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**Phytotoxins: Environmental
Micropollutants of Concern?**



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ON THE COVER: Agricultural crops and other plants produce myriads of phytochemicals, some of which are known to be problematic to husbandry animals and humans. Despite production rates up to many kilograms per hectare per year very little is known about environmental safety of such phytotoxins.

Comment

13023

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Environmental Science & Technology Presents the 2014 Excellence in Review Awards

Jerald L. Schnoor

Letters to the Editor

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Chemical Footprints: Thin Boundaries Support Environmental Quality Management

Leo Posthuma,* Anders Bjørn, Michiel C. Zijp, Morten Birkved, Miriam L. Diamond, Michael Z. Hauschild, Mark A. J. Huijbregts, Christian Mulder, and Dik Van de Meent

Features

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Phytotoxins: Environmental Micropollutants of Concern?

Thomas D. Bucheli

Natural toxins such as mycotoxins or phytotoxins (bioactive compounds from fungi and plants, respectively) have been widely studied in food and feed, where they are stated to out-compete synthetic chemicals in their overall human and animal toxicological risk. A similar perception and awareness is yet largely missing for environmental safety. This article attempts to raise concern in this regard, by providing (circumstantial) evidence that phytotoxins in particular can be emitted into the environment, where they may contribute to the complex mixture of organic micropollutants. Exposures can be orders-of-magnitude higher in anthropogenically managed/affected (agro-)ecosystems than in the pristine environment.

Viewpoints

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Innovative Platform and Incentive Mechanism Are the Keys for Electronic Waste Collection in Developing Countries

Mianqiang Xue and Zhenming Xu*

Policy Analysis

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Emissions Implications of Future Natural Gas Production and Use in the U.S. and in the Rocky Mountain Region

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Michael N. Taptich* and Arpad Horvath

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Characterization of Natural and Affected Environments

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DOI: 10.1021/es502849e

Speciation of Radioactive Soil Particles in the Fukushima Contaminated Area by IP Autoradiography and Microanalyses

Hiroki Mukai,* Tamao Hatta, Hideaki Kitazawa, Hirohisa Yamada, Tsuyoshi Yaita, and Toshihiro Kogure

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DOI: 10.1021/es502965b

Global Chemical Composition of Ambient Fine Particulate Matter for Exposure Assessment

Sajeev Philip,* Randall V. Martin, Aaron van Donkelaar, Jason Wai-Ho Lo, Yuxuan Wang, Dan Chen, Lin Zhang, Prasad S. Kasibhatla, Siwen Wang, Qiang Zhang, Zifeng Lu, David G. Streets, Shabtai Bittman, and Douglas J. Macdonald

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DOI: 10.1021/es5026867

Coastal Acidification Induced by Tidal-Driven Submarine Groundwater Discharge in a Coastal Coral Reef System

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DOI: 10.1021/es503490z

Perfluoroalkylated Substances in the Global Tropical and Subtropical Surface Oceans

Belen González-Gaya, Jordi Dachs, Jose L. Roscales, Gemma Caballero, and Begoña Jiménez*

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DOI: 10.1021/es503622x

The Regulation of Copper Stress Response Genes in the Polychaete *Nereis diversicolor* during prolonged Extreme Copper Contamination

Jonathan S. McQuillan,* Peter Kille, Kate Powell, and Tamara S. Galloway

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DOI: 10.1021/es5036333

Inhalable Constituents of Thirdhand Tobacco Smoke: Chemical Characterization and Health Impact Considerations

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DOI: 10.1021/es503792f

Particle-Size Dependent Accumulation and Trophic Transfer of Cerium Oxide through a Terrestrial Food Chain

Joseph Hawthorne, Roberto De la Torre Roche, Baoshan Xing, Lee A. Newman, Xingmao Ma, Sanghamitra Majumdar, Jorge Gardea-Torresdey, and Jason C. White*

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DOI: 10.1021/es504010q

Satellite Telemetry Informs PCB Source Apportionment in a Mobile, High Trophic Level Marine Mammal: The Ringed Seal (*Pusa hispida*)

Tanya M. Brown,* Sebastian Luque, Becky Sjare, Aaron T. Fisk, Caren C. Helbing, and Ken J. Reimer

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DOI: 10.1021/es5041267

Dissemination of Antibiotic Resistance Genes in Representative Broiler Feedlots Environments: Identification of Indicator ARGs and Correlations with Environmental Variables

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Environmental Processes

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DOI: 10.1021/es504508v

Effects of Humidity and $[\text{NO}_3]/[\text{N}_2\text{O}_5]$ Ratio on the Heterogeneous Reaction of Fluoranthene and Pyrene with $\text{N}_2\text{O}_5/\text{NO}_3/\text{NO}_2$

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Effect of Silicate on the Formation and Stability of Ni–Al LDH at the $\gamma\text{-Al}_2\text{O}_3$ Surface

Xiaoli Tan, Ming Fang, Xuemei Ren, Huiyang Mei, Dadong Shao, and Xiangke Wang*

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Inhibition and Biotransformation Potential of Veterinary Ionophore Antibiotics under Different Redox Conditions

