POSTER

USING HISTOLOGY TO DETECT AND QUANTIFY MICROPLASTICS IN THE COANOCYTES OF THE SPONGE *PARALEUCILLA MAGNA KALUTAU* ET AL., 2004 (PORIFERA, CALCAREA)

D. Semeraro[1], A. Schiavo[1], M. Fucci[1], M. Mastrodonato[1], G. Scillitani[1], R. Trani[1], J. Aguilo-Arce[2], C. Longo[1]

[1]Dept. Biosciences, Biotechnology and Environment (DBBA), University of Bari Aldo Moro Bari, Italy; [2]Balearic Oceanographic Centre (IEO-CSIC), Spanish Institute of Oceanography, Muelle de Poniente s/n, Palma de Mallorca, Balearic Islands, Spain

The ingestion of microplastics (MPs) by marine invertebrates can disrupt essential biological processes, including growth, feeding, reproduction, respiration, and immune responses (Stephanie et al., 2013). Although environmental MP concentrations often exceeded those found in sponge tissues, filter-feeding sponges may possess resistance mechanisms and/or active expulsion pathways, enabling survival in polluted habitats and making them valuable models for assessing particle-related impacts on marine life (Aguilo-Arce et al., 2025). Detecting MPs within biological tissues remains challenging, as standard histological procedures are largely incompatible with MP visualization (Aguilo-Arce et al., 2025). In this study, we validated a novel histological approach based on Technovit 8100 embedding to localize and quantify fluorescent MPs within the body plan and choanocytes of the calcareous sponge Paraleucilla magna. This method allowed reliable detection of MPs at both tissue and cellular levels, overcoming limitations of conventional paraffin-based protocols. Quantitative image analysis revealed a significant increase in MP-occupied area in exposed sponges compared to controls. Statistical evaluation using both parametric and non-parametric tests confirmed highly significant differences in the internalized particle load between control and MP-treated groups ($p < 0.001$). Overall, this validated histological tool provides a robust, reproducible tool for detecting and quantifying MPs in sponges, enabling high-resolution assessment of particle internalization dynamics and supporting the use of the calcareous sponge P. magna as a sensitive model for evaluating microplastic impacts in marine filter-feeders.

References

1. Stephanie et al. Environ Pollut.2013;178:483-92.
2. Aguilo-Arce et al. Mar. Poll Bull. 2025; 215:117849.