

Greenlist Bulletin

From the Toxics Use Reduction Institute
at the University of Massachusetts Lowell

August 24, 2015

In This Issue

A virtual screening approach to identifying the greenest compound for a task: application to switchable-hydrophilicity solvents

Institutional purchasing drives market for safer chemicals

Chemicals In Capsules Make Synthesis A Snap

Perfluorinated Alkyl Substances: Emerging Insights Into Health Risks

New Chemicals List Issued by Global Aerospace Industry

California's Fracking Fluids: The Chemical Recipe

Can you kill microbes without hurting healthcare workers?

Can Auto Repair Shops Use Safer Chemicals?

Greener and Cleaner: One Company's Environmental Win

What will it take for brands to deliver on the promise of greener chemicals?

Sustainability: Don't waste seafood waste

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[TURI Website](#)



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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.



Editor's Note

Dear Greenlist subscribers,
I'd like to thank our guest editor, Anna Ivanova, for assisting me in compiling Greenlist this week. Anna is a green chemist at the [Green Chemistry and Commerce Council](#), where she works to advance the adoption of green chemistry in industry. She earned her M.Sc. in chemistry from Carnegie Mellon University, and her B.Sc. in chemistry from Caltech. She is also director of communications for [NESSE](#), the Network of Early-Career Sustainable Scientists and Engineers.

Best,
Mary

A virtual screening approach to identifying the greenest compound for a task: application to switchable-hydrophilicity solvents

[Source: Royal Society of Chemistry, August 7, 2015](#)

Authors: J.R. Vanderveen, L. Patiny, C. B. Chalifoux, M.J. Jessop and P.G. Jessop

Abstract: A virtual or *in silico* screening approach makes it much easier to identify the molecular structure that best combines efficacy for a specific task with safety and minimum environmental or health impacts. In this approach, software is used to generate a larger number of possible molecular structures and then to use QSARs (quantitative structure-activity relationships) to predict properties related to performance, safety, health and environmental impact. The structures are then given scores on criteria (such as flash point or toxicity) and an overall score. The method identifies compounds that have high scores for the 3 performance criteria and 7 health, safety and environmental criteria. This method allows for larger-scale and faster screening than can be performed using human intellect and a benchtop approach. The success of this approach is demonstrated by its application to the identification of new and possibly greener switchable-hydrophilicity solvents (SHS). Three SHS were identified using this method. This approach to molecular design is entirely modular and can be applied to the design of almost any type of chemical. However, limitations of the method include the fact that it does not take into consideration the health and environmental costs of manufacturing the chemical.

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Institutional purchasing drives market for safer chemicals

[Source: Lowell Center for Sustainable Production, June 2015](#)

Author: Amy Perlmutter

There are tens of thousands of chemicals in commerce in the United States. Many chemicals may have a range of negative impacts on health, the environment, and the economy during their lifecycle, from manufacture, through use and disposal. It should be a key part of any sustainable purchasing program to understand which of these chemicals could pose hazards in products and services procured, how they might harm users of those products or the environment, and what safer alternatives are on the market.

This report from the Lowell Center for Sustainable Production profiles six organizations -- from governmental to private-sector to not-for-profit -- that are taking different approaches to screen and restrict products containing certain toxic chemicals or groups of chemicals and, as a result, are driving demand for safer chemistry; these organizations have developed processes beyond the use of third-party product certifications to identify and purchase safer products.

[Read more...](#)

Access report, "[Advancing Safer Chemicals in Products: The Key Role of Purchasing](#)".

Chemicals In Capsules Make Synthesis A Snap

[Source: Chemical & Engineering News, August 12, 2015](#)

Author: Bethany Halford

Anyone who's ever had to use a glove box to handle air- and moisture-sensitive reagents knows the experience is something akin to playing piano in boxing gloves. To make it easier to work with such compounds, chemists at MIT have devised paraffin capsules that can hold premeasured doses of chemicals and be dropped into reaction vessels outside the glove box. ...

The group, led by chemistry professor Stephen L. Buchwald, was inspired by work from University of Delaware chemistry professor Douglass F. Taber. More than 10 years ago, Taber invented a uniform dispersion of oxygen- and moisture-sensitive reagents such as potassium hydride in paraffin wax that can be added to solutions. When heated, the wax melts, releasing the reagent into solution. The paraffin doesn't interfere with reactions and can be removed from mixtures via filtration and chromatography.

