

Caught in the Filter: Are Marine Sponges Silent Witnesses to Microplastic Pollution?

Meenakshi A K¹, Titus Immanuel², Nina Tabitha Simon², Akshita Joshi², Kartik Shanker²

1. School of Informatics, Kerala University of Digital Sciences, Innovation and Technology
2. Centre for Ecological Science, Indian Institute of Science, Bengaluru

Introduction

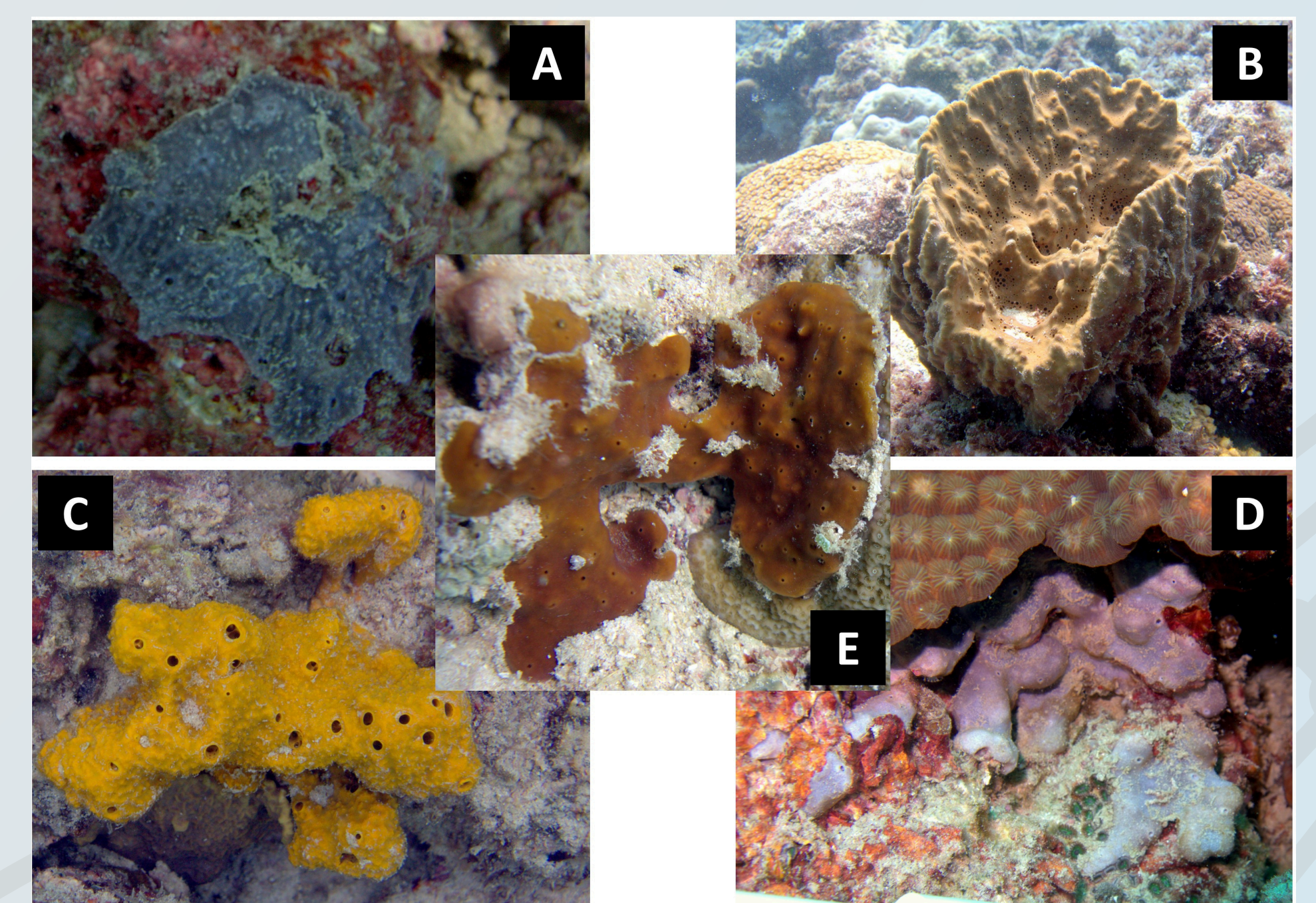
