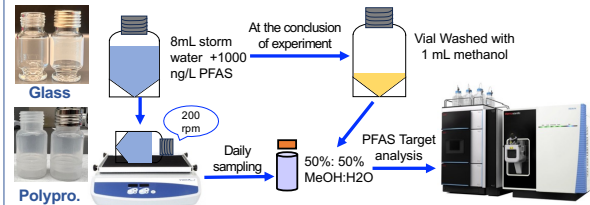


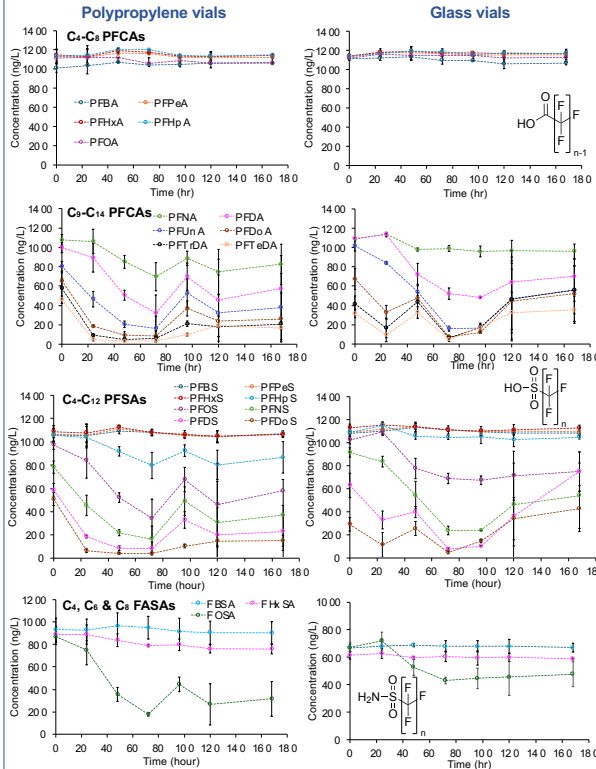
Background

- Widespread use and persistence of PFAS has led to ubiquitous detection in water, soil, air, and living organisms.
- US EPA Method 1633 is intended for analysis of PFAS in aqueous, solid and tissue samples using LC-MS/MS at part-per-trillion concentrations.
- This method involves significant sample preparation and purification steps prior to instrumental analysis, leading to bottlenecks in sample processing.
- We have developed a fully automated, online μ SPE-LC-MS/MS workflow based on a customized LC TriPlus RSH SMART Advanced system for high-throughput analysis of PFAS in environmental samples following EPA Method 1633 guidelines.

