

The amount of plastic waste is continuously increasing being a threat for the environment. Food packaging is the largest source of single-use plastic materials and the majority ends up in landfill/recycling facilities, with some ending up in the environment and the oceans. Plastic recycling is growing significantly to mitigate this problem being key for the sustainability of packaging. However, plastic containers made of recycled materials may contain contaminants from their previous life, collecting system and/or recycling process which may cause a potential threat to consumers' health, being very important the authentication/characterization of recycled material. A novel non-targeted approach based on static-headspace gas chromatography with mass spectrometry (SHS-GC-MS) has been developed to determine volatile organic fingerprint of plastic packages both virgin and containing different percentages of recycled polyethylene terephthalate (PET). A MS database including 160 volatile organic compounds present in plastic materials according to the literature was created. Among those compounds, seventeen substances were detected and identified by comparing their mass spectra with those of MS database libraries. The combination of the dataset obtained by SHS-GC-MS and the application of chemometrics demonstrated to be a useful tool for the discrimination between virgin and different recycled percentage PET samples as well as for the quantification of recycled plastic content in the PET samples. This analytical tool helps to avoid potential frauds in the recycling plastic field.