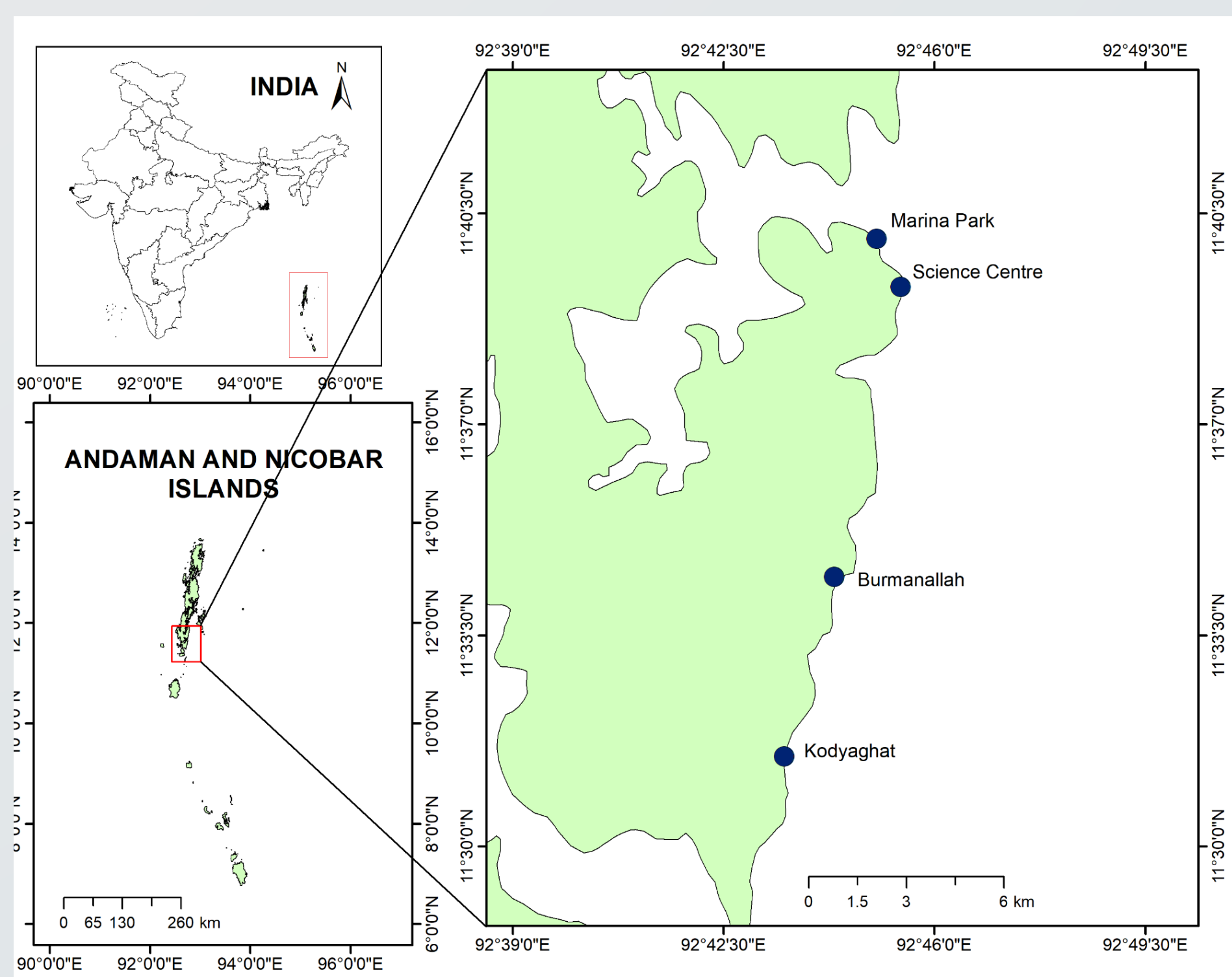
Microplastic (MP) pollution is widespread, detected in seawater, sediments, organisms, and even human breast milk. As sessile filter feeders, marine sponges can accumulate MPs and heavy metals (HMs), making them potential bioindicators. This study evaluates MP and HM accumulation in sponges to assess their role in coastal pollution monitoring.

