



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA
CAMPUS DI CESENA

MICROPLASTICHE NEI VERTEBRATI MARINI: PROBLEMI E POSSIBILI SOLUZIONI

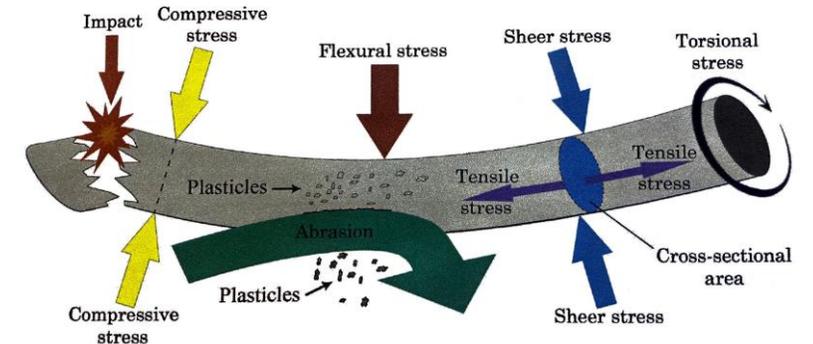
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Da dove originano le microplastiche (MPs)?

Le plastiche sono soggette a vari tipi di degradazione: termica, meccanica, fotodegradazione e biodegradazione.

Dalla degradazione di queste macroplastiche (>25 mm) si ottengono frammenti plastici sempre più piccoli.

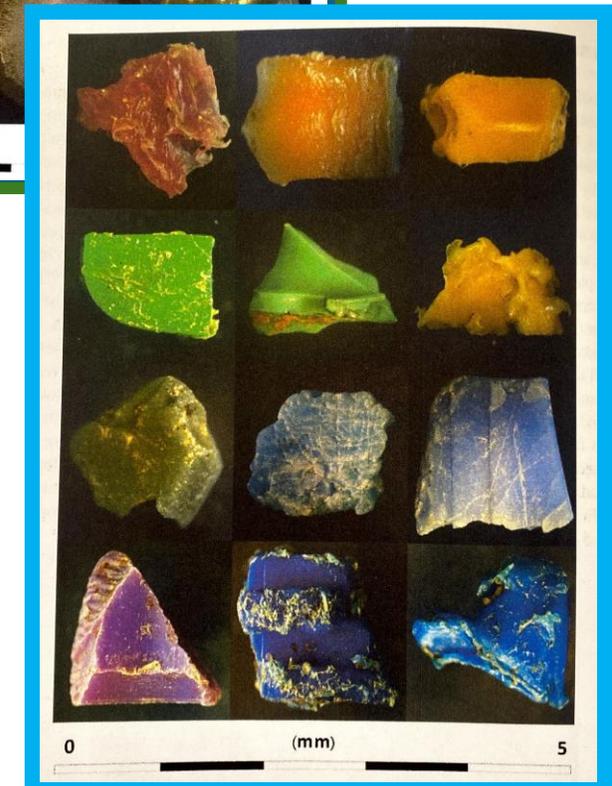
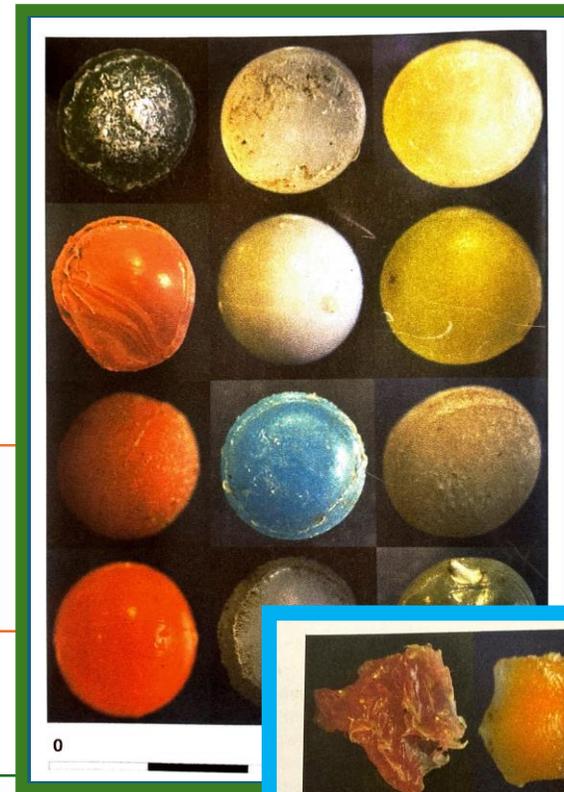


