**Performance Comparison of In-House and EPA 1633 Methods for PFAS Analysis: Insights from Spiked Sand Experiments**

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**Abstract:**

This study compares an in-house method with EPA Method 1633 for analyzing PFAS compounds in spiked sand, highlighting differences in extraction techniques and their impact on results. The EPA 1633 method, which utilizes a Weak Anion Exchange (WAX) Solid Phase Extraction (SPE) to remove contaminants, generally achieved higher recovery rates (ranging from 89% to 132%) but with greater variability (RSDs between 1.3% and 10.7%). Its method detection limits (MDLs) varied from 0.07 to 3.46 ppb.

In contrast, the in-house method, which did not use non-extracted internal standards and employed a simpler extraction process without clean-up steps, demonstrated more consistent recoveries, ranging from 16% to 92%, and lower RSDs, indicating better reproducibility in routine analyses. This method's key advantage is its efficiency, allowing the extraction process to be completed in a shorter time frame compared to the longer duration required by Method 1633. The in-house method also showed MDLs ranging from 0.02 to 0.84 ppb, indicating potential sensitivity advantages for certain compounds.

While the use of spiked sand provides controlled insights into method performance, it may not fully replicate the complexities of real soil matrices, which include organic matter, metal ions, and clay minerals. Further studies using real soil samples are recommended to evaluate the methods' applicability in more representative environmental conditions.