

Marine litter trends of beaches with different human-induced pressures on the European Atlantic coast (Portugal)

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Marine litter on sandy beaches is an issue of major current concern due to its ecological and economic impacts. Yet our understanding of the distribution and composition of beach litter and is still limited. The gathered information and constitute an important way to inform the local authorities to develop policy strategies to address the problem. In this study, the quantity, weight and composition of marine debris were determined beaches located in the European Atlantic coast (Portugal).

Material and methods

The data analysed in this study was collected on four Figueira da Foz beaches. Figueira da Foz is a city, which is located in southwestern Europe on the Atlantic coast of Portugal.



Fig. 1. Location of the sampled beaches in the central coast of Portugal.

Beach litter surveys were conducted at four beaches from summer of 2016 to summer 2018. The beaches were selected because they have different anthropogenic uses: industrial beach Leirosa, urban beach Cabedelo, peri-urban beach Cabedelinho and rural beach Quiaios.

Sampling was performed according to the operational guidelines from OSPAR (2010) and UNEP. In each beach one 100 meter long area was selected and all items of litter was collected, counted and weighted after classification. Marine debris was categorized according to material: plastic, metal, glass and ceramic, wood (processed), paper, and other material groups. Beach cleanliness was assessed through Clean Coast Index, Akalay (2007).

Results

The surveys at the four beaches recorded a total of 10 205 marine litter items, summing 57,7816 kg weight. The surveyed area ranged from 4100 to 8800 m², covering a total of 23 850 m². Marine debris densities ranged from 21 136 to 447 317 items/km².

Composition analysis showed that the main source of beached marine debris was mixed activities by numbers and fishing and mixed activities by weight. The dominant material type in marine debris was plastic which constituted 94% of debris (by number).

The majority of the litter was associated with fishing, smoking, drinking and eating activities. Plastic or polystyrene pieces size between 0 and 2,5 centimetres is in the first place with 30 % of total amount of debris. Plastic or polystyrene pieces size between 2,5 and 50 centimetres is in the second place with 17,85 %. Cigarette butts come third place with 12,42 %.

Discussion

Some tendencies do not change. Agência Portuguesa do Ambiente made coastal researches along whole Portugal coastline in 2017. They collected about 23 603 items from 11 beaches. Top 10 marine debris items were very similar to this research.

Table 1. Top 10 items found on Portugal beaches in 2017

<i>Plastic/polysterene pieces 0 - 2.5 cm</i>	5365
<i>Cigarette butts</i>	3397
<i>Caps/lids</i>	2828
<i>Plastic/polysterene pieces 2.5 to 50 cm</i>	1929
<i>Cotton bud sticks</i>	1280
<i>Bags of chips/snacks and sticks of lollipop</i>	875
<i>Small plastic bags, e.g., freezer bags</i>	644
<i>Foam sponge</i>	455
<i>Tangled nets/cord/rope and string</i>	401
<i>Other pieces of plastic and polystyrene</i>	349

In this research plastic contains about 94 % of all quantity. There were found 10 205 parts of debris in total and 9 611 of them were from plastic. In comparison the average of Portugal was about 73 % in 2017.

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