

SPlasH! - Stop to plastic in H₂O!

An EU Project to investigate the state of the port environment

**Anna Reboa¹, Laura Cutroneo¹, Giovanni Besio², Arianna Malatesta¹, Mario Petrillo¹,
Laura Canesi¹, Alessandro Stocchino², Greta Vagge¹, Marco Capello¹**

¹ DISTAV, University of Genoa, 26 Corso Europa, I-16132, Genoa, Italy

Phone: +39-(0)-010-35338143

² DICCA, University of Genoa, 1 Via Montallegro, I-16145, Genoa, Italy

E-mail: anna.reboa@email.it

Introduction: The presence of plastics at sea represents a threat to both marine species and marine ecosystems. In marine environment, where there are no barriers or borders that could delimit the transport and diffusion of these pollutants, cooperation between authorities and technicians of different countries becomes essential for the standardization of control systems, monitoring and management of microplastics. In this complex framework, the ports are inserted as microplastic receptors from the territory behind them, as microplastic source for the commercial and industrial activities they collect, and as microplastic diffusers to open sea and coastal environment being connected to the external environment. In this context, the EU project SPlasH! (**Fig. 1**) analyzes for the first time the presence, the origin and the dynamics of the microplastics in the ports of Genoa and Olbia (Italy) and Toulon (France). The project includes: a cross-border cooperation plan for the standardization of methods to monitoring the presence of microplastics in the various matrices of the port marine environment (sediment, water column and biota) to obtain comparable data; the construction of a prototype for the microplastic sampling at different depths in the water column; the use of shared dispersion models for the study and identification of the transit lines of the microplastics.

Methods: The first sampling of the project was carried out in the Port of Genoa. Fishes (*Mugil cephalus*) were captured with nets and immediately sacrificed with a quick blow to the head. The stomach was excised on board and conserved at 4°C in ethanol 70%. Other organs were sampled for further analysis regarding distinct pollutants. Water was sampled at different depth in the water column. Bottom sediments were sampled with a Van Veen grab and the surface layer of sediment (2-3 cm) was collected with a metal spoon. All the samples were stored in glass jars. Stomachs content, filters and sediments have been subsequently sorted to identify and analyze microplastics. The analysis of polymers was carried out using micro-FT-IR to characterize microplastics.



Fig. 1: European Interreg Italy-France 2014-2020 Maritime Project SPlasH!.

Results: Microplastics were found in stomach contents of sampled fishes, showing different sizes, colors and shapes. Water and sediment samples also revealed the occurrence of microplastics, which have been compared with the ones founded in fishes stomachs.

Discussion: The results obtained are very useful to better understand the level of contamination by microplastics in the selected port area and, consequently, their resulting intake by fishes. Thus, it is possible to relate the occurrence of these contaminants in water and sediment compartments with their presence in the biological compartment, or the stomach contents of fishes that live in the investigated area [1]. Hence, this is the first step to evaluate how microplastics move inside the marine port environment, and the possibility that they can actually act as pollutants, entering the trophic chain and affecting organism health status. In this study, only the preliminary data from the Port of Genoa are presented, but others will follow from further samplings.

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References: [1] Ivar do Sul and Costa (2014) *Environmental Pollution* **185**:352-364.