PFAS Fate and Transport: Impacts on Beneficial Reuse of Compost and Wastewater Biosolids

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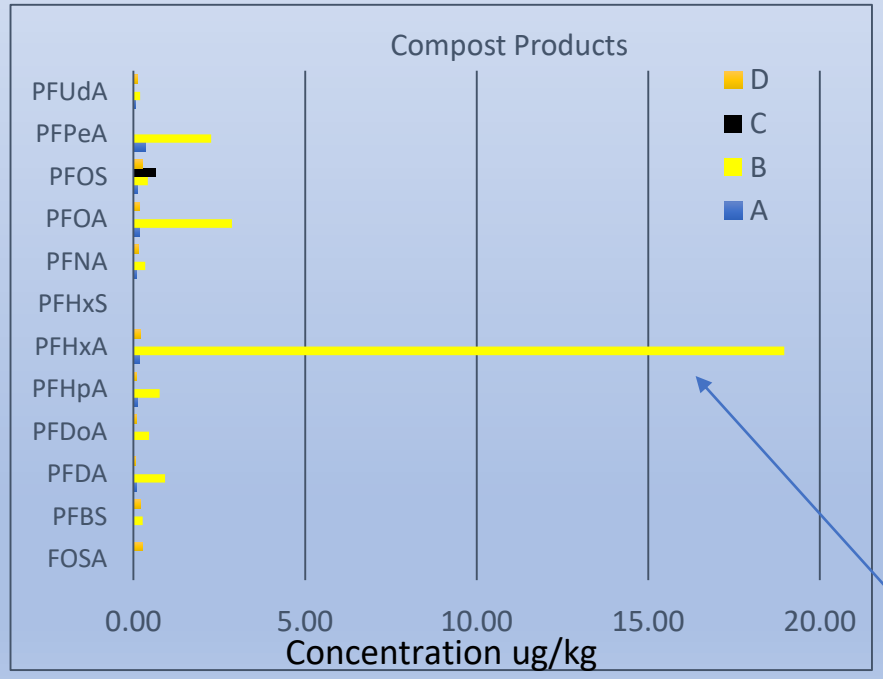
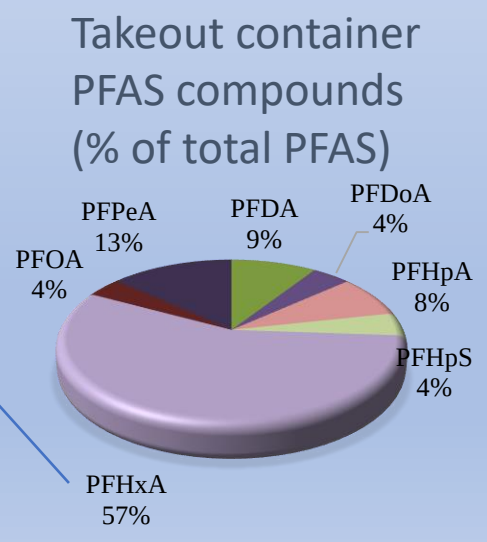
ESF State University of New York College of Environmental Science and Forestry

ESF is partnering with NYSDEC Division of Materials Management to assess the impact of PFAS cycling on sustainable materials recovery goals for non-recyclable paper, post-consumer food waste and compost.





Preliminary Results:

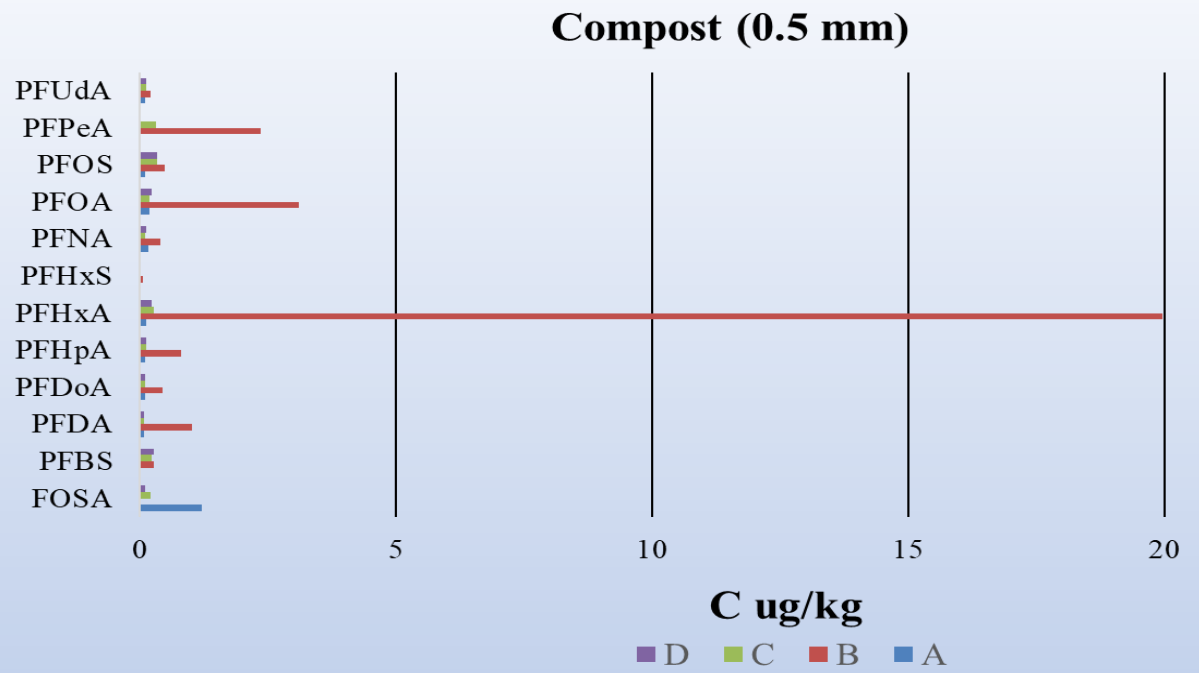
Compost Product B is a municipal compost with food waste as a feedstock. The elevated PFOA, PFHxA and PFPeA concentrations, compared to the other products, may be a result of paper food packaging in the food waste feedstock.

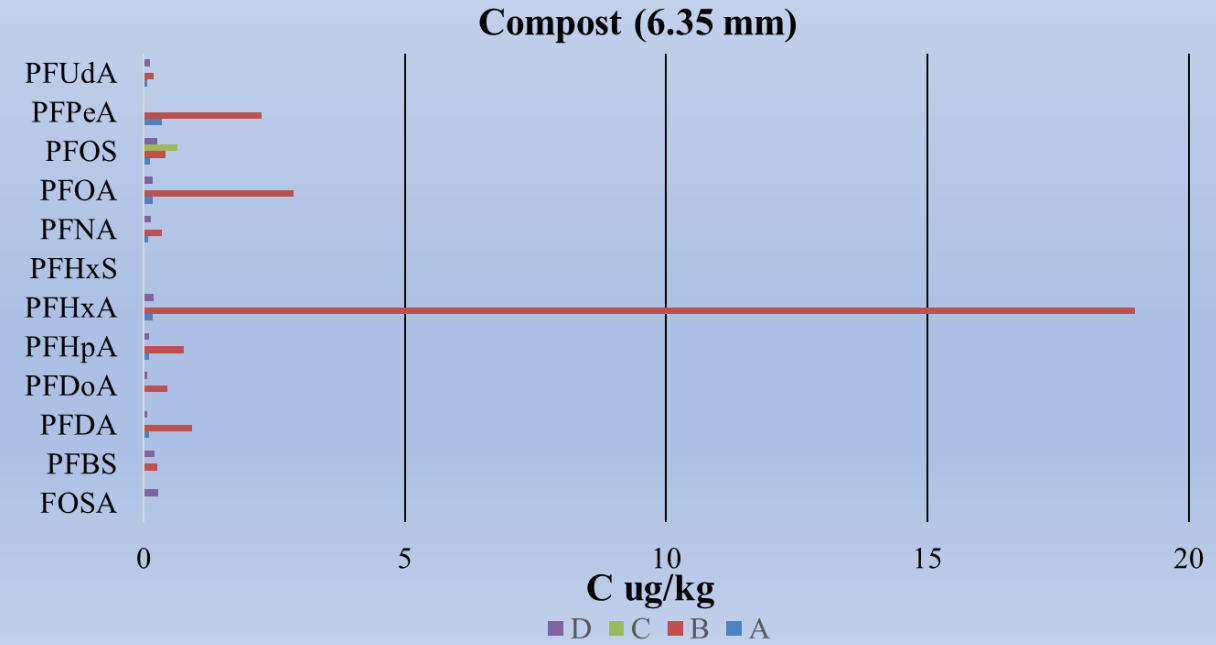
ESF analyzed PFAS in compost and similar consumer products purchased from retail stores.