But when Buchwald and coworkers tried a similar approach with reagents for an aryl fluorination reaction, they weren't able to get a uniform dispersion of the chemicals in the wax. That's when they hit upon the idea of creating a capsule with preloaded amounts of reagents.

[Read more...](#)

See original article in *Nature*, "[Dosage delivery of sensitive reagents enables glove-box-free synthesis](#)".

Perfluorinated Alkyl Substances: Emerging Insights Into Health Risks

[Source: *New Solutions: A Journal of Environmental and Occupational Health Policy*, Volume 25\(2\), 2015](#)

Authors: Philippe Grandjean and Richard Clapp

Perfluorinated alkyl substances have been in use for over sixty years. These highly stable substances were at first thought to be virtually inert and of low toxicity. Toxicity information slowly emerged on perfluorooctanoic acid and perfluorooctane sulfonate. More than thirty years ago, early studies reported immunotoxicity and carcinogenicity effects. The substances were discovered in blood samples from exposed workers, then in the general population and in community water supplies near U.S. manufacturing plants. Only recently has research publication on perfluorooctanoic acid and perfluorooctane sulfonate intensified. While the toxicology database is still far from complete, carcinogenicity and immunotoxicity now appear to be relevant risks at prevalent exposure levels. Existing drinking water limits are based on less complete evidence that was available before 2008 and may be more than 100-fold too high. As risk evaluations assume that untested effects do not require regulatory attention, the greatly underestimated health risks from perfluorooctanoic acid and perfluorooctane sulfonate illustrate the public health implications of assuming the safety of incompletely tested industrial chemicals.

[Read more...](#)

New Chemicals List Issued by Global Aerospace Industry

[Source: National Association for Surface Finishing, June 1, 2015](#)

The global aerospace industry issued in May the sector's "first ever" declarable substances list to identify potentially harmful substances and prioritize certain materials for phase out and substitution in the supply chain. The International Aerospace Environmental Group (IAEG) developed the list, which is intended to be a coordinated approach to reporting and managing chemicals.

Referred to as the "Aerospace & Defence Declarable Substances List (AD-DSL)," it contains around 800 chemicals and a dozen families of chemicals, [and] is considered an initial common list of substances that are used in or are critical for aerospace and defense applications, including manufacture and maintenance.

[Read more...](#)

See the International Aerospace Environmental Group, [Aerospace and Defence Declarable Substances List \(AD-DSL\)](#).

California's Fracking Fluids: The Chemical Recipe

[Source: Environmental Working Group, August 12, 2015](#)

Authors: Tasha Stoiber, Bill Walker, and Bill Allayaud

The fluids used in hydraulic fracturing of oil wells in California contain dozens of chemicals that are hazardous to human health, including substances linked to cancer, reproductive harm and hormone disruption, an EWG analysis of state data shows.

Under a 2013 California law (SB 4) requiring disclosure of all chemicals used to boost production from oil wells by fracking or similar methods, drilling companies reported using 197 unique chemicals in 691 oil wells from December 2013 through February 2015. The fracking fluids typically contained two dozen or more different chemicals. EWG's analysis found that they included...

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Access full report [here](#).

Can you kill microbes without hurting healthcare workers?

[Source: AHC Media, September 1, 2015](#)

In the fierce battle against healthcare-associated infections, healthcare workers have unwittingly become collateral damage, developing skin irritation, headaches, and even asthma from cleaners

and disinfectants. To address those health hazards, infection preventionists and occupational health professionals have come together in an unprecedented collaboration.

The National Institute for Occupational Safety and Health (NIOSH) gathered more than 40 experts from various fields to review what is known about cleaning and disinfection of hospital surfaces and to identify knowledge gaps and research needs. Their conclusion: Hospitals should engage interdisciplinary teams to evaluate the hazards of their cleaning and disinfecting products. ...

"Cleaning and disinfecting agents, especially disinfecting products, are designed to kill organisms. While that's an essential function in some areas of healthcare, we have to treat them as chemicals that can have human health impacts, as well," says Margaret Quinn, ScD, CIH, professor in the Department of Work Environment at the University of Massachusetts Lowell.

Choosing a product certified as "green" isn't necessarily the answer. There is no standard definition of a "green" product, and the criteria do not necessarily include human health effects, said the working group, which was convened through NIOSH's National Occupational Research Agenda.

