

Combined Fluorotelomer Alcohol/8270 Analysis Using Microextraction and GC-MS/MS

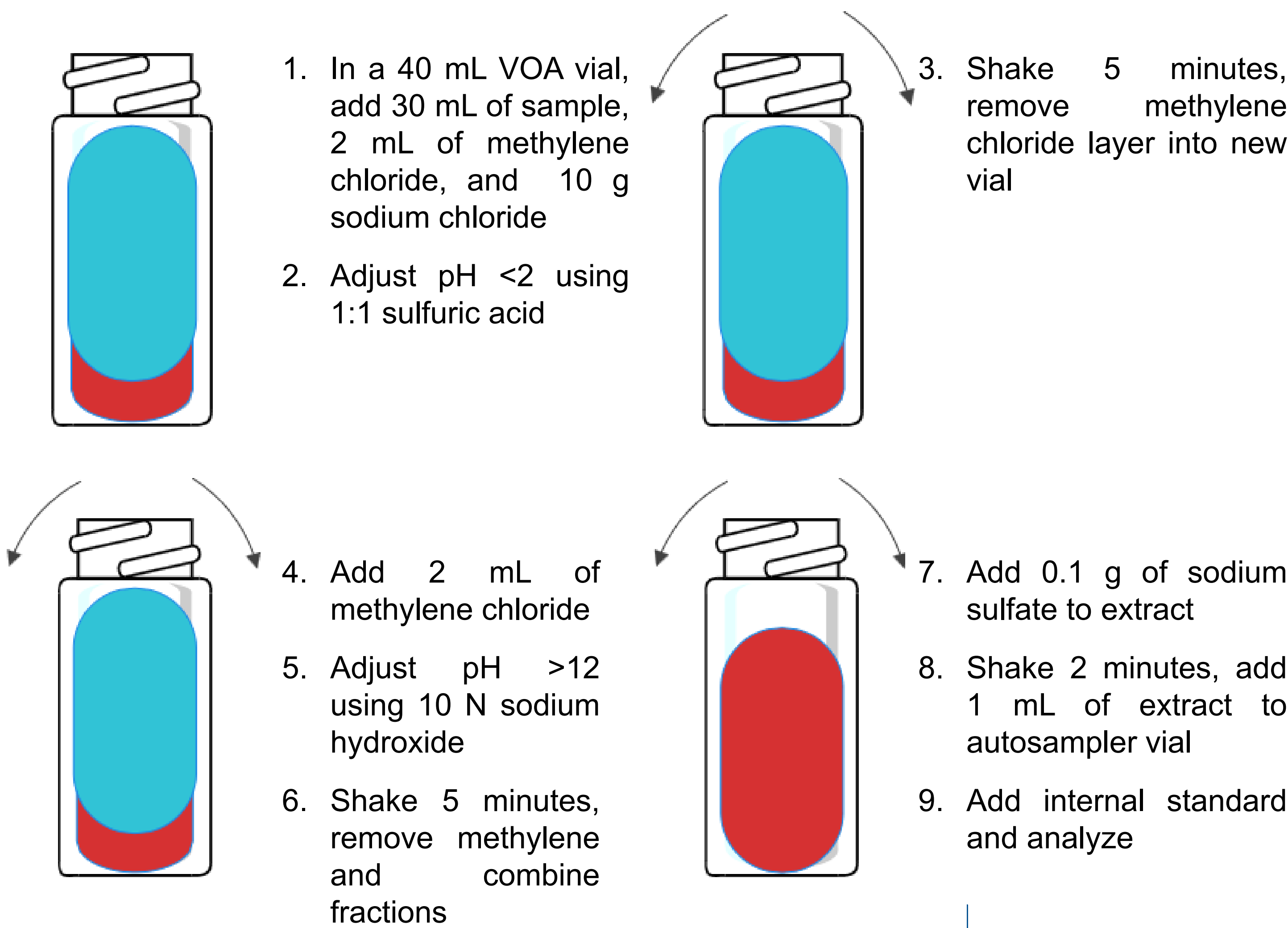
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Introduction

The analysis of PFAS compounds in environmental samples has traditionally focused on ionic, non-volatile PFAS analyzed by LC-MS/MS. Many PFAS compounds, such as the fluorotelomer alcohols (FTOH), are neutral, semi-volatile and can be better analyzed by GC-MS/MS. While no EPA methods have been published, these compounds have been analyzed with a variety of preparation techniques and column selections, including liquid/liquid extractions, headspace, and sorbent-based extractions on both volatile and semi-volatile type columns.

In this poster we'll explore a combined 8270E/FTOH method, focusing on small volume liquid/liquid extractions and GC-MS/MS using the new RMX-5Sil MS column. This workflow would allow labs to incorporate neutral PFAS compounds into their existing semi-volatile workflows, streamlining laboratory operations.

Modified SW-846 3511 Microextraction



Instrument Parameters

Thermo Trace 1310 GC and TSQ 8000 MS/MS	
Column	RMX-5Sil MS 30 m x 0.25 mm x 0.25 µm (Restek p/n 17323)
Inlet	250°C 10:1 split He carrier gas 1 µL injection
Oven	40°C hold for 0.5 minutes Ramp 18°C/min to 350°C, hold for 2 min
MS Parameters	MRM mode with Ar collision gas 330°C Transfer line 330°C ion source in EI mode

Discussion

Six replicate spiked samples were made at 13.3 ppb for 8270 semi-volatiles and surrogates (Restek p/n 31850, 31024, 31025) and 6.67 ppb for 4:2, 6:2, 8:2, and 10:2 FTOH (Accustandard p/n D-8591). Internal standards (Restek p/n 31885) were added post-extraction at 2 µg/mL in the extract.

Average recoveries were 107%, with 71/85 compounds within ±30%. The 8270 compounds showed a minimum recovery of 69% and a maximum of 145%, while FTOH recoveries had a minimum of 65% and a maximum of 133%.

Average % RSDs were 13%, with 77/85 compounds within ±20%. The 8270 compounds showed a maximum %RSD of 33%, while the FTOH %RSDs had a maximum of 18%.

Conclusion

The improved TriMax deactivation of RMX columns allow for confidence in trace level MS/MS analysis, even for reactive compounds. The enhanced sensitivity of MS/MS also allows for microextraction techniques, which can help labs decrease their use of hazardous solvents such as methylene chloride, as well as simplify sample shipping.

Using the SW-846 3511 microextraction method, FTOHs can be added to 8270E with comparable results to the standard suite of compounds. While further optimization of the extraction is possible to improve recoveries of some poor performing compounds, the data presented shows the feasibility of using 8270E to analyze neutral PFAS compounds as a complement to existing LC-MS/MS methods.

Results