A	horse manure and wood sawdust
B	Municipal yard waste and food scraps
C	Cow Manure
D	Composts derived from yard waste, manure, mushroom, food waste and processed forest products

Preliminary Results:

PFAS in compost appear to be uniformly distributed between the fine and coarse particle sizes.

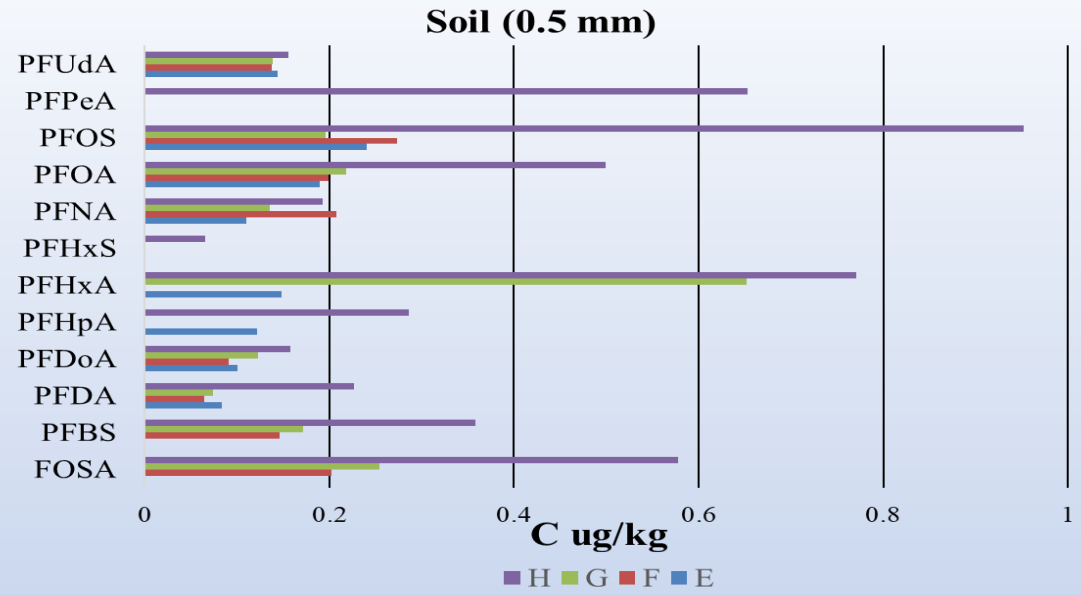


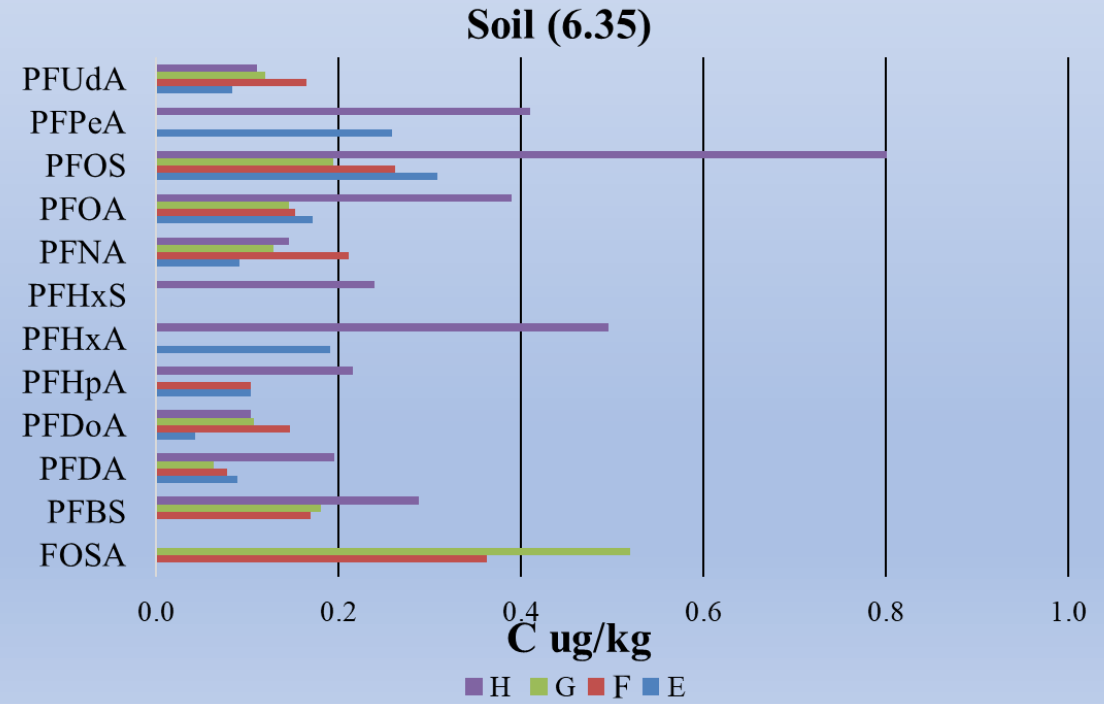


Preliminary Results:

