

MICROPLASTICS IN TISSUES OF THE MUSSEL *MYTILUS EDULIS PLATENSIS* FROM THE SAN JORGE GULF, ATLANTIC PATAGONIAN SEA



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INTRODUCTION: In recent years, the release of microplastics (MPs) into the environment is a major concern. Most of the MPs encountered in the oceans are secondary derivatives that come from the degradation and fragmentation of larger products that may reach the sea by different means. Microplastics (MPs) are recognized as an emergent threat since they can enter trophic webs and show complex ecotoxicological effects. In the Argentine Sea, there is scarce information about its presence, and spatial variation on its abundance related to coastal urbanization in Patagonia. The San Jorge Gulf-Argentina (SJG) is the most populated area in Patagonia but information on its coastal environmental quality is scarce. Cities have grown in a disordered way along the coastline, and raised serious environmental conflicts, with occurrence of controlled and illegal coastal dumpsites along with effluents that release wastewater and rainwater into nearshore ecosystems. Thus, we aim to assess MPs contamination in blue mussels (*Mytilus edulis platensis*) from different sites along the central coast of SJG as a biomonitoring approach.

METHODOLOGY: Mussels were collected at SM (impacted, within the urban area of Comodoro Rivadavia city), MAQ and QR (reference sites, distant 18 and 15 km S and N, respectively from urbanized areas) (Figure 1). The methodology used is an adaptation of Li et al. (2015) in which the soft tissues of 15 mussels per site were digested in pools of five individuals (n=3) using a 30% H₂O₂ solution (60 °C) and filtered through polycarbonate filters (10 µm). The filters were observed with a light microscope (LM) and the possible MPs were tested under a stereoscopic microscope with the hot needle method (Lusher et al., 2017). Procedural blanks were made in order to avoid any error due to contamination. MPs density in mussel tissues was compared between sites using a Kruskal-Wallis non-parametric test followed by a Dunn's test for multiple comparisons (significance level: p<0.05).

RESULTS: The results indicated the presence of plastic and non-plastic microfibers of anthropic origin (e.g., cellulose) in the three sites. Microplastics concentration was higher in the city (SM: 0.64±0.12 MPs/g w.w.) compared to more distant sites (0.49±0.19 and 0.31±0.05 MPs/g w.w. for MAQ and QR, respectively) (Figure 2) (Dunn's test QR vs SM, p<0.05). The MPs retrieved from mussels are mostly transparent or colorless (Figure 3), with averages length of 712 ± 16.19 µm and thickness of 14.98 ± 0.38 µm. In the case of non-plastic fibers, the average length and width were 686.78 ± 36.92 µm and 20.06 ± 0.03 µm, respectively.

