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CHARACTERIZATION OF MICROPLASTICS IN THE GASTROINTESTINAL TRACT AS WELL AS PHTHALATES AND BISPHENOLS IN SKELETAL MUSCLE OF STRANDED CETACEANS IN THE MACARONESIAN REGION

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Abstract:

Plastic ingestion by marine organisms may have physical and toxicological deleterious effects [1,2]. Stranded cetaceans represent a significant opportunity to study the interaction of marine fauna with plastic debris. Given their long life expectancy and their high position in trophic levels marine mammals are considered important sentinels for marine pollution [3].

Aiming to harmonize the available data to facilitate large-scale meta-analyses of plastic ingestion in the Macaronesian region, our approach is fully compatible with necropsy protocol in cetaceans [4], and at the same time complies with the recommendations for reporting ingested plastics in marine megafauna [5].

We examined the entire gastrointestinal tract of 12 individuals from 5 odontocetes species that stranded along the coasts of Madeira and the Canary Islands. The gastrointestinal contents were washed through nested sieves of 1000, 500 and 200 µm and the retained material was then collected and digested with 10% KOH. All filters were observed under microscope and micro-Raman analyses were performed to some of the particles allowing the identification of their composition.

In addition, the determination of different types of phthalates and bisphenols was carried out in skeletal muscle samples of these cetaceans by liquid chromatography with different detectors (diode array and mass spectrometry).

As main results, no plastic particles larger than 5mm were observed, except for the case of a plastic wrapper that was found in the oesophagus of one dolphin. On the contrary, all animals contained microplastics of diverse sizes, being most of particles classified as fibres

(98.2%, n=722). Likewise, different types of phthalates and bisphenols were found in all the muscle samples analysed.

The adopted workflow in this study allows the collection of valuable data for different interdisciplinary research teams, aiming to harmonize data, facilitate large-scale comparisons of plastic ingestion and also give scientific basis to future conservation policies.

Key words: microplastics, phthalates, bisphenols, protocol, stranded cetaceans, Macaronesia.

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