PFAS in retail soil-like products are present at <1 ug/kg

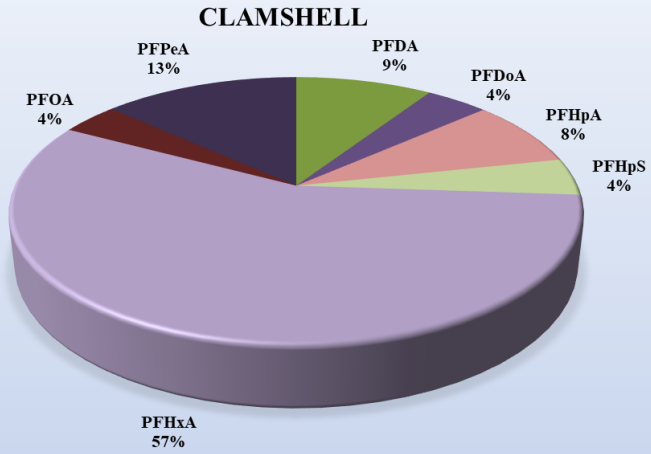
E	Garden Soil (peat, processed forest products, coir, and/or compost, sphagnum peatmoss, fertilizer, and a wetting agent)
F	sphagnum peat moss, coir, compost, peat, perlite, fertilizer, and processed forest products
G	sphagnum peat moss, processed forest products, coir, perlite, organic fertilizer, and yucca
H	yard waste

