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# Generating relevant reference materials for assessing the fate and impact of microplastics in agricultural environments

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## Abstract

Microplastic reference materials can be defined as standardised and well-characterised batches of particles available for use in scientific testing. Reference materials are necessary for quality assurance and quality control (QA/QC) of scientific experimentation and represent a fundamental component in facilitating harmonisation and cross comparability of analyses and hazard assessment.

Existing microplastic reference materials representative of relevant agricultural sources are scarce. This represents several challenges associated with generating micronised particles from relevant source materials, obtaining relevant particle characteristics, and producing sufficiently large amounts of reference materials. There is a demand for large batches of environmentally-relevant reference materials that are sufficiently homogenous in their characteristics (e.g. size, morphology, chemical composition) that can be used by multiple laboratories and therefore facilitate harmonisation between studies.

Experiences generating reference materials in two European projects addressing microplastic pollution in agricultural soil environments (IMPASSE and PAPILLONS) will be shared to identify challenges and opportunities. This includes producing different reference material types for important sources of microplastics to agricultural soils; for example, microplastic fibres from sewage sludge and fragments of mulching films. Approaches and challenges associated with simulated environmental ageing of particles in a relevant way will be discussed. Similar difficulties in producing relevant microplastic reference materials are present for different source materials (i.e. outside of agriculture). Accordingly, the development of reference materials remains an ongoing task across the whole research field. These insights represent an important step towards harmonisation.

**Keywords:** microplastic, reference material, agriculture, soil environments, harmonisation

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