

Greenlist Bulletin

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at the University of Massachusetts Lowell

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This is the bi-weekly bulletin of the TURI Library at the University of Massachusetts Lowell. Greenlist Bulletin provides previews of recent publications and websites relevant to reducing the use of toxic chemicals by industries, businesses, communities, individuals and government. You are welcome to send a message to mary@turi.org if you would like more information on any of the articles listed here, or if this email is not displaying properly.



Second Integrated Urban Air Toxics Report to Congress

[Source: U.S. Environmental Protection Agency, August 21, 2014](#)

On August 21, 2014, EPA released the Second Integrated Urban Air Toxics Report to Congress - the final of two reports required under the Clean Air Act (CAA) to inform Congress of EPA's actions and progress in reducing public health risks from urban air toxics.

Using national emissions and air quality data, the report shows the substantial progress that has been made to reduce air toxics across the country since the passage of the Integrated Urban Air Toxics Strategy in 1999.

The report highlights some of the results achieved through EPA's air toxics regulations, including:

- A 66 percent reduction in benzene;
- A nearly 60 percent reduction in mercury from man-made sources like coal-fired power plants;
- An 84 percent decrease of lead in outdoor air;
- The removal of an estimated 1.5 million tons per year of air toxics from stationary sources, and approximately 3 million tons per year of criteria pollutants as a co-benefit of air toxics reductions;
- The removal of an estimated 1.5 million tons per year of air toxics from mobile sources, which represents a 50 percent reduction in mobile source air toxics emissions.

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Access full report [here](#).

Review of the Formaldehyde Assessment in the National Toxicology Program 12th Report on Carcinogens

[Source: National Research Council. Review of the Formaldehyde Assessment in the National Toxicology Program 12th Report on Carcinogens. Washington, DC: The National Academies Press, 2014.](#)

Authors: Committee to Review the Formaldehyde Assessment in the National Toxicology Program 12th Report on Carcinogens; Board on Environmental Studies and Toxicology (BEST); Division on Earth and Life Sciences; National Research Council

Many people in the United States are exposed to formaldehyde. Exposure can occur from environmental sources (for example, combustion processes, building materials, and tobacco smoke) or in occupational settings (for example, the furniture, textile, and construction industries). Formaldehyde exposure also has endogenous sources -- it is produced intracellularly as a component of the one carbon pool intermediary metabolism pathway. Scientists have studied formaldehyde for decades to determine whether exogenous formaldehyde exposure may be associated with cancer in humans. In 1981, The National Toxicology Program (NTP) first listed formaldehyde in the 2nd Report on Carcinogens as "reasonably anticipated to be a human carcinogen". In 2011, NTP upgraded the listing of formaldehyde to "known to be a human carcinogen". Following the new listing, Congress directed the Department of Health and Human Services to arrange for the National Academy of Sciences to independently review formaldehyde's substance profile and listing. This report presents the findings and conclusions of the committee formed in response to the congressional request.

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Also see blog from Environmental Defense Fund, "[Twice in 2 weeks: National Academy of Sciences again strongly affirms federal government's science, agrees formaldehyde is a known human carcinogen](#)".

Cytotoxicity of ZnO Nanoparticles Can Be Tailored by Modifying Their Surface Structure: A Green Chemistry Approach for Safer Nanomaterials

[Source: ACS Sustainable Chemistry & Engineering, May 19, 2014](#)

Authors: Alex Punnoose, Kelsey Dodge, John W. Rasmussen, Jordan Chess, Denise Wingett, and Catherine Anders

ZnO nanoparticles (NP) are extensively used in numerous nanotechnology applications; however, they also happen to be one of the most toxic nanomaterials. This raises significant environmental and health concerns and calls for the need to develop new synthetic approaches to produce safer ZnO NP, while preserving their attractive optical, electronic, and structural properties. In this work, we demonstrate that the cytotoxicity of ZnO NP can be tailored by modifying their surface-bound chemical groups, while maintaining the core ZnO structure and related properties. Two equally sized (9.26 ± 0.11 nm) ZnO NP samples were synthesized from the same zinc acetate precursor using a forced hydrolysis process, and their surface chemical structures were modified by using different reaction solvents. X-ray diffraction and optical studies showed that the lattice parameters, optical properties, and band gap (3.44 eV) of the two ZnO NP samples were similar. However, FTIR spectroscopy showed significant differences in the surface structures and surface-bound chemical groups. This led to major differences in the zeta potential, hydrodynamic size, photocatalytic rate constant, and more importantly, their cytotoxic effects on Hut-78 cancer cells. The ZnO NP sample with the higher zeta potential and catalytic activity displayed a 1.5-fold stronger cytotoxic effect on cancer cells. These results suggest that by modifying the synthesis parameters/conditions and the surface chemical structures of the nanocrystals, their surface charge density, catalytic activity, and cytotoxicity can be tailored. This provides a green chemistry approach to produce safer ZnO NP.