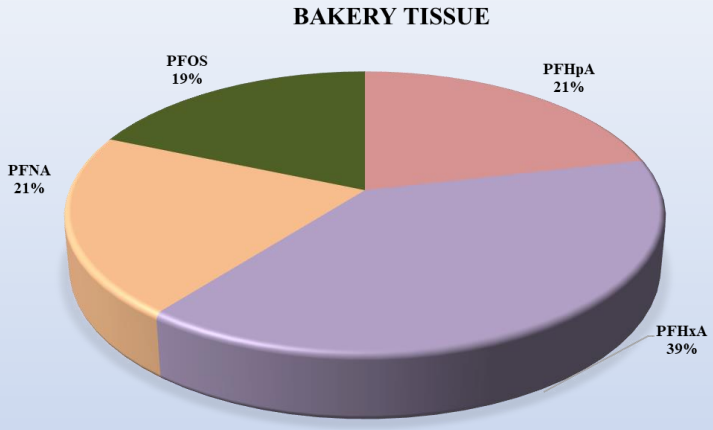


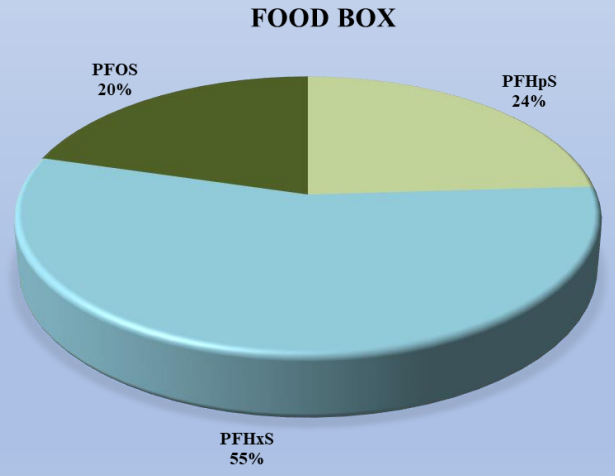


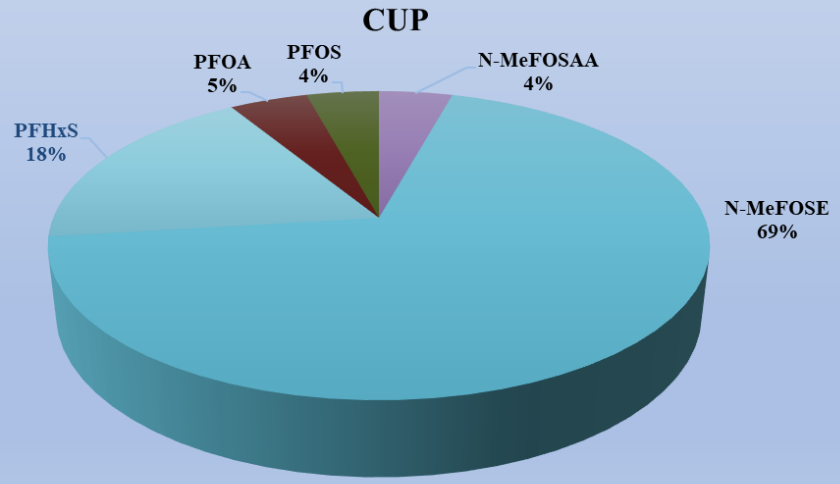
ESF purchased typical paper food packaging products from retail stores. Preliminary results include:

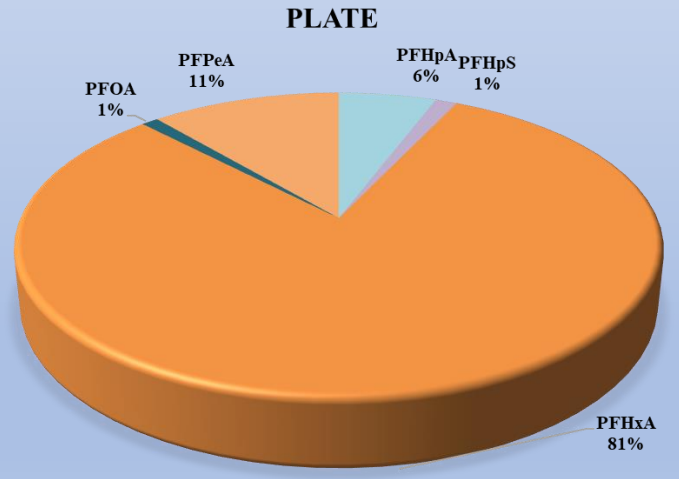
ID	Description
K	Biodegradable Take Out Food Containers with Clamshell Hinged Lid
L	Compostable Paper Cups
M	Bakery Tissue Wrap
N	Paper Take Out Containers (Food Boxes)
O	Compostable Round Plates