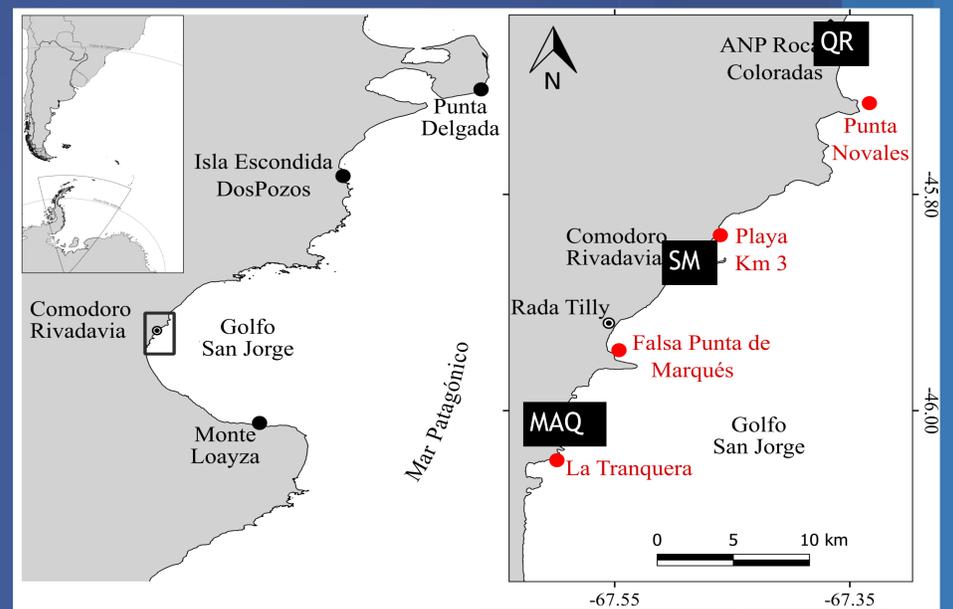


Figure 1: Map showing location of sampling sites

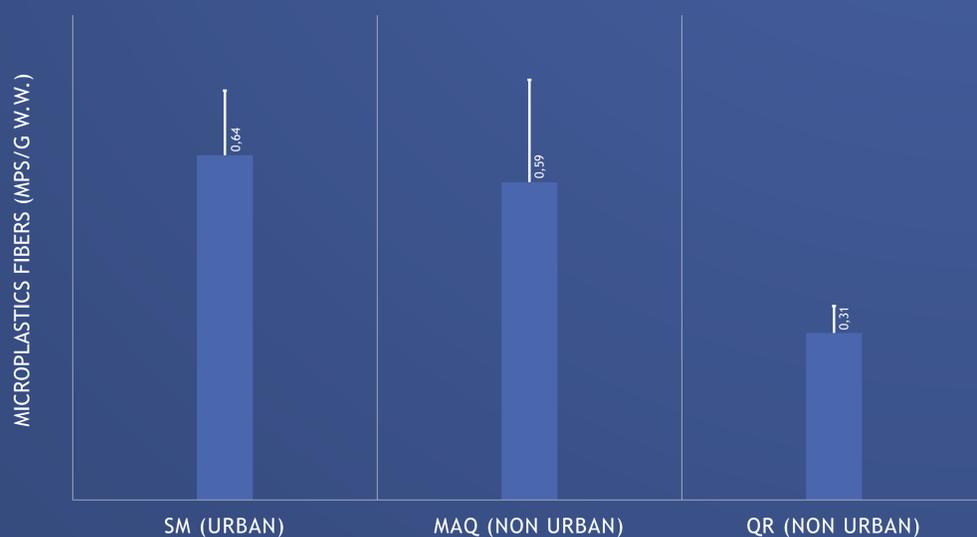


Figure 2: Mean (±SD) concentration of MPs at SM (urban site), MAQ and QR (non-urban sites).

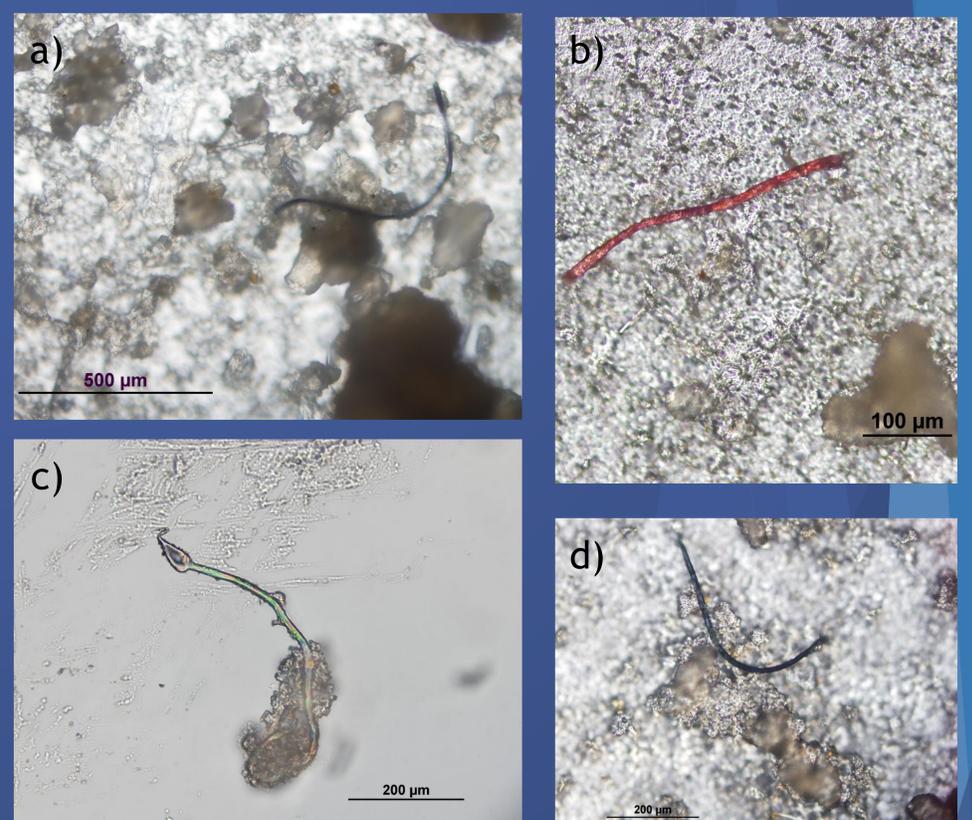


Figure 3: Photomicrographs of suspected MPs and non-plastic fibers. a, c-e: microplastic fibers. b, non-plastic fiber.

DISCUSSION AND CONCLUSIONS: The present study confirm the presence of MPs and non-plastic fibers of anthropic origin in *M. edulis platensis* in the central coastal zone of the San Jorge Gulf. Previous studies carried out at more distant points (> 500 km) along the coastline have noted the presence of fibers seawater, sediment and tissues of some benthic and planktonic organisms even at far distances from the coast. This study provides information on presence and concentration of anthropogenic fibers in the soft tissues of *M. edulis platensis* and the efforts are now concentrated in the characterization of the type of plastic or non-plastic material using analytical procedures (e.g., Raman spectroscopy). This baseline study has identified MPs and anthropogenic non-plastic fibers in mussels from the most populated coastal region of Patagonia. Further studies are needed to validate the MPs and explore for temporal and spatial distribution MPs trends in Patagonian nearshore habitats.

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