

COMPARISON OF MULTIPLE TRAPPING HS-SPME AND DYNAMIC HEADSPACE FOLLOWED BY GC×GC-MS FOR THE CHARACTERIZATION OF RECYCLED PLASTICS

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Recycled plastics represent an environmentally sustainable and economically viable alternative to conventional plastic production. However, the prior use of these materials may adversely affect the quality of the recycled products. A significant challenge associated with their reuse is the presence of specific off-flavour compounds. Two main techniques have been used in the literature for analysing volatiles from plastic, namely headspace solid phase microextraction (HS-SPME) and dynamic headspace (DHS) followed by thermal desorption of the tubes where the volatiles have been previously trapped (HS-TD).

In this study, the two injection techniques, namely HS-SPME and HS-TD, were systematically compared. A multivial multiple trapping HS-SPME method was preliminary optimized to increase the overall volatile signals. HS-TD was also optimized in terms of extraction time. An internal standard was employed to normalize the results and allow for an easier comparison.

The methods were tested on several recycled plastic samples using comprehensive two-dimensional gas chromatography, equipped with a reversed fill/flush flow modulator and coupled to a quadrupole mass spectrometer.