

DEVELOPMENTS IN SAMPLE PREPARATION AND IDENTIFICATION OF MICROPLASTICS IN FOOD AND BEVERAGES

*Joana C. Prata¹, António José Silva Fernandes², Florinda Mendes da Costa²,
Armando C. Duarte¹, Teresa Rocha-Santos¹*

*Centre for Environmental and Marine Studies (CESAM) & Department of Chemistry, University of Aveiro
2. I3N & Physics Department University of Aveiro*

prata@ua.pt

Microplastics are widespread contaminants, including of food and beverages. Determination of human exposure is dependent on sampling of complex matrices. There are no standard methods and most must be adapted to each sample type.

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Sample collection



Filtration of 0.5 – 1 L of liquids
([10.3390/w12041219](#)).

Solid samples and tissues (<1 g)

Considerations: replicates (≥ 3 samples;
 ≥ 50 organisms), contamination control
([10.1016/j.jhazmat.2020.123660](#)),
filtration rates and sample
weight/volumes.

Sample preparation



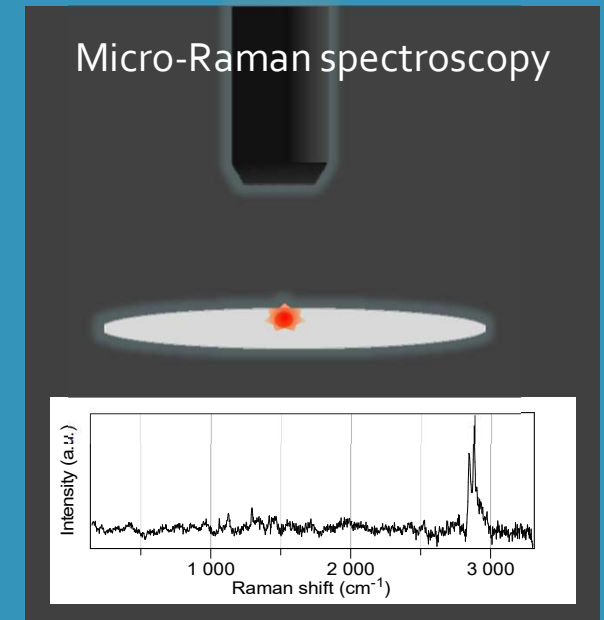
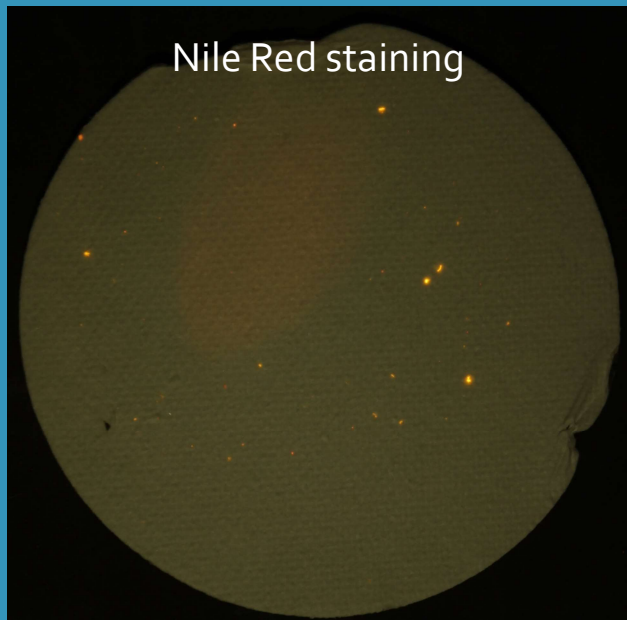
Depends on specific characteristics of the samples and is essential for following identification. Generally, involves the removal of biogenic organic matter.

Hydrogen peroxide (H_2O_2) works well in plant tissues and potassium hydroxide (KOH) in animal tissues ([10.1016/j.scitotenv.2019.05.456](#)).

Fats are persistent and can produce soaps (e.g., as a result of KOH) and must be removed by additional solvents, such as acetone
([10.1016/j.scitotenv.2021.147065](#)).

Oxidation by hydrogen peroxide is efficient in treating river water
([10.3390/w12041219](#)) but produces caramelization in white wines
([10.1016/j.foodchem.2020.127323](#)).

Sample Identification



With a correct sample preparation, organic matter is removed and the remaining microplastics can be stained with Nile Red, producing fluorescence at 470 nm under a orange filter, which allows quantification under the microscope ([10.1016/j.scitotenv.2019.07.060](https://doi.org/10.1016/j.scitotenv.2019.07.060)).

Chemical characterization is provided by spectroscopy methods, which can be combined with Nile Red staining to reduce the number of suspected particles, without interfering with spectra collection ([10.1016/j.scitotenv.2021.146979](https://doi.org/10.1016/j.scitotenv.2021.146979)).