Peizhe Sun, Ching-Hua Huang, and Spyros G. Pavlostathis*

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Biofouling and Microbial Communities in Membrane Distillation and Reverse Osmosis

Katherine R. Zodrow, Edo Bar-Zeev, Michael J. Giannetto, and Menachem Elimelech*

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DOI: 10.1021/es503161v

Identifying Iron Foundries as a New Source of Unintentional Polychlorinated Naphthalenes and Characterizing Their Emission Profiles

Guorui Liu, Pu Lv, Xiaoxu Jiang, Zhiqiang Nie, and Minghui Zheng*


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- 13173  DOI: 10.1021/es5032079
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- 13181  DOI: 10.1021/es5032147
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- 13188  DOI: 10.1021/es5034525
Photodegradation of Veterinary Ionophore Antibiotics under UV and Solar Irradiation
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- 13197  DOI: 10.1021/es5034684
Effects of Solution Chemistry on Adsorption of Selected Pharmaceuticals and Personal Care Products (PPCPs) by Graphenes and Carbon Nanotubes
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Kinetics of Hg(II) Exchange between Organic Ligands, Goethite, and Natural Organic Matter Studied with an Enriched Stable Isotope Approach
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- 13218  DOI: 10.1021/es503550g
Iron and Arsenic Speciation and Distribution in Organic Flocs from Streambeds of an Arsenic-Enriched Peatland
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- 13229  DOI: 10.1021/es503456g
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- 13238  DOI: 10.1021/es5035602
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- 13246  DOI: 10.1021/es5036249
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Environmental Modeling

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Assessing Recovery from Acidification of European Surface Waters in the Year 2010: Evaluation of Projections Made with the MAGIC Model in 1995
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DOI: 10.1021/es503918m

Evaluating the Bioaccessibility of Flame Retardants in House Dust Using an In Vitro Tenax Bead-Assisted Sorptive Physiologically Based Method

Mingliang Fang and Heather M. Stapleton*

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DOI: 10.1021/es504106j

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DOI: 10.1021/es504172j

Development of a Planar Waveguide Microarray for the Monitoring and Early Detection of Five Harmful Algal Toxins in Water and Cultures

Sara E. McNamee, Christopher T. Elliott, Brett Greer, Michael Lochhead, and Katrina Campbell*

Remediation and Control Technologies

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DOI: 10.1021/es503071m

Biodegradation of *cis*-Dichloroethene and Vinyl Chloride in the Capillary Fringe

Zohre Kurt, E. Erin Mack, and Jim C. Spain*

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DOI: 10.1021/es503491w

A Model Framework to Describe Growth-Linked Biodegradation of Trace-Level Pollutants in the Presence of Coincidental Carbon Substrates and Microbes

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DOI: 10.1021/es5035206

Thioarsenic Species Associated with Increased Arsenic Release during Biostimulated Subsurface Sulfate Reduction

Valerie K. Stucker,* David R. Silverman, Kenneth H. Williams, Jonathan O. Sharp, and James F. Ranville

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DOI: 10.1021/es503606j

Mechanism of Selenite Removal by a Mixed Adsorbent Based on Fe–Mn Hydrous Oxides Studied Using X-ray Absorption Spectroscopy

Natalia Chubar,* Vasyi Gerda, and Malgorzata Szlachta

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DOI: 10.1021/es504082r

Arsenite Oxidation-Enhanced Photocatalytic Degradation of Phenolic Pollutants on Platinized TiO₂

Jaesung Kim and Jungwon Kim*

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DOI: 10.1021/es504091s

Synthesis and Application of a Quaternary Phosphonium Polymer Coagulant To Avoid *N*-Nitrosamine Formation

Teng Zeng, Joseph J. Pignatello, Russell Jingxian Li, and William A. Mitch*

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DOI: 10.1021/es5041392

Surface Passivation Limited UO_2 Oxidative Dissolution in the Presence of FeS
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Sustainability Engineering and Green Chemistry

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DOI: 10.1021/es502695k

Recycling of Indium From CIGS Photovoltaic Cells: Potential of Combining Acid-Resistant Nanofiltration with Liquid-Liquid Extraction

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DOI: 10.1021/es5027882

Degradation of Poly(Ether Sulfone)/Polyvinylpyrrolidone Membranes by Sodium Hypochlorite: Insight from Advanced Electrokinetic Characterizations

Yamina Hanafi, Anthony Szymczyk,* Murielle Rabiller-Baudry, and Kamel Baddari


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DOI: 10.1021/es5029124

Comparison of Ceria Nanoparticle Concentrations in Effluent from Chemical Mechanical Polishing of Silicon Dioxide

Larry Zazzera,* Brian Mader, Mark Ellefson, Jess Eldridge, Steve Loper, John Zabasajja, and Julie Qian

Ecotoxicology and Human Environmental Health

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DOI: 10.1021/es504331n

The Antidepressant Venlafaxine Disrupts Brain Monoamine Levels and Neuroendocrine Responses to Stress in Rainbow Trout

