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Agenda Item 10

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME **CODEx COMMITTEE ON METHODS OF ANALYSIS AND SAMPLING**

Forty-fifth Session
Budapest, Hungary
9-13 March 2026

COMMENTS OF UNITED KINGDOM

Information on methods for the characterisation of microplastics to reduce microplastic pollution

Agenda Item 10: Other business and future work; An AOB item on microplastics was raised by the Korean delegation.

The UK delegation would like to bring to the attention of CCMAS 45, the work of the National Measurement Laboratory ([NML](#)), at LGC in the UK, on microplastics.

As the UK's Designated Institute for chemical and biological measurement, the NML provides measurement research and services to improve accuracy, traceability and standardisation of chemical and biological measurements, helping to foster innovation and promote productivity and economic growth.

Over 400 million tonnes of plastic waste¹ are produced globally each year, out of which two-thirds is released into the environment. In the environment large plastics fragment into smaller 'micro' plastics, which can enter our food chain. Analysis of microplastics in food and the environment are challenging due to complexity of the matrix, lack of harmonised measurement methods and reference materials.

The NML and the UK [Government Chemist](#) is addressing these complex measurement challenges by developing reliable sample preparation strategies, representative test materials and accurate measurement methods. Refer to Annex 1 for two recent publications:

1. Multimethod Platform Based on Dynamic Image Analysis and spICP-MS for Number-Based Quantification of Microplastics.
2. A guide for testing laboratories on the application of LD-IR for microplastics.

In addition, [LGC Standards](#) offers a range of [microplastic reference materials](#) (featuring polyethylene (PE) and polypropylene (PP) standards in five different sizes, as well as nylon (N66) and polyester (PET) fibres) certified to ISO/IEC 17025.

Reference materials and validated and harmonised methods will enable comparability of the results across various monitoring agencies and testing laboratories and contribute to the reduction of microplastics pollution.

¹ United Nations Environment Programme (UNEP). *Plastic Pollution*. Humanity produces more than 400 million tonnes of plastic each year.

Annex 1: Multimethod Platform Based on Dynamic Image Analysis and spICP-MS for Number-Based Quantification of Microplastics

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Article

Multimethod Platform Based on Dynamic Image Analysis and spICP-MS for Number-Based Quantification of Microplastics

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ABSTRACT: A multimethod platform based on the combination of dynamic image analysis (DIA) and single particle inductively coupled plasma mass spectrometry (spICP-MS) has been developed, validated, and applied for the first time to reliably determine the particle number concentration of small microplastics. The ability of the DIA/spICP-MS platform to reliably detect and quantify microplastics was carefully studied using polystyrene (PS) microparticles in the size range from 1 to 10 μm . Critical instrumental parameters affecting the accuracy of the number-concentration measurements were identified for both techniques. In the case of DIA, the detection threshold (DT) was found to be the most important, while for spICP-MS, both the calibration of the transport efficiency (TE) using the frequency method and the choice of sample introduction system were critical. Under optimal conditions, the number-concentration values obtained for 5 μm PS-Latex microspheres using DIA and spICP-MS methodologies agreed well within their associated uncertainty (u , $k = 1$ of approximately 2.5% for DIA and u , $k = 1$ of approximately 10.2% for spICP-MS). Main contributing factors to the overall measurement uncertainty were evaluated for methodology based on both techniques, being the variability in the number of detected particles for DIA and the number of detected particles and transport efficiency calibration for spICP-MS. These accounted for approximately 94% (DIA) and approximately 45% (spICP-MS) of the overall uncertainty budget, respectively.

INTRODUCTION

Plastics are increasingly present in today's world, with 395 million tonnes produced globally per annum, out of which two-thirds are released to the environment.¹ In the environment, plastics suffer complex physicochemical transformation processes such as aging, degradation, and fragmentation, breaking down into microplastics and becoming a persistent environmental pollutant and health hazard.^{2,3} The potential risks to humans from exposure to smaller plastic particles are not fully understood. Particles with sizes at the lower end of the microscale are likely to bring an increased risk to human health,⁴ as the result of relatively high surface area per volume or mass and ability to breach biological barriers, compared to particles with sizes in the upper range of the microscale. Moreover, it was reported that the nonspherical shape of such plastic particles is a major source of risk for humans.⁵ To better understand environmental and health impact arising from microplastic pollution, as well as determine safe exposure limits, in particular for plastics at the lower end of the microscale, reliable methods for their quantification are needed.

The quantification of microplastics is challenging not only due to their shape irregularity and inherited polydispersity but most importantly due to the size limitations of typically used analytical techniques, especially at the lower end of the

microscale.^{6,7} Whilst, the upper limit of accessible size of techniques used for concentration measurements at the nanoscale such as particle tracking analysis (PTA), multiangle dynamic light scattering (MADLS), or even nanoflow cytometry (nFCM) is approximately about 1 μm , techniques typically used at the microscale, e.g., Fourier transform infrared (FT-IR) have been demonstrated to offer selective detection at sizes above 10 μm .⁸ For this reason, selective detection as needed for accurate number-based quantification of small microplastics (SMPs, <10 μm) remains a challenge. In recent years, efforts have been made to combine chemical identification techniques, e.g., FT-IR⁹ or Raman spectroscopy¹⁰ with optical microscopy (OM), allowing the determination of particle number concentration down to a few micrometers.⁷ However, such approaches require complex sample preparation strategies, involving sample filtration and deposition on a solid support prior to analysis, often affecting

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[A guide for testing laboratories on the application of LD-IR for microplastics](#)