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Preface

Analysis, fate and effects of microplastics in the environment: Preface to article collection

Plastic pollution is a globally recognized problem and reached 322 million metric tonnes in 2016, excluding plastic fiber production. During the same period, approximately 100 million metric tonnes of textile fibers were produced. Over 60% of this production corresponds to plastic fibers. The rest corresponds to cellulosic (6%) and natural fibers (27%). Three main sources of microplastics (MP) need to be considered: (i) polymer nanoparticles that are manufactured for specific purposes like cosmetic products, ink for 3D printers, and others, (ii) fragmentation of plastics due to UV photodegradation, mechanical actions, hydrolysis or microbial degradation as it is often the case in the marine environment and (iii) wastewater treatment plants discharges including biosolids and effluents. It has been estimated that daily discharges of MPs could range from 50, 000 up to 15 millions particles. Following degradation by different processes, micro ((with particles lower than 5 mm) and nano (nanomaterial size between 1 and 100 nm) plastics (MP and NP, respectively) are obtained.

MPs pollution is a global problem being detected everywhere: marine environment, wastewaters, surface waters, soils, sediments, food and air. MPs can also absorb organic contaminants, mainly persistent organic pollutants (POPs) that can be ingested by organisms and introduced into the food web. Studies on the effects of MPs and emerging contaminants in freshwater species like microalgae and daphnia and in seafood products like bivalves and fish and in commercial salts were reported. European shellfish consumers are expected to ingest up to 11,000 plastic particles per year. MPs can sorb as well pathogens and airborne fibrous

MPs may enter our respiratory system. Exposure experiments on mammals like mice were reported indicating damage to the liver functions.

But one of the key remaining questions are still sampling and analytical methods for MPs. There is not a general agreement which type of sampling and analysis should be carried out for the different matrices. This Virtual Special issue (VSI) on MPs will provide state-of-the art information on the sampling, analysis, fate and toxicity of MPs in the environment.

To finalize, I am sure that this Virtual Special Issue (VSI) will serve to scientists working in interdisciplinary fields, like chemistry, biology, environmental, marine and soil sciences and beyond. This VSI should be in the radar of all of you, specially for those already experts in this field as well as newcomers and students who want to learn more about applications and risks of Microplastics in the environment.

Damia Barcelo^{a,*}, Thomas Knepper^b

^a IDAEA, CSIC, Barcelona and ICRA, Girona, Spain

^b Hochschule Fresenius Gem, GMBH, Limburger Straße 2, 65510, Idstein, Germany

* Corresponding author.

E-mail address: dbcqam@cid.csic.es (D. Barcelo).

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