

COASTAL PLASTIC FRAGMENTS AS RESERVOIRS OF ANTIBIOTIC-RESISTANT BACTERIA IN GRAN CANARIA (CANARY ISLANDS, SPAIN)

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Abstract:

Plastics have become ubiquitous pollutants in the marine environment. Direct effects on marine wildlife such as physical damage caused by ingestion and entanglement are well known across the scientific community. However, there are also other barely explored mechanisms by which plastics could be potentially harmful to ecosystems and human health. In recent years, the ability of plastics to act as reservoirs of potentially pathogenic bacteria, including antibiotic-resistant bacteria, has been proven.

In this work, a preliminary study was carried out with the purpose of evaluating the presence of antibiotic resistant bacteria in Gran Canaria Island's coasts (Canary Islands, Spain), with a focus on coliform bacteria due to their role as faecal contamination indicators. For this reason, samples of mesoplastics (5 - 25 mm) and microplastics (< 5 mm), sand and seawater were collected from three different beaches in Las Palmas de Gran Canaria. Samples were cultivated on MacConkey agar and antimicrobial resistance was determined by disk diffusion test using nine different antibiotics (amoxicillin-clavulanic acid, clarithromycin, cephalexin, doxycycline, enrofloxacin, lincomycin, nitrofurantoin, nalidixic acid and tetracycline).

Growth was observed in 4/4 plastic samples, 2/3 sand samples and 1/3 seawater samples, however, plastic samples showed a higher concentration of strains. All isolated strains were identified as coliforms and were resistant to four antibiotics (amoxicillin-clavulanic acid, cephalexin, clarithromycin and lincomycin). In contrast, the compounds that showed the highest susceptibility were doxycycline, enrofloxacin and tetracycline.

These preliminary results highlight the need for further research on the impacts of plastic waste, with particular attention to its potential role as a vehicle and reservoir for antibiotic-resistant bacteria.

Key words: microplastic, mesoplastic, antimicrobial resistance, coliforms