OPEN ACCESS **Scientific Letters**

IV 1H-TOXRUN INTERNATIONAL CONGRESS 2025 | 08-09 MAY, 2025 Porto, Portugal

Poster 42

Analytical techniques for microplastics analyses

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Abstract

Background: Pollution caused by plastic waste is an emerging environmental problem. Micro- and nanoplastics are omnipresent in various ecosystems. This threat requires the use of instrumental techniques for the analysis of these xenobiotics. Moreover, there is an urgent need to develop methods enabling the analysis of increasingly smaller particles. **Objective:** The aim of the study is to present a review of analytical techniques for microplastic determination. Furthermore, the poster will present the comparative analysis of real samples using two complementary analytical techniques, pyrolysis gas chromatography-mass spectrometry (Pyr-GC/MS) and laser direct infrared imaging (LDIR). **Methods:** A review of the latest scientific literature was done to compare instrumental analytical methods used for the determination of micro- and nanoplastics. Additionally, Pyr-GC/MS and LDIR were used to analyze the same real samples, to compare the obtained results. **Results:** The analytical process of microplastics analysis is affected by the sample preparation, extraction, quantification and quality assurance/quality control (QA/QC). The sample preparation stage is crucial and depends on the sample matrix and the location from which it was collected (air, water, soil, sediments, or biota). This step is followed by the extraction of particles. The methods commonly used to extract microplastics in the environment include visual inspection, flotation, density separation, size separation (like sieving and filtration), digestion, biological removal, and chemical treatments. At present, many techniques for microplastic analysis are used, such as Fourier transform infrared spectroscopy, Raman spectroscopy, laser diffraction, scanning electron microscope, thermal analysis, or pyrolysis gas chromatography coupled to quadrupole mass spectrometry. **Conclusions:** All methods used for micro- and nanoplastics determinations have their advantages, disadvantages, and limitations. Hence, the information on microplastics obtained through one detection method is usually unstructured and inconsistent. In order to obtain reliable and complete results, it is necessary to use methods that complement each other. The poster will present a summary of the most efficient techniques for more precise and accurate microplastic determinations in complex environmental samples.

Keywords: microplastic; analytical methods; analysis

Acknowledgments/Funding

This research was funded by the Minister of Science of the Republic of Poland under the Programme Regional initiative of excellence, Agreement No. RID/SP/0010/2024/1.

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