



Abstract

Microplastics Contamination of Large Pelagic Fish in the Open Atlantic Ocean [†]

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Abstract: Fish are one of the most important components of the ocean, playing relevant ecological roles and providing several ecosystem services. Large migratory fish, such as tunas, mackerels and amberjacks, can function as valuable indicators of ocean health, since they are top predators and are exposed to several anthropogenic pressures, including pollution from different sources. Microplastics (MPs), small plastic particles (<5 mm), are ubiquitous throughout the world, occurring even in habitats with little anthropogenic pressure such as open sea waters. Taking advantage of the unique fish collection gathered by the NRP Sagres Crew during the 2020 Circumnavigation Expedition, biological samples of fish gastrointestinal tract and gills were collected and properly stored on board for further laboratorial analyses to assess MP contamination, using optimized protocols. MPs were characterized in terms of shape and color, and polymers were identified using FTIR. Seven fish were collected across the middle of the Atlantic Ocean, between the continents of Africa and South America, and along the South American coast. Three *Acanthocybium solandri*, two *Seriola lalandi*, one *Thunnus abacares* and one *Coryphaena* spp. were collected, with the total length ranging from 54 cm to 127 cm, and total weight from 1 kg to 11 kg, including adults and one juvenile (*S. lalandi*). A total of 124 MPs were observed in the gastrointestinal tract and gills, including 72% of fibers and 28% particles. Rayon was the most abundant polymer (25%), and a large majority MPs were blue (85%). Fibers were mainly Rayon (34%) and blue, while particles were mostly composed of polypropylene (71%). MPs were found in all fish, with an average of 18 ± 11 MPs per fish. In all sampled fish, both organs presented MPs with a mean number of 9 ± 5 MPs in the gills and 9 ± 6 MPs in the gut. These results demonstrate the ubiquitous occurrence of MPs throughout the world, even in remote areas such as the open Atlantic Ocean, and in top predators which are more prone to bioaccumulate pollutants. This study reinforces the need for further research regarding plastic pollution and MP contamination in species from higher trophic levels.

Keywords: microplastics; fish; pollution; bioaccumulation; open waters; Atlantic Ocean



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