Objectives

- To examine the occurrence, accumulation, and characteristics of microplastics and associated heavy metals.
- To compare five species of marine sponges and seawater samples from four coastal sites in the Andaman Islands.
- To evaluate the potential of sponges as bioindicators of localised microplastic pollution.

Study site and sampling

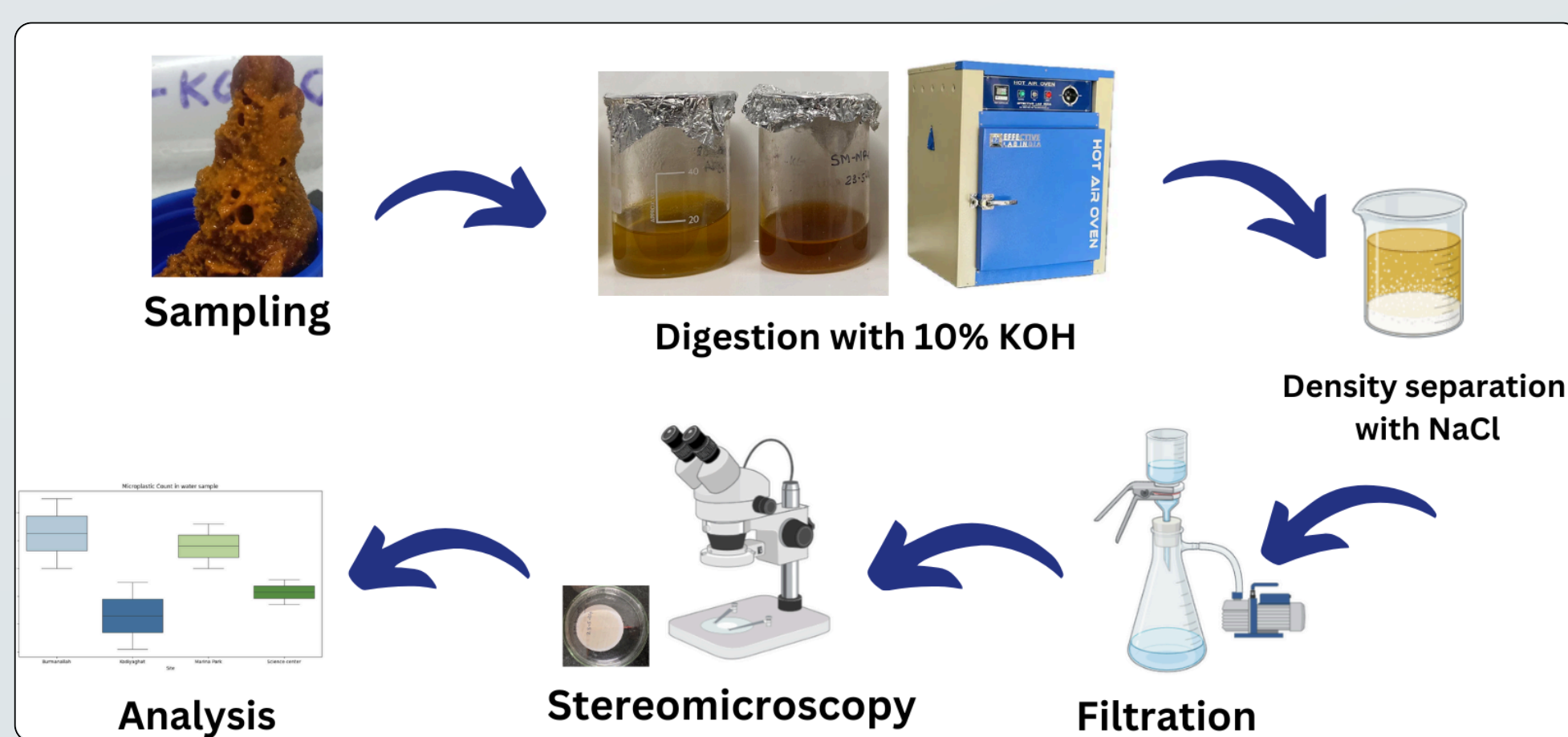
- 66 sponges (5 species) + water samples from 4 sites in South Andaman.
- 2 sites had freshwater discharge while the other 2 didn't causing a difference in pollution.
- Species availability was site-specific; not all five species were present at every location.