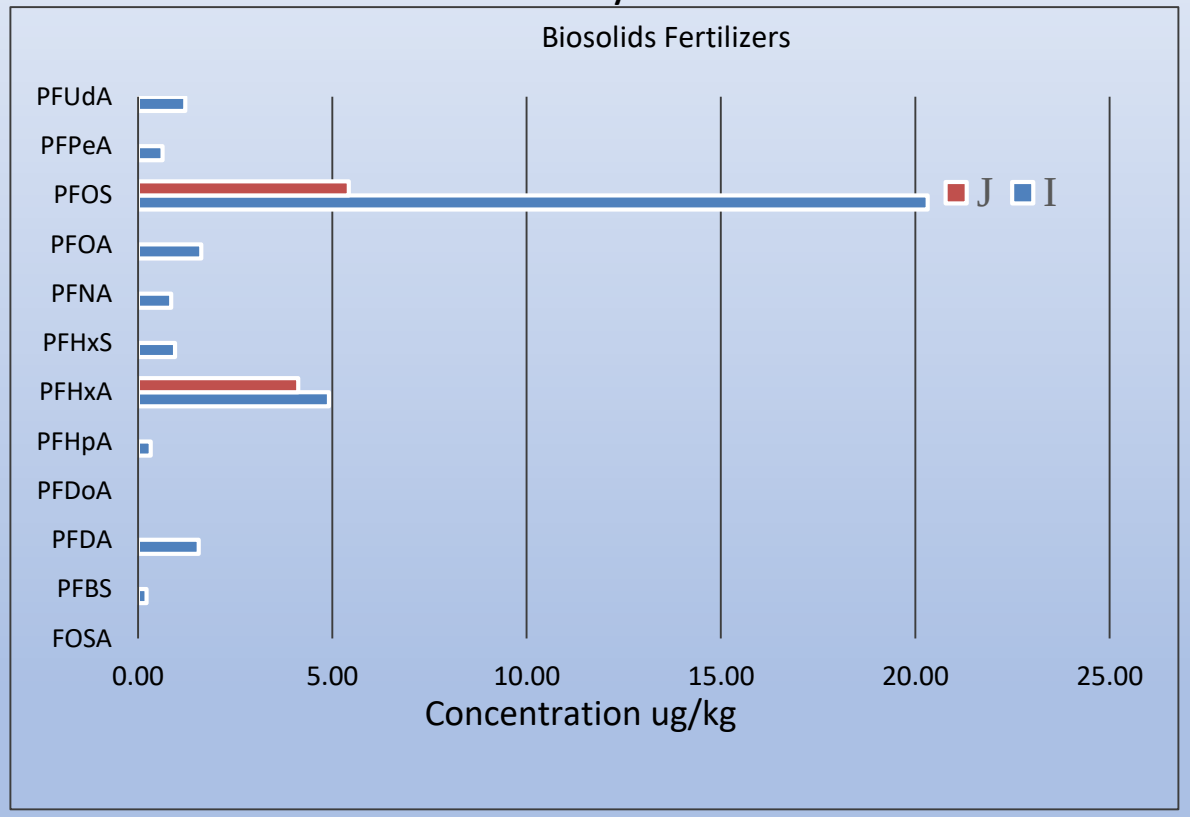
Biosolids

ESF and NYSDEC are engaged in baseline characterization of PFAS in biosolids destined for land application at NYS water resource recovery facilities (WRRFs).

- Scope: 84 facilities will be sampled, commencing in November 2023
- Sampling influent, effluent & biosolids
- Analysis at ESF following USEPA Draft Method 1633
- Discussion: Other analytes for consideration?

Preliminary Results:

ESF purchased two fertilizers produced from wastewater biosolids. These are commonly available at retail stores.



Discussion Prompts

- WRRF
  - Fate/transport processes in WRRFs and potential for capture/concentration throughout treatment train (foam and aerosols in aeration basin)
    - Aeration (foam and aerosol capture with diversion)
    - Solids stabilization processes (AD, incinerations)
  - Precursors
  - Land application
- Waste management: Composting/Land disposal/WTE
  - Leachate treatment pitting the waste disposal facilities (are they a source or the sink?)against WRRFs
- Focus on source control
- Discussion re. public access to and use of PFAS datasets
  - Concerns about FOIL – some projects are using “blind” studies.
  - Studies are not using standardized methods; difficult to draw conclusions
  - Concerns about duty to disclose vs liability
    - associated with analyzing PFAS if not otherwise required by regulation or permit
  - Regulatory permitting/acceptance (BACT/MACT)
    - Emissions testing difficult due to low concentrations

Discussion Prompts: Technology Transfer

- Lab to field scalability; lack of uniformity w/ reporting data results challenging to make comparisons and predictions -
- Monitoring air/flue/stack emissions following destruction
- Data reporting – effect on mass balance when VS are destroyed
- Analytical technology – MDLs, characterizing non-target