ANALYSIS OF ORGANIC POLLUTANTS IN MICRO-PLASTICS

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INTRODUCTION

Plastic debris undergo size reduction as a result of physical and chemical processes, such as abrasion by waves and chemical transformation by ultraviolet light. Tiny plastic particles smaller than a few millimeters are often referred to as "micro-plastics".

A number of heavily produced low density plastics (e.g., polyethylene, polypropylene, and polystyrene) have been identified as the main components of micro-plastics, and these have various shapes and sizes, ranging from a few micrometers to a few millimetres.

Hydrophobic organic chemicals (HOCs) that are persistent and travel long distance tend to sorb to organic phases such as particulate and dissolved organic matter, sediments and **synthetic polymers**.

Some authors [1] have found that common plastic materials hold high sorption capacities to HOCs. Since micro-plastics are widespread in the marine environment and undergo slow decomposition, they may play an important role in the fate and transport of HOCs in the marine environment.

HOW ARE COMMONLY DETERMINED THE POLLUTANTS?

For the extraction of the pollutants, Soxhlet technique has been the most used [2-4] although it has also been utilised Accelerated Solvent Extractor [5].

For the determination of HOCs, also referred as Persistent Organic Pollutants (POPs), GC-MS have been the most employed technique. These pollutants include Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), Dichloro-diphenyl-trichloroethanes (DDTs), Nonylphenols, (NPs), etc. [2, 3, 5]. Another techniques like GC-ECD have been used for the quantification of chlorinated benzenes (CBs) and hexachlorocyclohexanes (HCHs), or LC-FD for the determination of PAHs [1].

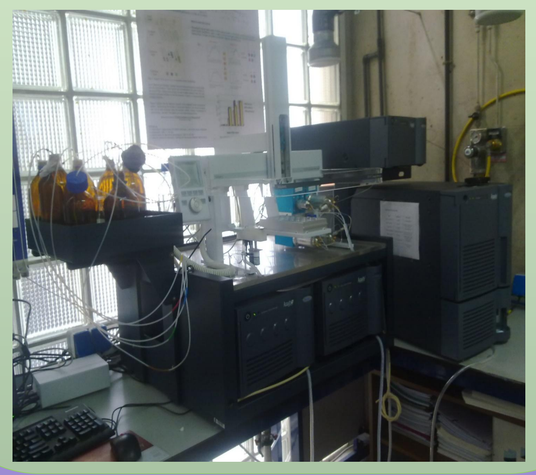
Only few researchers have used LC for the determination of pollutants in micro-plastics. Pharmaceuticals and Personal Care Products (PPCPs) have been determinated by LC-DAD previous extraction by SPE [6], concluding that micro-plastics might also act as an important carrier for the transport of PPCPs, especially for the hydrophobic ones.

WHAT WE PROPOSE

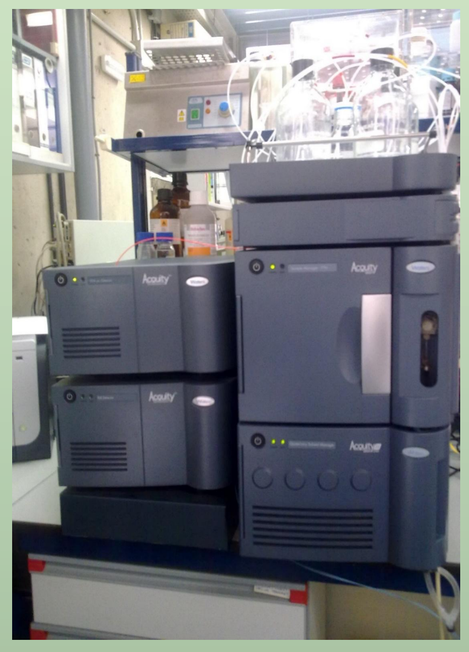
Our Research Group has experience in the determination of trace **of organic compounds** especially in emerging pollutants, in solid and liquid matrices [7-9]. We propose to transfer this experience to the field of micro-plastics and contaminants adsorbed to them.

Determination of micro-pollutants, including emerging contaminants, by UPLC-FD/DAD and UPLC-MS/MS

Ultra High Performance Liquid Chromatography with Mass Spectrometer in Tandem (UPLC-MS/MS)

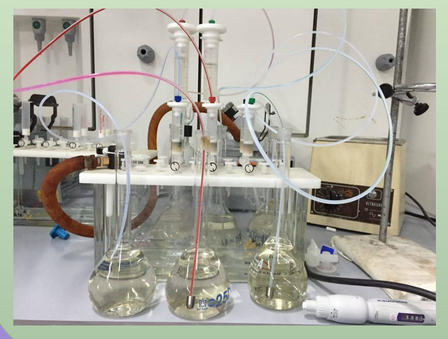


Ultra Perfomance Liquid Chromatography – Fluorescence Detector and Diodo Array Detector (UPLC-FD) (UPLC-DAD)

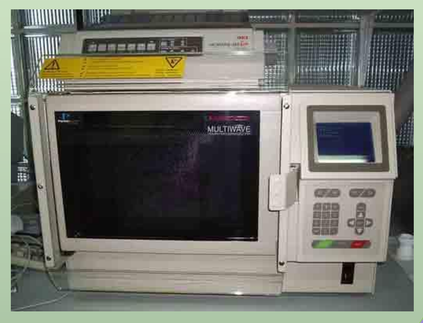


Extraction and preconcentration of liquid and solid samples by SPE and MAE

Solid Phase Extraction (SPE)



Microwave Assisted Extraction (MAE)



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