MICROPLASTICS
An opportunity to disseminate science

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INTRUDUCTION

Plastic production and use have risen in recent decades, leading to an increase of these pollutants in the ocean [1]. Microplastics (MPs) are particles of a plastic nature that are smaller than 5 mm in size. The occurrence of these particles in the ocean is due to their use in some industries, such as cosmetic, and through the degradation of larger plastics [2]. The low degradation rate together with their ease of entry into the trophic chain, causing damage to aquatic organisms, make microplastics of special concern and should be studied in depth.

OBJECTIVES

The general objective of the Project is to screen the presence of microplastics in the Spanish coast with a double purpose: to establish a baseline for future monitoring and to explore the opportunity of the activity as citizen science.

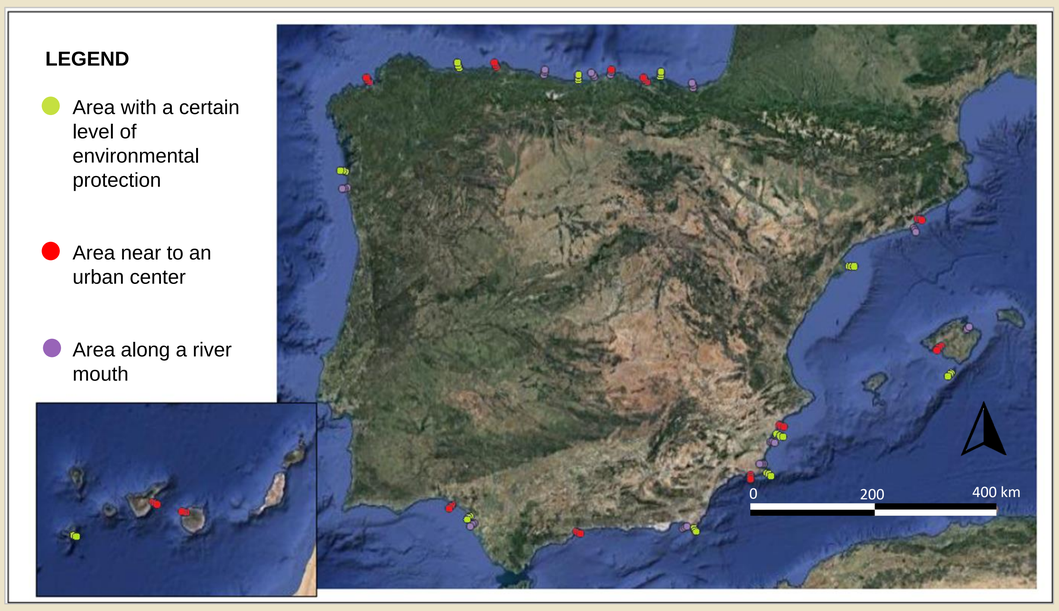

Image 1. Map of the study area where the sampling points are plotted.

METHODOLOGY

Sample collection

The sampling is carried out aboard a sailing boat along the Spanish coastline. Sea surface samples were collected using a manta net with a 200 µm mesh size in 10 autonomous regions (País Vasco, Cantabria, Asturias, Galicia, Canarias, Andalucía, Murcia, Baleares, Valencia y Cataluña) in order to determine the distribution of microplastics in relation to the distance to the coast and as a function of the particularities of 3 different types of location: areas close to urban centers, river mouths and areas with a certain level of environmental protection.

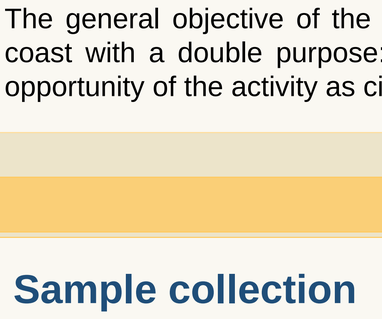

Image 2. Manta net used in sampling

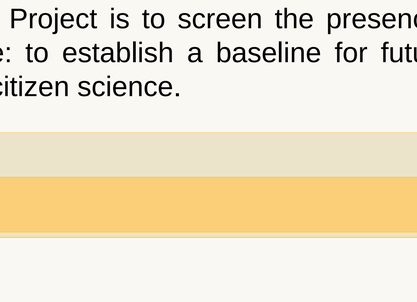

Image 3. Vessel used for the sampling trip

Laboratory processing

1. Solid content is separeted from the preservative and deposited in filtered sea water.
2. MPs are manually extracted using a binocular loupe and placed in Petri dishes.
3. The dry particles are weighed and categorized according to shape and origin into fragment, film, fishing line, pellet and foam [3]
4. Petri dishes are photographed and subjected to image analysis using ImageJ software to obtain morphological and color variables [4]
5. Finally, chemical analysis was performed by Fourier Transform Infrared Spectrometry (FTIR) which allows determining the type of plastic [5].

Image 4. Preparing the sample on the ship for further processing in the laboratory

Image 5. Microplastics in binocular loupe view

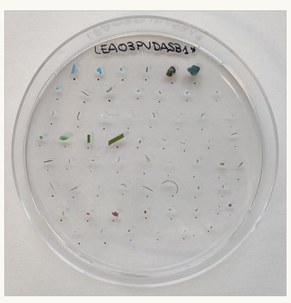

Image 6. Petri dish ready to be photographed

PRELIMINARY RESULTS

The results of the project are currently being obtained. So far, 1819 items of plastic nature have been processed, of which 1345 are microplastics (< 5 mm).

Of the total number of items studied, the results show that clearly the majority belong to the fragments category (78%). The next most frequent category of plastic items are fishing line (9%) and films (8%). Foam and pellet types are the least frequent (3% and 2%, respectively).

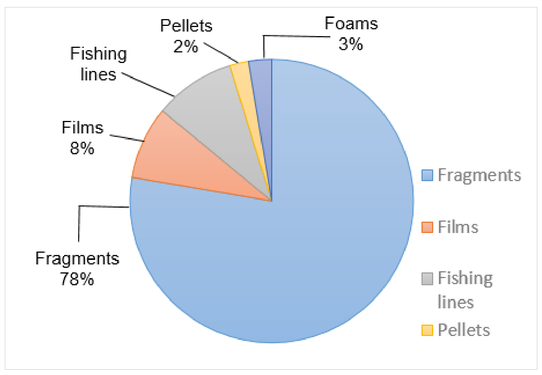

Image 7. Frequency of diferent categories of plastic (N = 1819 ítems)

From the total of 68 samples analyzed until now, the total concentration as a function of distance from the coastline has been obtained as a preliminary result. The table shows the total concentration values for samples taken 1, 3 and 5 nautical miles from the coastline.

Table 1. Total concentrations of microplastic items (<5mm) in each zone: shallow zone (1 nmi), middle zone (3 nmi) and deep zone (5 nmi).

	1 Nautical mile	3 Nautical miles	5 Nautical miles
Total Concentration (ítems/m^3)	0.006733044	0.001512158	0.002233608

CONCLUSIONS

This project has provided an opportunity to obtain data of scientific value through citizen science, thus raising awareness of the problems related to plastic pollution of the marine environment.

ACKNOWLEDGMENTS

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