Nataliya Melnyk-Lamont, Carol Best, Manuel Gestó, and Mathilakath M. Vijayan*

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DOI: 10.1021/es501187g

Cellular Partitioning of Nanoparticulate versus Dissolved Metals in Marine Phytoplankton

Gretchen K. Bielmyer-Fraser,* Tayler A. Jarvis, Hunter S. Lenihan, and Robert J. Miller

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DOI: 10.1021/es501385y

Fate of Microplastics in the Marine Isopod *Idotea emarginata*

Julia Hämer, Lars Gutow, Angela Köhler, and Reinhard Saborowski*

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DOI: 10.1021/es502490w

Variability in PCB and OH-PCB Serum Levels in Children and Their Mothers in Urban and Rural U.S. Communities

Rachel F. Marek, Peter S. Thorne,* Jeanne DeWall, and Keri C. Hornbuckle*

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DOI: 10.1021/es502635t

Bioaccessibility of Arsenic in Mining-Impacted Circumneutral River Floodplain Soils

Christian Mikutta,* Petar N. Mandaliev, Nina Mahler, Tsvetan Kotsev, and Ruben Kretzschmar

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DOI: 10.1021/es502855x

Iodoacetic Acid Activates Nrf2-Mediated Antioxidant Response *in Vitro* and *in Vivo*

Shu Wang, Weiwei Zheng, Xiaolin Liu, Peng Xue, Songhui Jiang, Daru Lu, Qiang Zhang, Gensheng He, Jingbo Pi, Melvin E. Andersen, Hui Tan,* and Weidong Qu*

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DOI: 10.1021/es5031646

Soybean Plants Modify Metal Oxide Nanoparticle Effects on Soil Bacterial Communities

Yuan Ge, John H. Priester, Laurie C. Van De Werfhorst, Sharon L. Walker, Roger M. Nisbet, Youn-Joo An, Joshua P. Schimel, Jorge L. Gardea-Torresdey, and Patricia A. Holden*

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DOI: 10.1021/es5031992

Minimised Bioconcentration Tests: A Useful Tool for Assessing Chemical Uptake into Terrestrial and Aquatic Invertebrates?

Laura J. Carter, Roman Ashauer, Jim J. Ryan, and Alistair B. A. Boxall*

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DOI: 10.1021/es503297n

Endocrine and Fitness Correlates of Long-Chain Perfluorinated Carboxylates Exposure in Arctic Breeding Black-Legged Kittiwakes

Sabrina Tartu,* Geir W. Gabrielsen, Pierre Blévin, Hugh Ellis, Jan Ove Bustnes, Dorte Herzke, and Olivier Chastel

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DOI: 10.1021/es5039547

Rapid *In Vitro* Metabolism of the Flame Retardant Triphenyl Phosphate and Effects on Cytotoxicity and mRNA Expression in Chicken Embryonic Hepatocytes

Guanyong Su, Doug Crump,* Robert J. Letcher,* and Sean W. Kennedy

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DOI: 10.1021/es5050503

Crustacean Intersexuality Is Feminization without Demasculinization: Implications for Environmental Toxicology

Stephen Short, Gongda Yang, Yasmin Guler, Amaia Green Etxabe, Peter Kille, and Alex T. Ford*

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DOI: 10.1021/es5043386

Toxicological Assessment of Polychlorinated Biphenyls and Their Metabolites in the Liver of Baikal Seal (*Pusa sibirica*)


Kei Nomiya,* Shusaku Hirakawa, Akifumi Eguchi, Chika Kanbara, Daisuke Imaeda, Jean Yoo, Tatsuya Kunisue, Eun-Young Kim, Hisato Iwata, and Shinsuke Tanabe

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Behavior of Mercury Emissions from a Commercial Coal-Fired Power Plant: The Relationship between Stack Speciation and Near-Field Plume Measurements

Matthew S. Landis,* Jeffrey V. Ryan, Arnout F. H. ter Schure, and Dennis Laudal

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DOI: 10.1021/es5017125

Microbial Reduction of U(VI) under Alkaline Conditions: Implications for Radioactive Waste Geodisposal

Adam J. Williamson, Katherine Morris, Gareth T. W. Law, Athanasios Rizoulis, John M. Charnock, and Jonathan R. Lloyd*

Additions and Corrections

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DOI: 10.1021/es505252v

Correction to Degradation, Phytoprotection and Phytoremediation of Phenanthrene by Endophyte *Pseudomonas putida*, PD1

Zareen Khan,* David Roman, Trent Kintz, May delas Alas, Raymond Yap, and Sharon Doty

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DOI: 10.1021/es505291k

Correction to Effect of Body Condition on Tissue Distribution of Perfluoroalkyl Substances (PFASs) in Arctic Fox (*Vulpes lagopus*)

Camilla Bakken Aas, Eva Fuglei, Dorte Herzke, Nigel G. Yoccoz, and Heli Routti*