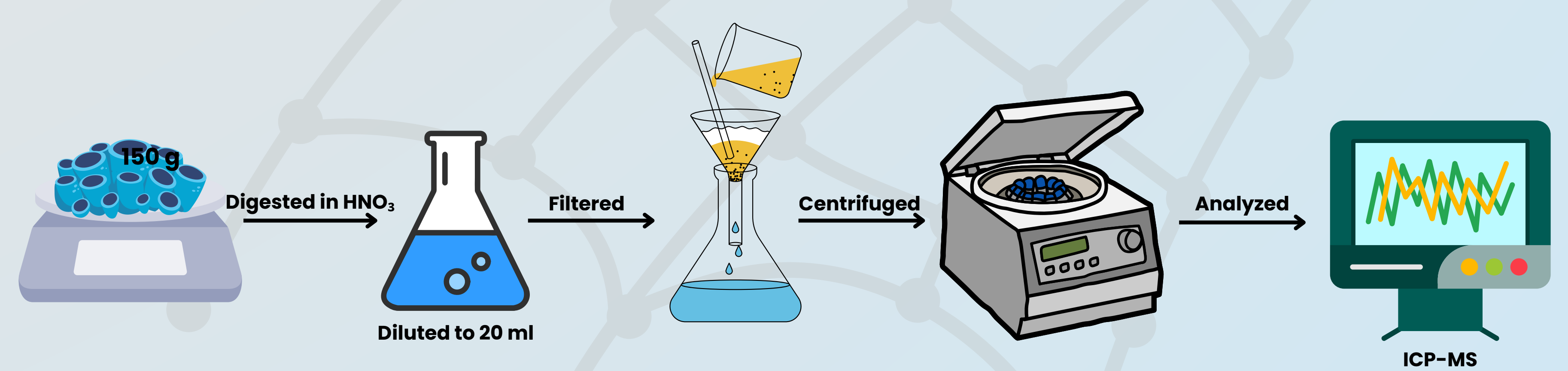
A-Lamellodysidea herbacea, B-Rhabdastrella globostellata, C-Styllissa massa, D-Dysidea granulosa, E-Neopetrosia chaliniformis

Methods

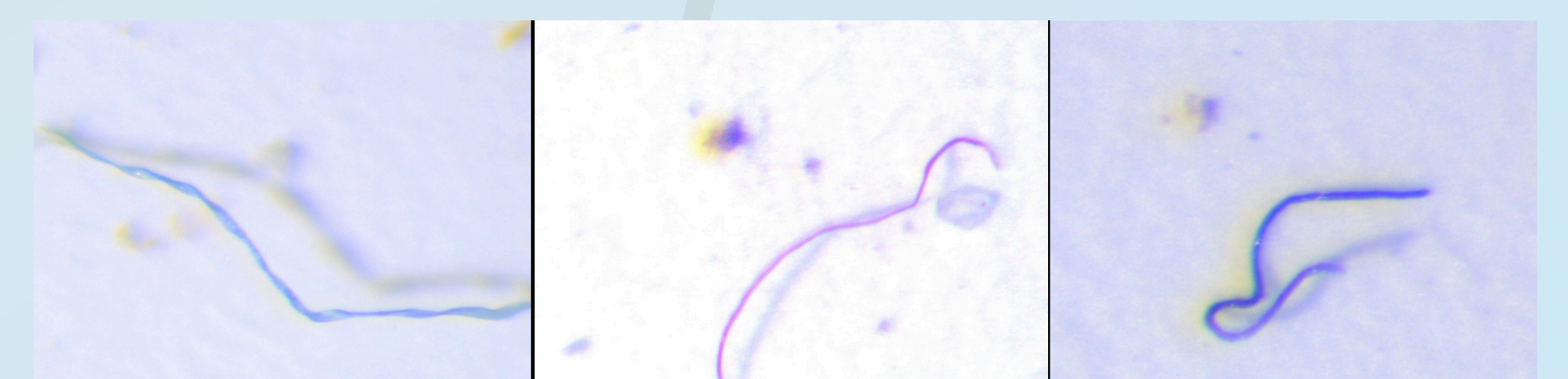
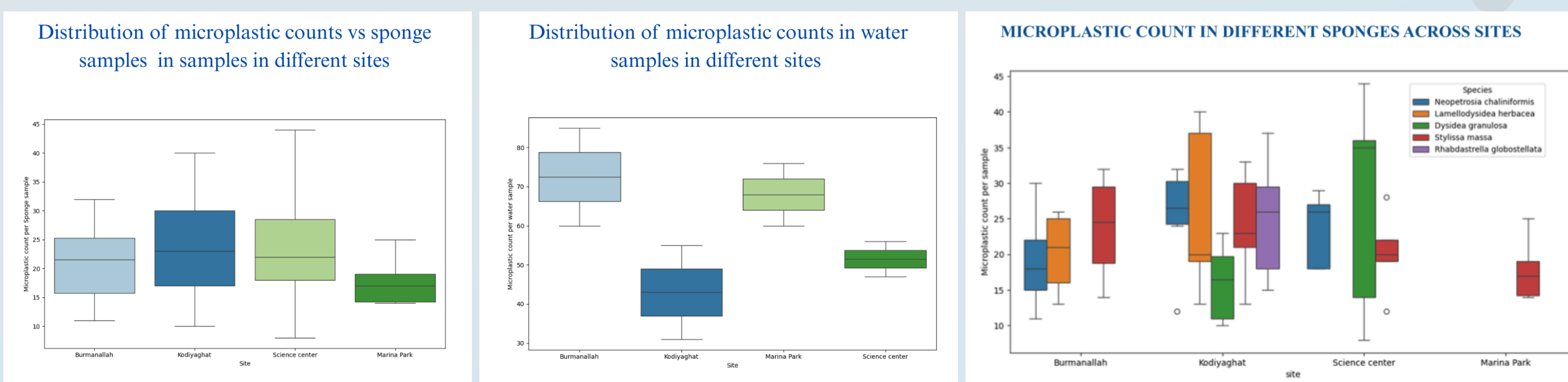
Microplastic analysis:



