

Protecting Waterways and Our Food Supply from “Forever Chemicals”

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In October of 2021, the Environmental Protection Agency's **PFAS Strategic Roadmap** took a major step towards combating a threat invisible to the naked eye: per- and polyfluoroalkyl substances known as PFAS, or “forever chemicals,” because they persist indefinitely in the environment and accumulate in humans and animals. According to the **Interstate Technology Regulatory Council**, thousands of such PFAS chemicals are widely used in commercial and consumer food applications, including in such common products as nonstick cookware and food packaging. They pose risks to human health by helping to cause cancer, thyroid disease, liver disease, decreased fertility, asthma, and pregnancy-related hypertension.

The Environmental Protection Agency's plans focus especially on drinking water and large-scale contaminated sites. Although certainly merited, this emphasis does not go far enough. In our interdisciplinary research at the University of Maine, we measured contamination by forever chemical pollutants in recycled food waste, and the results leave us concerned.

Risks in Circular Food Systems

From 2018-2019, our team of researchers conducted a study to understand potential contamination risks in circular food systems, defined as systems that seek to maximize the value of the food produced by never letting it go to waste. Circular food systems use edible food to feed people first, and then animals; afterwards, inedible food becomes an input for agricultural food production. Circularity is the entire point of this approach to environmentally sustainable resource use, because waste is minimized. But does this approach pose specific dangers attributable to PFAS chemicals?

Our project was located in New England, which is rapidly advancing policies and programs to capture wasted food and, through composting and anaerobic digestion, turn it into materials that nourish the soil and help grow crops. We collected food waste samples from Maine, Massachusetts, and Vermont to test for chemical and biological contamination. Over half of the food waste samples we tested contained PFAS forever chemicals. This is especially concerning because eating or drinking food containing these chemicals is a pressing danger to members of the public. Furthermore, the quantity and pervasiveness of these chemicals make it difficult for people to accurately assess exposure and risk, even to know whether any level of exposure is safe. Our findings are in line with **other research** on composted municipal food waste in the United States, suggesting that the risks we found are not unique to New England.

Our study also sought to understand how different stakeholders perceived and sought to address risks associated with food waste recycling. Through a survey and follow-up interviews, we asked food waste processors what they considered the biggest risks of contamination. Their responses were overwhelmingly focused on *visible contaminants* like glass, plastics, and produce stickers. These visible contaminants show up in finished compost and fertilizer, and can lead to issues with the marketing and sale of compost products. Importantly, though, our stakeholders did not identify forever chemicals as a contaminant of concern; and they did not have the tools, capacity, or policy support to test food waste inputs for these contaminants.

Encouraging Circular Food Systems to Combat Forever Chemicals

Avoiding food waste is an important part of combatting climate change, and cities, states, and regions can all recycle unneeded food into valuable end-products. But we must ensure that inputs in circular food systems

lead to safe, high quality outputs. There are several additional steps the Environmental Protection Agency can take to make sure the systems we set up are safe for food waste processors, agricultural producers, and the public.

As of January 1, 2020, the Biodegradable Products Institute **changed their certification scheme** to restrict PFAS chemicals in compostable foodware products. However, not all such products are certified by the Institute, and forever chemicals continue to be used in non-compostable items such as paper take-out packaging, fast-food wrappers, and microwavable popcorn bags. To limit contaminants in food-related packaging and cookware items, the Environmental Protection Agency could follow Maine's leadership in prohibiting the sale of products that are known to contain PFAS chemicals.

Although many individuals and organizations are concerned about the safety of products derived from recycled food waste, they often lack guidance and support to test for and deal with invisible contaminants. We applaud the Environmental Protection Agency's recently heightened attention to PFAS issues, yet remain concerned about too little attention to contaminants in food recycling systems. The Agency and the rest of the Biden administration can do more to scrutinize outputs such as food packaging and finished compost. Only by doing so can we ensure that human health is preserved as food waste is reduced.

Read more in Jean MacRae, Cindy Isenhour, Travis Blackmer, Balunkeswar Nayak, and Linda Silka, "The Emergent Risks of Food Waste Recovery: Characterizing the Contaminants in Municipal Solid Waste," Environmental Research and Education Foundation, 2021.