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# Microplastic Concentrations in Cultured Oyster in Two Bays of Baja California, Mexico

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**Abstract :** Microplastics (MPs) are one of the most numerous reported wastes found in the marine ecosystem, representing one of the greatest risks for organisms that inhabit that environment due to their bioavailability. Such is the case of bivalve mollusks, since they are capable of filtering large volumes of water, which increases the risk of contamination by microplastics through the continuous exposure to these materials. This study aims to determine, quantify and characterize microplastics found in the cultured oyster Crassostrea gigas. We also analyzed if there are spatio-temporal differences in the microplastic concentration of organisms grown in two bays having quite different human population. In addition, we wanted to have an idea of the possible impact on humans via consumption of these organisms. Commercial size organisms (>6cm length; n = 15) were collected by triplicate from eight oyster farming sites in Baja California, Mexico during winter and summer. Two sites are located in Todos Santos Bay (TSB), while the other six are located in San Quintin Bay (SQB). Site selection was based on commercial concessions for oyster farming in each bay. The organisms were chemically digested with 30% KOH (w/v) and 30% $H_2O_2$ (v/v) to remove the organic matter and subsequently filtered using a GF/D filter. All particles considered as possible MPs were quantified according to their physical characteristics using a stereoscopic microscope. The type of synthetic polymer was determined using a FTIR-ATR microscope and using a user as well as a commercial reference library (Nicolet iN10 Thermo Scientific, Inc.) of IR spectra of plastic polymers (with a certainty ≥70% for polymers pure; ≥50% for composite polymers). Plastic microfibers were found in all the samples analyzed. However, a low incidence of MP fragments was observed in our study (approximately 9%). The synthetic polymers identified were mainly polyester and polyacrylonitrile. In addition, polyethylene, polypropylene, polystyrene, nylon, and T. elastomer. On average, the content of microplastics in organisms were higher in TSB (0.05 ± 0.01 plastic particles (pp)/g of wet weight) than found in SQB (0.02 ± 0.004 pp/g of wet weight) in the winter period. The highest concentration of MPs found in TSB coincides with the rainy season in the region, which increases the runoff from streams and wastewater discharges to the bay, as well as the larger population pressure (> 500,000 inhabitants). Otherwise, SQB is a mainly rural location, where surface runoff from streams is minimal and in addition, does not have a wastewater discharge into the bay. During the summer, no significant differences (Manne-Whitney U test; P=0.484) were observed in the concentration of MPs found in the cultured oysters of TSB and SQB, (average: 0.01 ± 0.003 pp/g and 0.01 ± 0.002 pp/g, respectively). Finally, we concluded that the consumption of oyster does not represent a risk for humans due to the low concentrations of MPs found. The concentration of MPs is influenced by the variables such as temporality, circulations dynamics of the bay and existing demographic pressure.

**Keywords :** FTIR-ATR, Human risk, Microplastic, Oyster
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