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# Evaluating Perfluoroalkyl Acids in Composts with Compostable Food Serviceware Products in their Feedstocks

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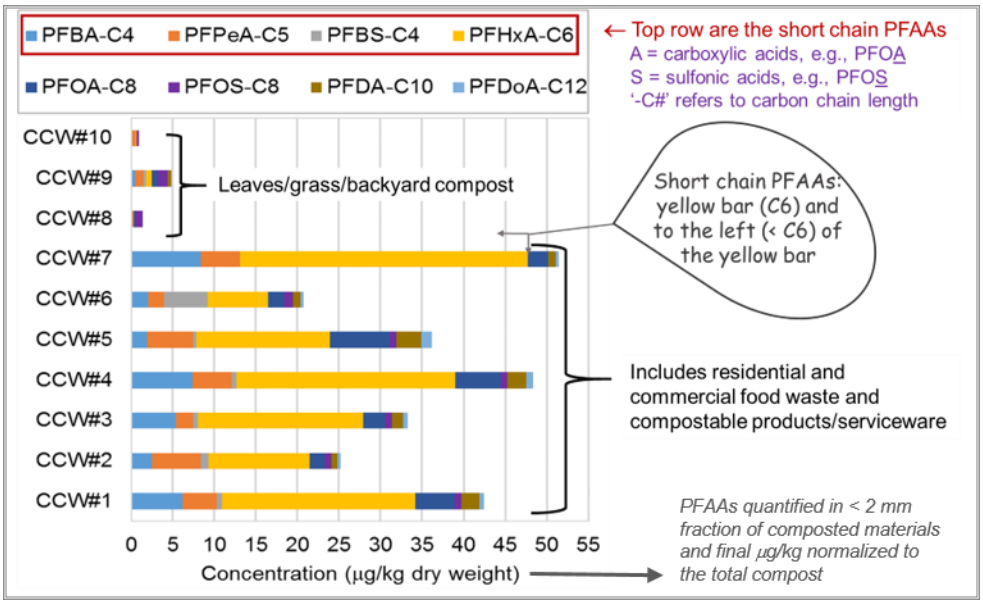
We recently conducted analysis of ten compost samples from across the United States for perfluoroalkyl acids (PFAAs), which range in carbon chain length from 4 to 16 carbons. PFAAs are a subclass of chemicals and final degradation products of the broader class of per/polyfluoroalkyl substances (PFASs) that are fire-resistant and repel water, fat and other substances. They are used in many commercial applications including food serviceware products such as paper plates and clamshells, pizza boxes and popcorn bags that are often present in wastes that are composted for reuse as fertilizers. Compost samples were collected from Washington, Oregon, California, Massachusetts and North Carolina at the consumer point of acquisition with assistance of nonprofit Zero Waste Washington. Nine of the samples were generated by commercial compost facilities and one was from a backyard compost bin. Samples were extracted and analyzed in Linda Lee's environmental chemistry lab using a method similar to EPA recommendations.

## Results

Most of the PFAAs quantified were found in the compost samples with the short chain PFAAs (C4, C5, and C6) being most prevalent. PFAAs levels are much higher in the seven samples that had feedstocks of mixed food and yard waste and included compostable food serviceware. In contrast, low levels of PFAS were found in the three samples which did not include compostable food serviceware in the feedstock (two commercial yard/leaf waste composts and the backyard bin sample).

## Comparison of Results

Results are similar to what Drs. Lee and *Mashtare's research groups found for commercially available nonbiosolid-based composts and significantly lower than found in pre-2015 biosolids composts; PFAA levels in biosolids composts were generally 2 to 10 times higher. Research by Blaine, Higgins, et. al (2013) with 1:10 biosolid/soil mixes showed that shorter chain PFAAs were taken up by lettuce and tomatoes in pot studies, but not significantly in pilot or full scale field trials. Gottschall, Topp et al. (2017) noted leaching to tile drains of PFAAs from compost-amended crop production fields at low parts per trillion levels. The concern about leaching to groundwater or stormwater needs further quantification.




***PFAA Highlights***

- *PFAAs are persistent*
- *Short chain PFAA are more mobile from soil:* 'Stickiness' to soil/media is proportional to organic carbon content and chain length
- *Crop uptake potential is higher for the shorter chain PFAAs*
- *Leaching to groundwater and stormwater has been documented (further quantification is needed)*
- *Much is still unknown on PFAA human and ecosystem health impacts*

Blaine, Higgins et al. (2013, EST, 47:14062-14069); Gottschall, Topp et al., (2017, Science of the Total Environment, 57:1345-1359)
*Dr. Michael L. Mashtare, Purdue University, Assistant Professor, Dept. of Agronomy (Previously Dr. Lee's post doc)