**Turbulence Effects on Volatilization Rates of Liquids and Solutes**

Jiunn-Fwu Lee, Huan-Ping Chao, Cary T. Chiou, and Milton Manes
A new algorithm is presented for determining the vapor- and liquid-phase transfer coefficients in the two-film model for predicting the solute volatilization coefficient.

4334**Commercially Available Chemicals That Mimic a Deposit Feeder's (*Arenicola marina*) Digestive Solubilization of Lipids**

Ian M. Voparil and Lawrence M. Mayer

A cocktail of sodium taurocholate and bovine serum albumin is developed to mimic a deposit feeder's digestive solubilization of sedimentary contaminants.

4340**Importance of Adsorption (Hole-Filling) Mechanism for Hydrophobic Organic Contaminants on an Aquifer Kerogen Isolate**

Yong Ran, Baoshan Xing, P. Suresh, C. Rao, and Jiamo Fu

Modified Freundlich and Polanyi–Dubinin equations indicate the dominant role of an adsorption/hole-filling mechanism of four hydrophobic organic contaminants by an aquifer kerogen isolate.

4349**Search for the Contamination Source of Butyltin Compounds in Wine: Agglomerated Cork Stoppers**

Gui-Bin Jiang, Ji-Yan Liu, and Qun-Fang Zhou

Agglomerated cork stoppers are the main contamination source of butyltin compounds in wine.

4353**Abiotic Degradation of Pentachloronitrobenzene by Fe(II): Reactions on Goethite and Iron Oxide Nanoparticles**

Theodore P. Klupinski, Yu-Ping Chin, and Samuel J. Traina

Kinetics studies of reduction of pentachloronitrobenzene by Fe(II)/goethite suggest a rate-affecting surface-association process and reactions that occur on iron oxide nanoparticles in nominal Fe(II) solutions.

4361**Evidence for π - π Electron Donor–Acceptor Interactions between π -Donor Aromatic Compounds and π -Acceptor Sites in Soil Organic Matter through pH Effects on Sorption**

Dongqiang Zhu, Seunghun Hyun, Joseph J. Pignatello, and Linda S. Lee

Protonation of basic substituents on aromatic rings in humic substances increases the π -acceptor strength of the rings and favors complexation with π -donor molecules.

4369**Solid-State NMR Characterization of Pyrene–Cuticular Matter Interactions**

Joseph R. Sachleben, Benny Chefetz, Ashish Deshmukh, and Patrick G. Hatcher

Solid-state NMR spectroscopy probes the phase behavior of cuticular materials and their interactions with the model hydrophobic pollutant pyrene.

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.

► This issue contains a news story about this research.

4377**Velocity Effects on Fullerene and Oxide Nanoparticle Deposition in Porous Media**

Hélène F. Lecoanet and Mark R. Wiesner

At a higher flow rate, a velocity-sensitive affinity transition in the initial deposition of nanoparticles is observed for fullerene-based (but not for silica or titania) nanoparticles.

4383**Alteration of Mammalian-Cell Toxicity of Pesticides by Structural Iron(II) in Ferruginous Smectite**

Kara C. Sorensen, Joseph W. Stucki, Richard E. Warner, and Michael J. Plewa

Reduced-iron smectites are more effective in altering the mammalian toxicity of pesticides than are oxidized smectites; environmental impact assessments must consider the redox state.

4390**Leaching of Heavy Metals from Contaminated Soils: An Experimental and Modeling Study**

Joris J. Dijkstra, Johannes C. L. Meeussen, and Rob N. J. Comans

A modeling approach incorporating multiple reactive surfaces adequately predicts metal leaching from contaminated soils over a wide pH range, without any parameter fitting.

4396**Intercorrelations among Degree of Geochemical Alterations, Physicochemical Properties, and Organic Sorption Equilibria of Kerogen**

Chen Yang, Weilin Huang, Baohua Xiao, Zhiqiang Yu, Ping'an Peng, Jiamo Fu, and Guoying Sheng

Phenanthrene and TCB sorption capacity, isotherm nonlinearity, and sorption–desorption hysteresis are found to correlate quantitatively with degree of maturation of kerogen-based coal materials.