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Scientists Discover 56 Active Pharmaceuticals in Wastewater Treatment Plants

[Source: Elsevier, 2014](#)

Scientists have identified 56 active pharmaceutical ingredients in effluent samples from 50 large wastewater treatment plants across the USA, according to a report published in *Environmental Pollution*. ...

Commonly used pharmaceutical products such as antihypertensive and anti-psychotic drugs are ending up in water from sewage treatment plants across the USA. There are long-standing public concerns about the potential risks to public health and to aquatic wildlife due to contamination of waters that receive effluents from treatment plants.

"Our research is the first systematic country-wide examination of pharmaceuticals in effluent waters and the risk that this might pose," said Mitchell Kostich, one of the authors of the paper from the Environmental Protection Agency.

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See original article in *Environmental Pollution*, "[Concentrations of prioritized pharmaceuticals in effluents from 50 large wastewater treatment plants in the US and implications for risk estimation](#)".

Also see in *Environmental Pollution*, "[Environmental pollution by antibiotics and by antibiotic resistance determinants](#)".

BPA-Free Plastic Containers May Be Just as Hazardous

Source: [Scientific American, August 11, 2014](#)

Author: Jenna Bilbrey

In 2012 the U.S. Food and Drug Administration banned the sale of baby bottles that contain bisphenol A (BPA), a compound frequently found in plastics. The ban came after manufacturers' responded to consumer concerns of BPA's safety after several studies found the chemical mimics estrogen and could harm brain and reproductive development in fetuses, infants and children. Since then store shelves have been lined with BPA-free bottles for babies and adults alike. Yet, recent research reveals that a common BPA replacement, bisphenol S (BPS), may be just as harmful.

BPA is the starting material for making polycarbonate plastics. Any leftover BPA that is not consumed in the reaction used to make a plastic container can leach into its contents. From there it can enter the body. BPS was a favored replacement because it was thought to be more resistant to leaching. If people consumed less of the chemical, the idea went, it would not cause any or only minimal harm.

Yet BPS is getting out. Nearly 81 percent of Americans have detectable levels of BPS in their urine. And once it enters the body it can affect cells in ways that parallel BPA. A 2013 study by Cheryl Watson at The University of Texas Medical Branch at Galveston found that even picomolar concentrations (less than one part per trillion) of BPS can disrupt a cell's normal functioning, which could potentially lead to metabolic disorders such as diabetes and obesity, asthma, birth defects or even cancer. "[Manufacturers] put 'BPA-free' on the label, which is true. The thing they neglected to tell you is that what they've substituted for BPA has not been tested for the same kinds of problems that BPA has been shown to cause. That's a little bit sneaky," Watson says.

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See the U.S. EPA Design for the Environment, "[BPA Alternatives in Thermal Paper Partnership](#)".

Also see from *Environmental Health Perspectives*, "[BPA and Reproductive Health: Reviewing the Current State of the Science](#)".

Maine Town Votes to Ban Lawn Pesticides on Public and Private Property, Becoming Second to Act in Last Year

Source: [Beyond Pesticides, July 8, 2014](#)

In another key victory for public health and the environment, last month residents in the small ocean-side community of Ogunquit, Maine (pop:~1,400) voted to become the first town in the state to prohibit the use of pesticides on public and private property for turf, landscape, and outdoor pest management activities. Ogunquit's ordinance makes the town the second local jurisdiction in the United States in the last year to ban pesticides on both public and private property, and the first to be passed by popular vote, 206 to 172. The ordinance, modeled in large part on the first private/public pesticide ban in Takoma Park, Maryland last year, was passed after a three-year education and awareness campaign, initiated by the town's Conservation Commission. The law expands on existing pesticide use restrictions on town-owned property. The passage of this ordinance positions Ogunquit as a leader in the state for environmental sustainability and the protection of public health, and supports the Conservation Commission's goals to ensure that the

town's popular beaches [are] clean and healthy for all those that visit. The law's stated purpose is to "conserve and protect the town's ground water, estuarine, marine and other natural resources, while ensuring preservation of the land."

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TURI's Note: See our tip sheet page for "[Ten Tips for a Healthy, Pesticide-free Lawn](#)", also available in Spanish, Portuguese, and Vietnamese.

Direct Transformation of Edible Vegetable Waste into Bioplastics

[Source: ACS Macromolecules, July 15, 2014](#)

Authors: Ilker S. Bayer, Susana Guzman-Puyol, José Alejandro Heredia-Guerrero, Luca Ceseracciu, Francesca Pignatelli, Roberta Ruffilli, Roberto Cingolani, and Athanassia Athanassiou

Bioplastics with a wide range of mechanical properties were directly obtained from industrially processed edible vegetable and cereal wastes. As model systems, we present bioplastics synthesized from wastes of parsley and spinach stems, rice hulls, and cocoa pod husks by digesting in trifluoroacetic acid (TFA), casting, and evaporation. In this way, amorphous cellulose-based plastics are formed. Moreover, many other natural elements present in these plants are carried over into the bioplastics rendering them with many exceptional thermo-physical properties. Here, we show that, due to their broad compatibility with cellulose, amorphous cellulose can be naturally plasticized with these bioplastics by simply mixing during processing. Comparison of their mechanical properties with that of various petroleum based synthetic polymers indicates that these bioplastics have equivalent mechanical properties to the nondegrading ones. This opens up possibilities for replacing some of the nondegrading polymers with the present bioplastics obtained from agro-waste.