[Read more...](#)

Also see article in the *American Journal of Infection Control*, "[Cleaning and disinfecting environmental surfaces in health care: Toward an integrated framework for infection and occupational illness prevention](#)".

Can Auto Repair Shops Use Safer Chemicals?

[Source: Pacific Northwest Pollution Prevention Resource Center, May 21, 2015](#)

Author: Cyrus Philbrick

On May 13, PPRC hosted a webinar on Safer Alternatives in the Auto Repair Industry. The webinar reviewed specific and effective ways that auto repair shops can improve the safety of the chemicals they use.

Larry Garcia, with Seattle City Light, presented a number of hazardous materials that auto shops still use as brake cleaners and degreasers. Garcia offered many feasible and effective replacement chemicals, specifically water-based surfactants. Garcia also reviewed the new Washington state Better Brakes labeling system, which makes it easy for auto shops to choose brake pads that use minimal heavy metals.

[Read more...](#)

TURI's Note: See TURI and OTA's [case study](#) of the 912 Auto Center switching to water-based paint gun cleaner. Also see our upcoming [Auto Body and Repair Shop Alternatives to Solvents Demonstration](#) event, September 19th, 11am-2pm (drop in any time), in Lowell, MA.

Greener and Cleaner: One Company's Environmental Win

[Source: Products Finishing, August 2015](#)

Authors: Jack Reinke

Eliminating chlorinated and other degreasing solvents for metal parts cleaning continues to command attention for environmental and worker safety reasons.

The phase-out of most ozone depleting solvents in the late 1980s and early 1990s, along with the regulatory limits placed on other chlorinated solvents, prompted manufacturers in many industrial segments to move entirely away from chlorinated solvent cleaning. However, in some segments, such as stamping and other metal forming, chlorinated lubricants remained the standard for decades because of limited alternatives.

Most often, these companies replace solvent vapor degreasing by adopting safer aqueous and organic solvent cleaning options. One of these operations, a large stamping house, wanted to reduce the environmental and worker risks associated with the high volume use of chlorinated solvents in its vapor degreaser.

[Read more...](#)

See from *Products Finishing*, "[Safer Cleaning Choices Replace nPB Aerosols](#)" and "[Kanegsbergs on Cleaning: DeGreasing With Aqueous Products](#)".

Also see a fact sheet from the National Toxicology Program on [nPB](#).

What will it take for brands to deliver on the promise of greener chemicals?

Source: [The Guardian, August 19, 2015](#)

Author: Amy Westervelt

When Paul Anastas coined the term "green chemistry" back in 1991, he was a 28-year-old staff scientist at the US Environmental Protection Agency (EPA), where he was thought of as a little eccentric. By 1995, he had convinced then president Bill Clinton to launch the Presidential Green Chemistry Challenge, and in 1998, he and scientist John Warner co-authored a textbook on the subject that still stands as the field's dominant primer.

In it, the two laid out 12 principles for the new field they were founding, including "prevention", the idea that chemicals should be designed to avoid waste as much as possible from the outset; "safer chemicals", which instructed that chemicals should be designed to be both effective and non-toxic; and "safer solvents and auxiliaries", which indicated that auxiliary substances like solvents and separation agents should be avoided wherever possible and innocuous when used.

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Sustainability: Don't waste seafood waste

Source: [Nature, August 10, 2015](#)

Authors: Ning Yan & Xi Chen

Every year, some 6 million to 8 million tonnes of waste crab, shrimp and lobster shells are produced globally -- about 1.5 million tonnes in southeast Asia alone. Whereas 75% of the weight of a tuna fish can be extracted as fillets, meat accounts for only around 40% of a crab's mass.

In developing countries, waste shells are often just dumped in landfill or the sea. In developed countries, disposal can be costly -- up to US \$150 per tonne in Australia, for example.

Yet shells harbour useful chemicals -- protein, calcium carbonate and chitin, a polymer similar to cellulose, but which contains nitrogen. ... The potential value of such shells for the chemical industry is being ignored. Scientists should work out sustainable ways to refine crustacean shells, and governments and industry should invest in using this abundant and cheap renewable resource.

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Please send a message to mary@turi.org if you would like more information on any of these resources. Also, please tell us what topics you are particularly interested in monitoring, and who else should see Greenlist. An online search of the TURI Library catalog can be done at <http://library.turi.org> for greater topic coverage.

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