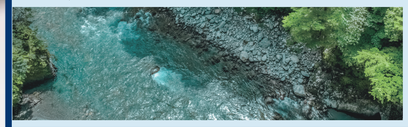
BENEFITS OF CO-SOLVATION METHODS FOR NON-TARGET PFAS ANALYTES

Maya Murshak
Merit Laboratories, Inc.

PFAS testing is an important component of the overall effort to identify, remediate and eliminate source materials in an effort to help our environment and protect human health.

- As we learn more about these compounds and find more ways to identify the broader class of PFAS materials, the analytical testing has to keep step with the ever-expanding knowledge base.
- The PFAS list of target analytes is growing.
- Method 1633 is currently looking at a compound list of 40 target analytes.
- Method 8421 is currently looking at a compound list of 44 target analytes.



Co-solvation Technology

Co-solvation Advantages

- This method introduces the PFAS chemicals to the instrument without any selectivity that can lead to losses.
- Due to the nature of PFAS chemicals and their ability to adhere to different materials, this method eliminates additional surfaces for the samples to come in contact with
- Has demonstrated excellent recoveries with external calibration, which is helpful for new analytes that may not have an isotopic analog.

Co-solvation Limitations

- Co-solvation does not utilize selectivity of the extraction procedure, this can present matrix interference issues (longer run times).
- The sensitivity is not as good as the SPE, because the sample is diluted and not concentrated.

Co-solvation Methods

SOLVENT DILUTION

Method	SW846 8327	ASTM D8535	ASTM D8421
Procedure	Solvent extraction	Solvent extraction	Solvent extraction
Matrix	WW/GW/Sludge	Soil/Biosolids	WW/GW/Sludge
Sample Volume	5 ml	5 ml grams	5 ml
QC Criteria MS/MSD	70 - 130%	70 - 130%	70 - 130%
QC Criteria RPD	≤ 30%	≤ 30%	≤ 30%
Isotopic Dilution	No (allowed)	YES	YES
Analytes	Performance based	Performance based	Performance based
Reporting Limits*	2 ppt	50 ppt	2 ppt
Holding Times	28 Days Ext. 14 Days Analyses	28 Days	28 Days

Compounds

- Over 15,000 PFAS compounds have been identified so far *
- Current compounds being tested... tip of the PFAS monster

*Source: From the National Institute of Health (NIH)

Identifying Non-Target PFAS Analytes

IDENTIFICATION

Accurate Mass
- LC TOF
- LC QTOF
- LC ORBITRAP

QUANTITATION
- QQQ (LC/MS/MS)

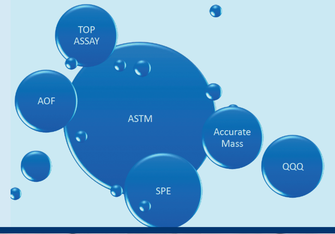
ASTM ADVANTAGE
Means of preparing and introducing samples into both accurate mass for identification and QQQ when quantifying

TOP ASSAY
Total Oxidizable Precursors
- Oxidizing agent introduced to the sample
- Heated for an extended period of time
- Analyzed to see what changes in known PFAS compound concentration occur
- Measurement of future PFAS contamination
- For example: 6:2 FTS will breakdown into PFHxA and PFPeA

Absorbable Organic Fluorine (AOF)
EPA DRAFT Method 1621
- A screening method to estimate the concentration of adsorbable organic fluorine (AOF) in aqueous matrices by combustion ion chromatography (CIC)
- This method is another tool to examine the broader spectrum of fluorinated compounds without speciation.
- High RLs, work needs to be done on how this data is utilized.

Toxicological Evaluation

Non-Target to Target Transition



Merit Laboratories, Inc.