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Also see article from *Scientific American*, "[Strong, Clear Bioplastic Containers Could Be Made from Rice](#)".

Antibacterial Soap Exposes Health Workers to High Triclosan Levels

[Source: University of California, San Francisco, August 19, 2014](#)

Author: Steve Tokar

Handwashing with antibacterial soap exposes hospital workers to significant and potentially unsafe levels of triclosan, a widely-used chemical currently under review by the U.S. Food and Drug Administration, according to a study led by researchers from UC San Francisco.

Triclosan, a synthetic antibacterial agent, is found in thousands of consumer products, including soaps, cosmetics, acne creams and some brands of toothpaste. The FDA is reviewing its safety based on a growing body of research indicating that it can interfere with the action of hormones, potentially causing developmental problems in fetuses and newborns, among other health concerns.

In the current study, published in the August issue of the *Journal of Occupational and Environmental Medicine*, researchers analyzed urine samples from two groups of 38 doctors and nurses - three fourths of them women - at two hospitals, identified as Hospital 1 and Hospital 2. Hospital 1 used an antibacterial soap containing 0.3 percent triclosan, while Hospital 2 used plain soap and water.

Workers at Hospital 1 had significantly higher levels of triclosan in their urine than workers at Hospital 2.

[Read more...](#)

See article in the *Journal of Occupational and Environmental Medicine*, "[Health Care Worker Exposures to the Antibacterial Agent Triclosan](#)".

Also see in *Environmental Health News*, "[Germ-killing chemicals common in pregnant women, newborns](#)".

Sunscreens as a Source of Hydrogen Peroxide Production in Coastal Waters

[Source: *Environmental Science & Technology*, July 28, 2014](#)
Authors: David Sanchez-Quiles and Antonio Tovar-Sanchez

Sunscreens have been shown to give the most effective protection for human skin from ultraviolet (UV) radiation. Chemicals from sunscreens (i.e., UV filters) accumulate in the sea and have toxic effects on marine organisms. In this report, we demonstrate that photoexcitation of inorganic UV filters (i.e., TiO₂ and ZnO nanoparticles) under solar radiation produces significant amounts of hydrogen peroxide (H₂O₂), a strong oxidizing agent that generates high levels of stress on marine phytoplankton. Our results indicate that the inorganic oxide nanoparticle content in 1 g of commercial sunscreen produces rates of H₂O₂ in seawater of up to 463 nM/h, directly affecting the growth of phytoplankton. Conservative estimates for a Mediterranean beach reveal that tourism activities during a summer day may release on the order of 4 kg of TiO₂ nanoparticles to the water and produce an increment in the concentration of H₂O₂ of 270 nM/day. Our results, together with the data provided by tourism records in the Mediterranean, point to TiO₂ nanoparticles as the major oxidizing agent entering coastal waters, with direct ecological consequences on the ecosystem.

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Seafood substitutions can expose consumers to unexpectedly high mercury

[Source: University of Hawai'i, Mānoa, August 18, 2014](#)

Authors: Peter Marko and Talia Oglione

New measurements from fish purchased at retail seafood counters in 10 different states show the extent to which mislabeling can expose consumers to unexpectedly high levels of mercury, a harmful pollutant.

Fishery stock "substitutions"-- which falsely present a fish of the same species, but from a different geographic origin -- are the most dangerous mislabeling offense, according to new research by University of Hawai'i at Mānoa scientists.

"Accurate labeling of seafood is essential to allow consumers to choose sustainable fisheries," said UH Mānoa biologist Peter B. Marko, lead author of the new study published in the scientific journal *PLOS One*. "But consumers also rely on labels to protect themselves from unhealthy mercury exposure. Seafood mislabeling distorts the true abundance of fish in the sea, defrauds consumers, and can cause unwanted exposure to harmful pollutants such as mercury."

The study included two kinds of fish: those labeled as Marine Stewardship Council- (MSC-) certified Chilean sea bass, and those labeled simply as Chilean sea bass (uncertified). The MSC-certified version is supposed to be sourced from the Southern Ocean waters of South Georgia, near Antarctica, far away from man-made sources of pollution. MSC-certified fish is often favored by consumers seeking sustainably harvested seafood but is also potentially attractive given its consistently low levels of mercury.

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See original article in *PLOS One*, "[Seafood Substitutions Obscure Patterns of Mercury Contamination in Patagonian Toothfish \(*Dissostichus eleginoides*\) or 'Chilean Sea Bass'](#)".

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