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# Production of Microplastic Reference Materials

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## Abstract

The validation of analytical methods for the identification and quantification of micro and nanoplastics in environmental matrices is hindered by a lack of standard reference materials (RMs). These materials are required for the harmonisation of analytical methods and the generation of comparable and reliable data. As a result, uncertainties associated with the measurements from individual laboratories can occur due to contamination, over-estimation, and under-estimation of nano and microplastics from environmental samples affecting the comparison and interpretation of analytical data from different laboratories. Until now, the Norwegian Institute for Water Research (NIVA) has focused on making reference materials (RMs) in the microscale, i.e., from 50  $\mu\text{m}$  and up to 1 mm of the following polymer types: PVC, PE, PET, PS, PP and PC as well as polymer mixtures, in the form of effervescent soda tablets. These RMs have been used in inter-laboratory comparison (ILC) studies worldwide as well as in microplastic recovery tests. The RMs have been analysed by different laboratories using different techniques, including light microscopy,  $\mu\text{FTIR}$ , Raman and Pyro-GC/MS.

The latest ILC study including the soda tablets is the EU project EUROqCHARM, where two sets of soda tablets, one containing PE, PET and PS (50-300  $\mu\text{m}$ ) and the other containing PP, PC and PVC (50-300  $\mu\text{m}$ ) were produced. A complete characterisation of these batches was carried during production by counting the number of particles in 20 tablets obtaining a RSD of 11 % and 13 %, respectively and by measuring all the particles in 10 of the tablets for each batch to study the size distribution. In this presentation the results for the complete characterisation of the tablets will be shown.

The next step in generating relevant RMs is to focus attention on the size fractions below < 50  $\mu\text{m}$ . This is of importance as the detection of small particles will allow the generation of data relevant e.g. for the impact of nano and microplastics on biota. These materials will be generated by cryo milling and size fractionation and will be characterised by several techniques. The materials will be made available through the NORMAN network and the EU project EUROqCHARM.

**Keywords:** Microplastic reference material, comparability, comparison, interlaboratory comparison study, soda tablets

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