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Environmental harmfulness of lost fishing gear in the NW Portuguese coast – the NetTag project

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Abstract

Lost fishing gear at sea, mainly composed of plastics, threatens greatly marine ecosystems. Although inert, environmental dynamics can induce modifications on its surface, making it suitable to adsorb pollutants, or even promote plastics degradation which can result in the production of microplastics. Moreover, plastic debris provide a substrate for microbes, making them a possible transportation vector for biological pollutants such as opportunistic pathogens. To better understand the ecological implications of fishing-related debris, NetTag project is studying the environmental harmfulness of lost fishing gear as a new pollutant.

In this work, chemical (metals, PAHs, microplastics) and microbiological (pathogens) contaminants were analyzed in two hotspots of lost fishing nets located along the NW Portuguese coast, both with intensive fishing activity: (i) Cavalos de Fão, a natural rocky bottom area, with several reefs; and (ii) Matosinhos submarine wreck, an artificial reef. Samples of water, sediment and lost nets were collected from both sites, for chemical monitoring of metals and PAHs, and also for microbial community analyses by next-generation sequencing.

Overall, low levels of metals and PAHs were found at both sites, showing that both water and sediments were not polluted by metals or organic contaminants. No clear influence of lost fishing nets was observed on these contaminants levels. Matosinhos submarine presented a higher level of microplastics contamination, mainly fibers, and further analyses are being done to characterize the plastic polymer and ascertain the source of those microplastics. Microbial communities associated with lost nets, were sequenced and are being analyzed to investigate the occurrence of pathogenic bacterial groups.

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Keywords

ghost gear, marine pollution, plastic debris, pollutants