

Microplastics: an emerging threat for marine organisms

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Abstract



A sample of microplastics (particles, fibers, filaments, films) collected at sea

Almost all aspects of daily life involve plastics, and consequently the production of plastics has increased substantially the last 60 years. Plastics are persistent materials, which accumulate in the marine environment and affect marine life as they remain there for years. Microplastics (MPs) are defined as all plastic particles of less than 5 mm originating from micro-sized manufactured particles or from the fragmentation of larger plastic debris. MPs contain additives such as UV-stabilizers, colourings, flame retardants and plasticizers, which are transported by the particles and are susceptible for uptake and accumulation by living organisms. They can also adsorb

persistent organic pollutants (POPs) and facilitate their transfer in marine food webs. Although the colonization of MPs by a wide range of microorganisms began to be reported in the literature, the risk for long range transport of invasive, harmful or pathogenic species still needs to be properly investigated.

Our group aims to evaluate risk and impact of microplastics (MP) as well nanoplastics (NP; < 100nm) on marine organisms and ecosystems through integrated approaches divided into several sub-objectives:

- Modelling of the presence, fate and accumulation of microplastics in the marine environment (mainly coastal zones) based on set-up methodologies
- Characterize chemical loads (additives, POP) and micro-organisms present at MP/NP surface and study experimentally colonisation processes to provide knowledge on MP/NP interaction with marine microcosm
- Determine of the biological effects of plastic particles on marine life and marine environment. MP/NP impacts on marine organisms are investigated in vitro to study their interaction with free living cells (and consequently biological membranes), and in vivo following an integrative approach from molecular changes to ecophysiology responses in key marine species experimentally exposed to MP/NP.