

Environmental

Screening of PFAS compounds in wastewater using adsorbable organic fluorine with combustion ion chromatography (CIC)

Results from U.S. EPA draft Method 1621 collaboration study

Introduction

Per- and polyfluoroalkyl substances (PFAS) is the collective name for synthetic fluorinated compounds. A screening method, such as combustion ion chromatography (CIC), can be used to assess the total extent of PFAS contamination by determining organic fluorine in various matrices, including wastewater. In Application Note 002748, the results from Thermo Fisher Scientific's IC application lab in Sunnyvale, California, as part of the multi-laboratory validation study of EPA draft Method 1621, are presented alongside techniques needed for successful analyses.

Equipment

- Thermo Scientific™ Dionex™ RFIC microbore system
- Compatible combustion-absorption system with offline adsorption unit
- Thermo Scientific™ Chromeleon™ Data System (CDS) software

Results

Figure 1 shows the chromatogram of a wastewater sample with and without added PFOS, PFAS mixture, and PFBA standards. Notably, all recoveries are between 80%-110%, and no compound specific dependency is observed.

Conclusion

The method outlined in AN002748 demonstrates that CIC is an excellent tool to measure AOF and screen for PFAS in wastewater. The method is sensitive, with method blanks of 1 ng/mL and method detection limits (MDLs) of 2.5 ng/mL, and accurate, with recoveries of 80–120%. Together, these data highlight the power of CIC in eliminating the sample matrix and measuring only adsorbable fluorine content in samples, successfully achieving the goals outlined in EPA draft Method 1621.

Sample prep.: 100 mL adsorbed onto 2 GAC columns
 Samples: Chromatograms of only top GAC column
 A: Sample 7 wastewater.
 Replicates: B) + 10.05 ng/mL fluoride equivalence (PFOS),
 C) + 30 ng/mL fluoride equivalence (PFAS mix),
 D) + 30 ng/mL fluoride equivalence (PFBA)

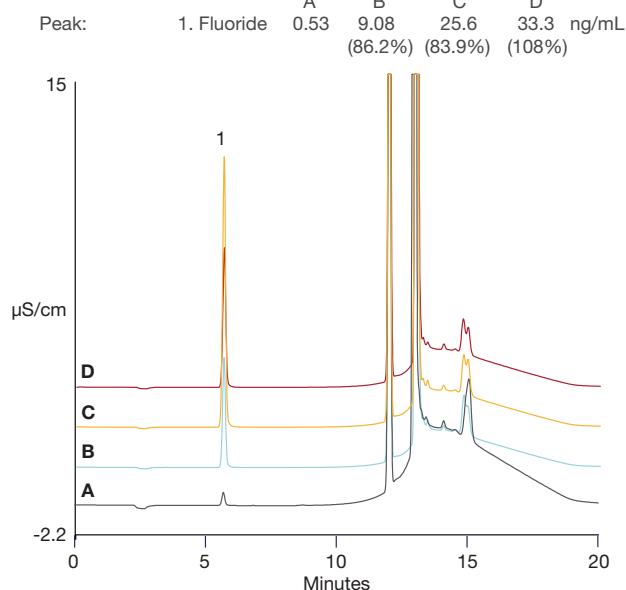


Figure 1. Determining recovery of different PFAS compounds. No compound specific dependency is observed.

For more information and the cited references, see the full application note, [AN002748](#).



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