

L-38: VOCs Analysis in Recycled Plastic Materials via HS-SPME-GC×GCMS

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Abstract

European regulatory pressure on plastic waste management is driving the need for reliable methods to characterize volatile organic compounds (VOCs) in recycled polymers. This study focuses on sample preparation strategies for VOC analysis using PDMS/DVB/CAR HS-SPME combined with GC×GC-qMS. We compare the conventional single HS-SPME extraction with the multiple vials-multiple cumulative trap (MV-MCT) approach, designed to enhance sensitivity and expand analyte coverage through cumulative VOC enrichment. Extraction parameters, including sample mass and reduced headspace temperatures, were optimized to better replicate real conditions associated with off flavor development in recycled plastics. Chromatographic analysis served primarily as a tool to assess extraction performance. Results highlight how extraction mode and preparation conditions critically influence VOC profiling, underscoring the central role of sample preparation in evaluating recycled plastic quality.