Environmental Measurements Methods**4409****Colored Thin Films for Specific Metal Ion Detection**

Caroline L. Schauer, Mu-San Chen, Ronald R. Price, Paul E. Schoen, and Frances S. Ligler

Thin, colored films of chitosan and poly(allylamine) are investigated for their ability to selectively distinguish metal ions in solution.

4414**Equivalence of Elemental Carbon by Thermal/Optical Reflectance and Transmittance with Different Temperature Protocols**

Judith C. Chow, John G. Watson, L.-W. Antony Chen, W. Patrick Arnott, Hans Moosmüller, and Kochy Fung

Thermal/optical reflectance corrections yield equivalent organic carbon/elemental carbon splits for widely divergent temperature protocols.

Remediation and Control Technologies**4423****Mechanism of Europium Retention by Calcium Silicate Hydrates: An EXAFS Study**

Michel L. Schlegel, Ingmar Poiteau, Nathalie Coreau, and Pascal Reiller

EXAFS spectroscopy and chemical kinetics suggest that europium adsorbed on calcium silicate hydrates is located at calcium structural sites, presumably after coprecipitation or solid diffusion.

4432

Precipitation of Nitrate–Cancrinite in Hanford Tank Sludge

E. C. Buck and B. K. McNamara

The nitrate–cancrinite phase forms spherical aggregates consisting of platy hexagonal crystals with cesium-117 concentrated in these aluminosilicate structures.

4439

Hindered Gas-Phase Partitioning of Trichloroethylene from Aqueous Cyclodextrin Systems: Implications for Treatment and Analysis

N. Kashiwama and T. B. Boving

Vaporizing of volatile organic compounds from cyclodextrin solution requires significantly higher gas flow rates or longer residence times in air strippers.

4445

Limestone-Particle-Stabilized Macroemulsion of Liquid and Supercritical Carbon Dioxide in Water for Ocean Sequestration

D. Golomb, E. Barry, D. Ryan, C. Lawton, and P. Swett

CO₂ and H₂O are emulsified with pulverized limestone particles; the emulsion is released in the deep ocean without acidification of seawater around the injection point.

4451

Iron Blast Furnace Slag/Hydrated Lime Sorbents for Flue Gas Desulfurization

Chiung-Fang Liu and Shin-Min Shih

Iron blast furnace slag/hydrated lime sorbents are highly reactive toward SO₂, the use of which reduces the cost of FGD and the amount of slag waste.

Sustainability Engineering and Green Chemistry

4457

Variability Assessment of Groundwater Exposure to Pesticides and Its Consideration in Life-Cycle Assessment

Georg Geisler, Stefanie Hellweg, Simon Liechti, and Konrad Hungerbühler

Leaching scenarios indicate that substance properties contribute the most to variability in pesticide leaching, followed by site, weather, season of application, crop, and macropore flow.



EAWAG

EAWAG (Swiss Federal Institute for Environmental Science and Technology) is an independent research facility of the Swiss Federal Institute of Technology (ETH) Domain. It is a competence center for water and aquatic sciences. Multidisciplinary teams of specialists develop solutions to environmental problems, in particular related to water. The acquired knowledge and know-how is transmitted nationally and internationally through publications, lectures, teaching, and consulting to the private and the public sector. As of January 1, 2005 we have an opening for an outstanding personality as

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The head of this newly formed department will lead a motivated team of about 20 scientists with national and international reputation to carry out research with a strong focus on the quantitative assessment of anthropogenic organic chemicals in natural and engineered aquatic systems and on the development of measures to reduce the input of such chemicals into the environment. Currently, investigations focus on sources such as wastewater treatment and agriculture.

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We are looking for a leading scientist with the following profile:

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- Sound knowledge of chemical trace analysis
- Management of significant research and consulting projects
- Willingness to cooperate on an inter- and multidisciplinary level
- Experience in academic teaching and professional training
- Strong and integrative organization and communication skills

Candidates should send their documentation incl. detailed professional background, CV, publication list and references by September 15, 2004 to: EAWAG, Human Resources Dept., P.O. Box 611, CH-8600 Duebendorf. Questions should be directed to: Prof. R. Schwarzenbach (Tel.: +41-1-823 5109). Consult our homepage for further information on EAWAG: www.eawag.ch. *To increase the rate of women at EAWAG, applications of female scientists are especially welcome.*