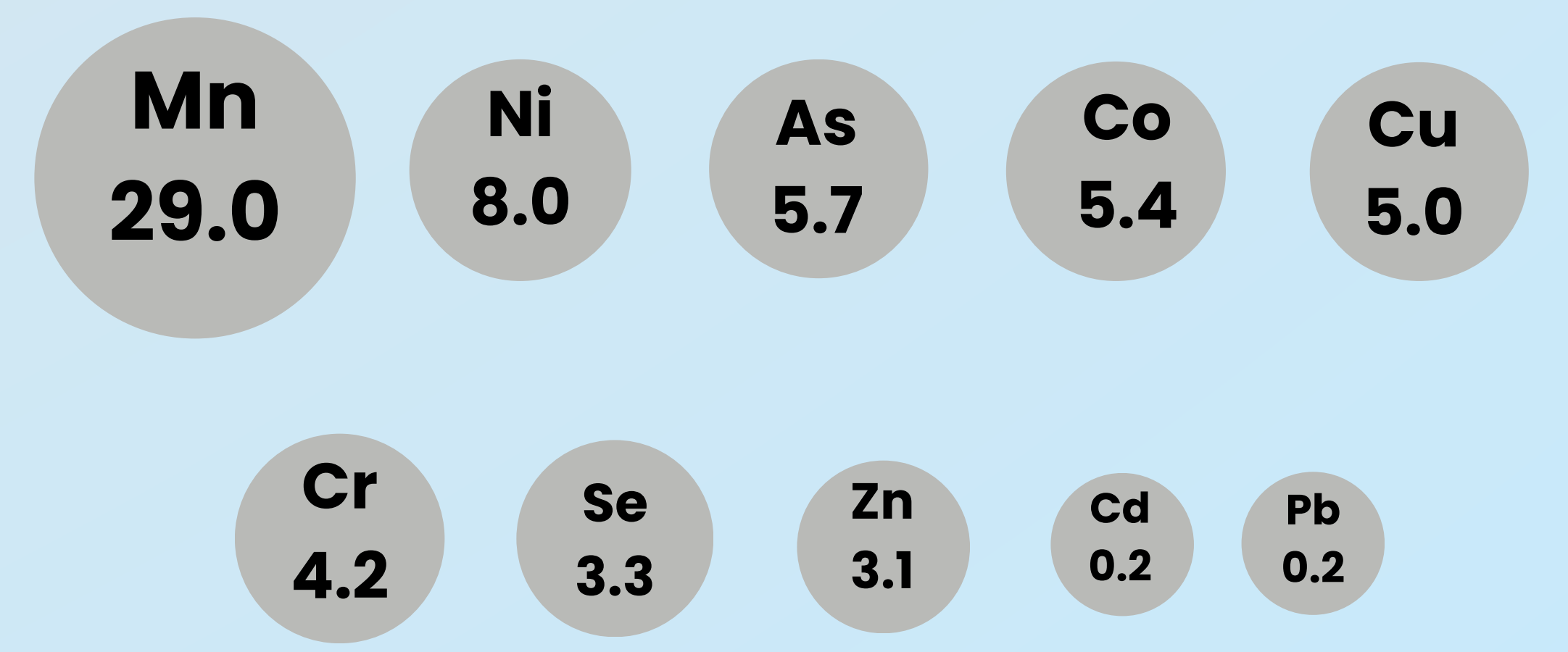
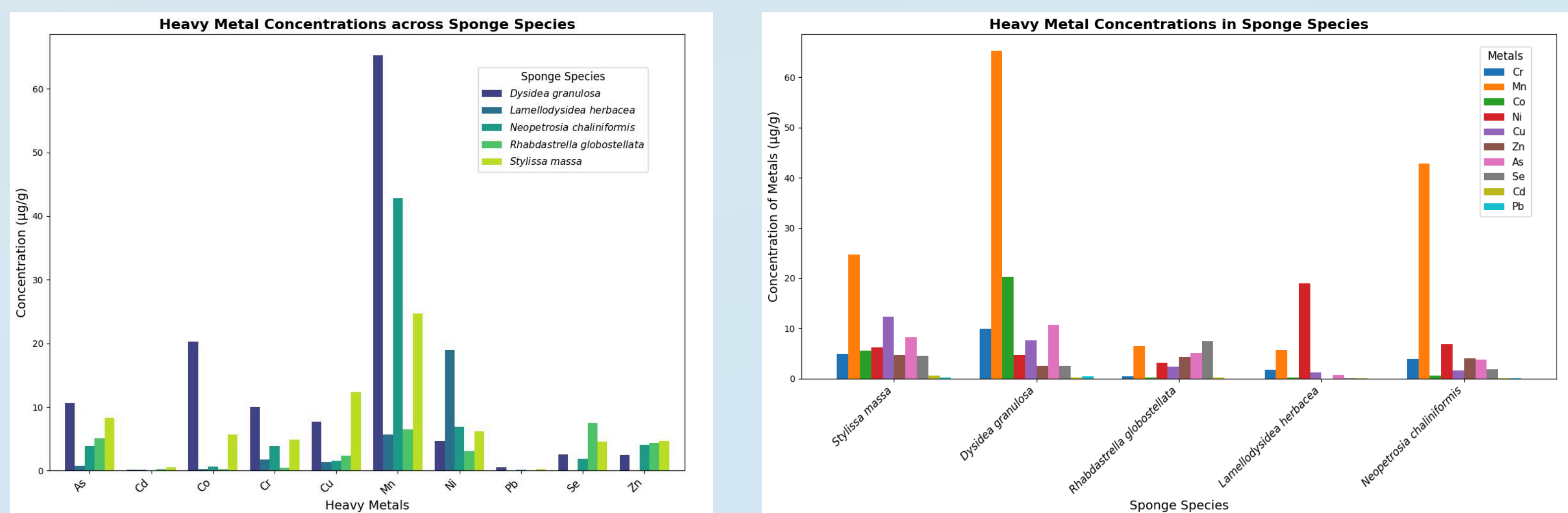
Heavy metal analysis:



Results



Raman spectroscopy of colored fibers revealed polymers such as PA (nylon nets), PB (pipes), and PVA/PET (plastic bottles & packaging), highlighting diverse anthropogenic sources of microplastics.



Discussion

- Sponges showed no selective MP uptake, yet their filtration and sessile nature support use as local pollution indicators.
- Predominant MP colours (blue, transparent) and polymers (PA, PB, PVA/PET) trace to fishing nets and packaging sources.
- Despite limited sampling, results demonstrate sponges' value in tracking MPs and heavy metals in nearshore waters.
- Outcomes inform coastal management on pollution hotspots, waste reduction, and long-term monitoring.

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References

