Plastic marine debris on the Portuguese coastline
Sampling the coastal sediments of Praia de Matosinhos
a beach located in the North of Portugal

Beatriz Valongo¹, Filipe Batista¹, Rodrigo Mesquita¹, Rita Rocha²

¹Secondary Education Students, Colégio Luso-Francês, Porto
²Project Coordinator Teacher, Colégio Luso-Francês, Porto.
Corresponding author: rita.rocha@lusofrances.com.pt

MARINE PLASTIC DEBRIS

Marine plastic debris is all persistent solid materials, produced or processed directly or indirectly, of an intentional or unintentional way (NOAA, 2010). Its worldwide production has increased substantially since the 50s, the decade in which diversification and mass consumption of synthetic polymers (Thompson et al, 2009) occurred. Plastic production was accompanied by an increase of plastic waste in the oceans, presently assuming values of 158 million tons. In 2020, it will be estimated that this scenario will evolve into 240 million tons of marine plastic waste worldwide.

The properties that make plastics so useful, as its stability and resistance to degradation, are the causes that, simultaneously, make them potential environmental pollutants (Andrady, 2011). Plastics currently account for 75% of total marine litter in the oceans (DNV, 2013).

The Portuguese coastline is very vulnerable to the accumulation of plastic waste (Martins and Sobral, 2011). Preliminary studies of plastics debris in Portuguese beaches date back to 2008; however, data on the north coast are virtually non-existent (Martins, 2011).

Recent studies indicate that the water from the washing machines are an important domestic source of synthetic fibres (Browne, 2011), being estimated that one single piece of clothing can release approximately 1,900 acrylic and polyester fibres in each wash (Browne, 2011). These microfibers are drained daily to the oceans, currently constituting about 70% of plastic marine debris (Browne et al, 2011).

OBJECTIVES

With the present study we aimed to characterize, in quantitative and qualitative terms, plastic debris found in sediments from Matosinhos beach.

1. For quantitative characterization, we proceed to the calculation of the abundance of plastic debris per unit of sampling.
2. For qualitative characterization, we proceed to the classification of plastic particles sampled by type, size and colour.
3. The study aims to assess the quality of the beach by application of the index Clean Coast Index (CCI).

RESULTS

Field sampling

1. Collect the superficial cm of sand
2. Collect the 5mm sieved debris (CCI Index)

In the Lab

Clean Coastal Index 2.05
CLEAN BEACH

Synthetic fibres - 62% of microplastics' fraction
Microplastics - >85% of the sample

FUTURE PERSPECTIVES

The prevalence of microfibers in coastal sediments samples, with percentages reaching 85%, confirms the need to develop a technological solution - filter - that captures the synthetic fibres released upstream.

By a system of vacuum pumping, similar to the one used in a macro scale lab, this might be coupled with domestic washing machines. The filter would then be replaced with every wash, being deposited with the domestic solid waste.