CHE Collaborative for Health & Environment

Webinar Highlights

The Realities of Chemical Recycling and Plastics

In the midst of the global plastics pollution crisis, there has been growing interest in so-called "advanced recycling" and "chemical recycling" for plastic. However, these processes pose many concerns. One concern is the large number of toxic chemicals found in recycled plastics.

In this webinar, **Dr. Eric Carmona**, a scientist at the Helmholtz Centre for Environmental Research-UFZ, discussed a recent study of chemical pollutants found in recycled plastics. Alaska State **Representative Andy Josephson** discussed plastics pollution and legislation in Alaska.

Featured Speakers: Dr. Eric Carmona Martinez, a scientist at the Helmholtz Centre for Environmental Research-UFZ, and Alaska State Rep. Andy Josephson, speaking February 28, 2024.

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The Problem

More than 13,000 chemicals are used in plastic production, including thousands of plastics additives, as well as substances that are added unintentionally. Thousands of these chemicals are known to have dangerous properties, while the health effects of others are unknown.Only 1% of plastic chemicals are subject to international regulation, and there are no laws monitoring chemicals in recycled materials.

For the study, researchers collected 28 plastic pellet samples from small scale plastics recycling facilities. These pellet samples were made from recycled high density polyethylene (HDPE). A pellet sample from virgin HDPE was also analyzed in order to compare it to the

recycled samples. The samples came from facilities in South America, Asia, Africa, and Europe.

The HDPE pellets were extracted by Ultrasound Assisted Extraction (UAE), using three different organic solvents: Methanol (MeOH), a solution of Acetonitrile (ACN):MeOH (2:1), and Hexane (Hx).

Key findings:

- The study detected 653 compounds and quantified 492 of these chemicals, including the following:
    - 162 pesticides/biocides
    - 89 pharmaceuticals
    - 64 industrial chemicals
    - 45 plastic additives
    - 21 polycyclic aromatic hydrocarbons (PAHs)
    - 12 polychlorinated biphenyls (PCBs)
    - 2 polybrominated diphenyl ethers (PBDE)

New products made from these recycled pellets would very likely be contaminated from these compounds. Dr. Carmona stressed that chemicals from plastics could be a threat to the environment and human health.

> **"Plastics can act as a Trojan horse and release those chemicals into the environment."**

Recommendations

Plastics need to be regulated throughout their lifecycle, which includes curbing of production, use, waste management, and remediation. The study recommends increased transparency, chemical simplification, improved waste management, and monitoring of hazardous chemicals for safer recycling.

Rather than rely on recycling as the primary solution, the most important thing we can do to address the plastic pollution crisis is to reduce production. Rep. Josephson discussed legislation he is working on in Alaska on this front. He has filed House Bill 354, which would largely eliminate the use of polystyrene foam in restaurants. This follows other states such as California and Maryland that have enacted similar bans. He has also worked to enact

plastic bag bans across the state. He expressed hope that with continued efforts, effective legislation could be passed.

To Find Out More

- Watch the February 28, 2024 webinar: The Realities of Chemical Recycling and the Plastic Pollution Crisis
- Read the presentation slides: Slides – Eric Carmona
- Read the study: A dataset of organic pollutants identified and quantified in recycled polyethylene pellets
- Access the resulting dataset from the study: https://zenodo.org/records/8367104
- Read a CHE blog post on "advanced recycling": "Advanced Recycling" of Plastics: Largely waste disposal by another name

About the Speakers

Dr. Eric Carmona Martinez is a postdoctoral scientist at the Helmholtz Centre for Environmental Research-UFZ, focusing on large-scale monitoring of European rivers and projects analyzing recycled and non-recycled plastics. He holds a degree in Environmental Sciences and a Master's in Toxicology from the University of Valencia. He completed his Ph.D. in Chemistry in the Food Safety and Environmental Research Group (SAMA-UV) under the Spanish Research Council. He has participated in different projects at national and international levels, such as SOLUTIONS and on the framework of the FRAM center, analyzing the chemicals in recycled plastics. Eric Carmona is a member of the Spanish Society of Chromatography and Related Technics and the Environmental Scientists Association in Spain.

Rep. Andy Josephson was born in Anchorage, AK in 1964. He was elected to the Alaska State House of Representatives in 2012 and represents residents in South Midtown, Taku-Campbell, and East Sand Lake. Andy is a certified school teacher and actively taught in the mid-Kuskokwim region from 1991-1994 in the village of Kalskag. After law school, he was a judicial law clerk to superior court judges in Fairbanks and Kenai. Following that, he served as an Assistant District Attorney in Kotzebue. He entered the private practice of law in 2001 and practiced law in Anchorage from 2001-2012. He holds a Master of Arts in Teaching from U.A.A. and a Juris Doctorate from Penn State-Dickinson.