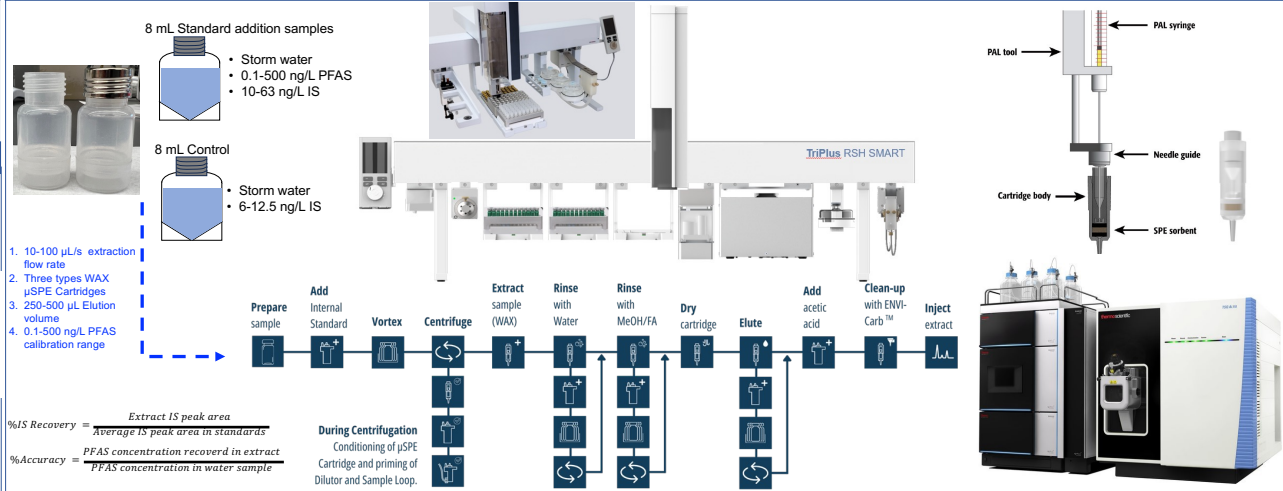
PFAS Sorption to Vials



Polypropylene & glass vials showed similar trends in PFAS sorption from water



Workflow



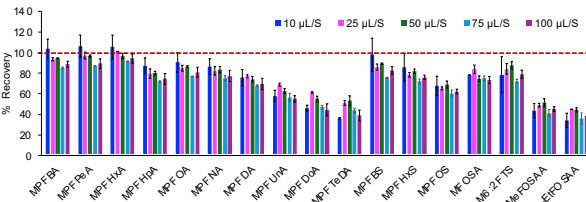
$$\%IS \text{ Recovery} = \frac{\text{Extract IS peak area}}{\text{Average IS peak area in standards}}$$

$$\%Accuracy = \frac{\text{PFAS concentration recovered in extract}}{\text{PFAS concentration in water sample}}$$

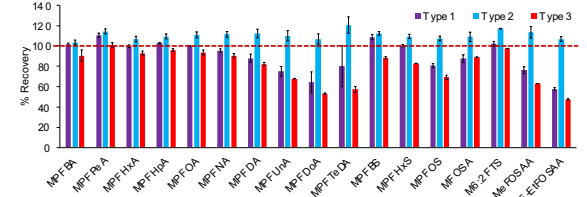
During Centrifugation
Conditioning of μ SPE
Cartridge and priming of
Dilutor and Sample Loop.

Results

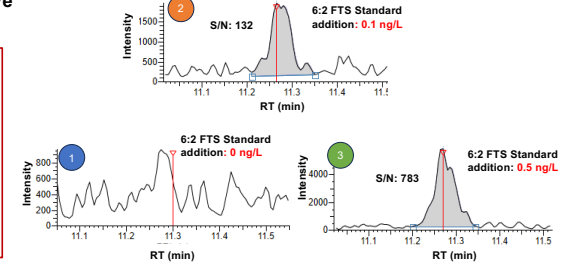
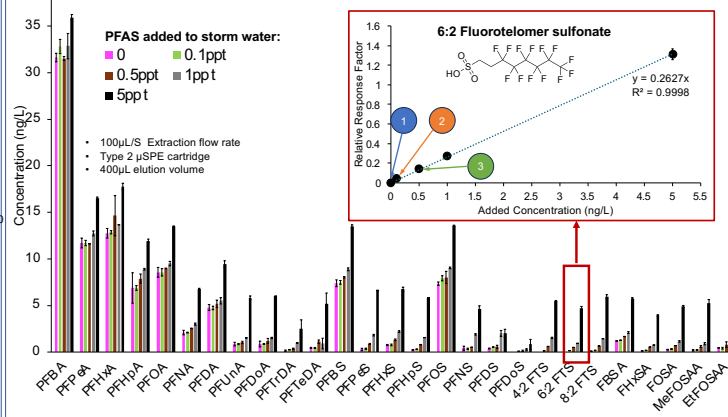
Extraction flow rate had minimal effect on IS recovery



WAX SPE type/brand influenced IS recovery



PFAS standard addition experiment with stormwater shows quantitative performance and sensitivity to below 0.1 ng/L



Conclusions

- Automated EPA 1633 processing achieved full sample preparation and parallel analysis in < 30 minutes per-sample without user intervention.
- New polypropylene large-volume sample vials showed no loss of short chain PFAS (< C₆) but sorptive losses of 30-60% long chain PFAS over 6 days of sample storage (recovered with methanol rinse during sample processing).
- WAX μ SPE Pro cartridges allow fast (100 μ L/sec) sample loading with high recovery.
- Sample concentration factors of 20 allowed acceptable accuracy and sensitivity at concentration ≥ 0.1 ng/L for PFAS < C₁₁.