Classificazione delle MPs

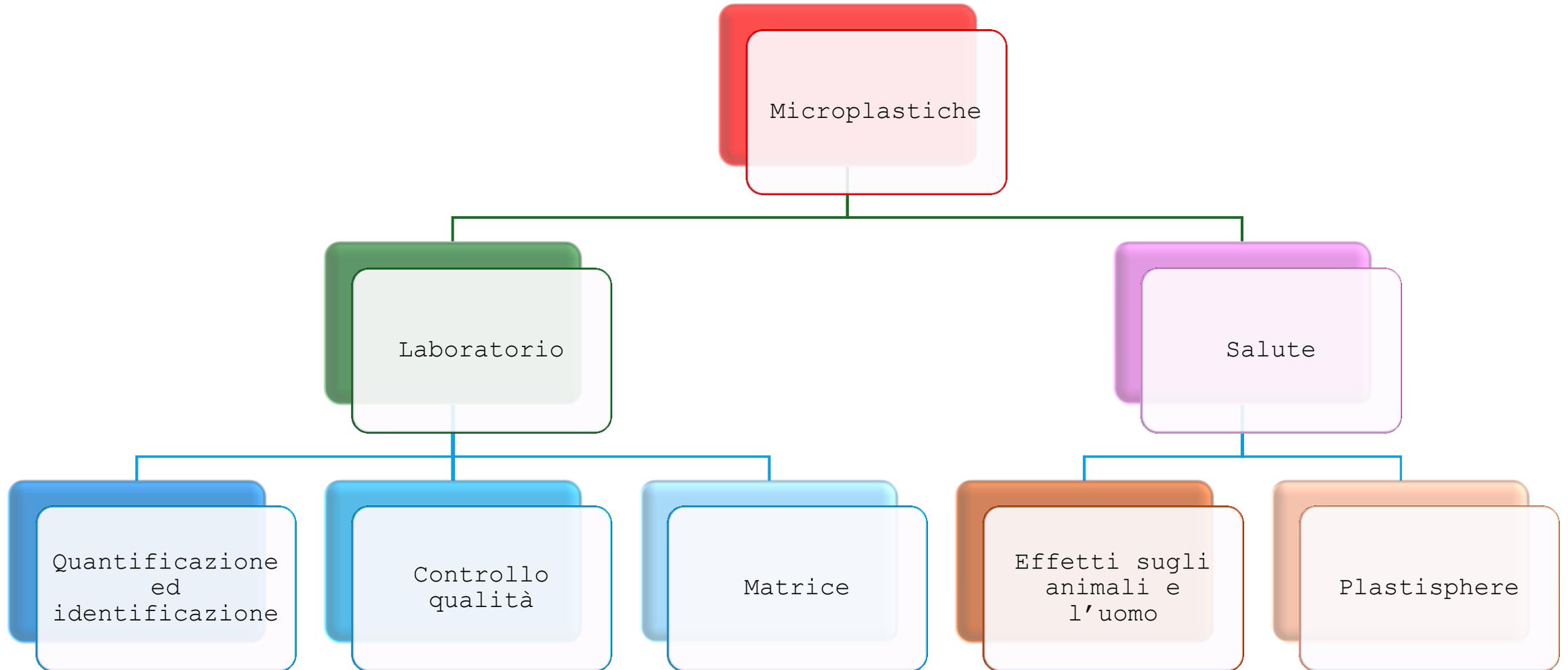
Oltre a forma (frammenti, fibre, pellet), colore, polimero (e.g., PET, PVC, PS) e dimensione, sono divise in primarie e secondarie.

Le MPs primarie sono usate come tali e prodotte per usi industriali e domestici.

Le MPs secondarie sono il risultato della frammentazione di plastiche più grandi.



Problematiche delle MPs



Challenge for the detection of microplastics in the environment

Lulu Lv,¹ Xicun Yan,² Limin Feng,¹ Shiqi Jiang,¹ Zifan Lu,² Hui Feng Xie,¹ Shengli Sun,¹ Jinjun Chen,² Chengyong Li^{1,2,3}

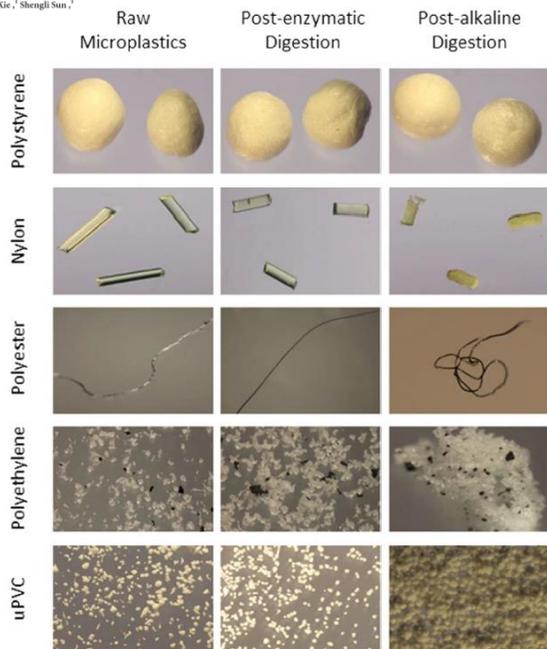
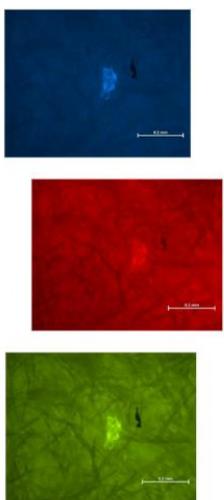


Figure 1. Microplastics photographed before and after enzymatic and alkaline digestion. Alkaline hydrolysis resulted in structural damage to nylon fibers, melting of polyethylene fragments, and discoloration to uPVC granules. Magnification: polystyrene spheres x40; nylon line x20; polyester fiber x63; polyethylene granules x200; uPVC powder x160.

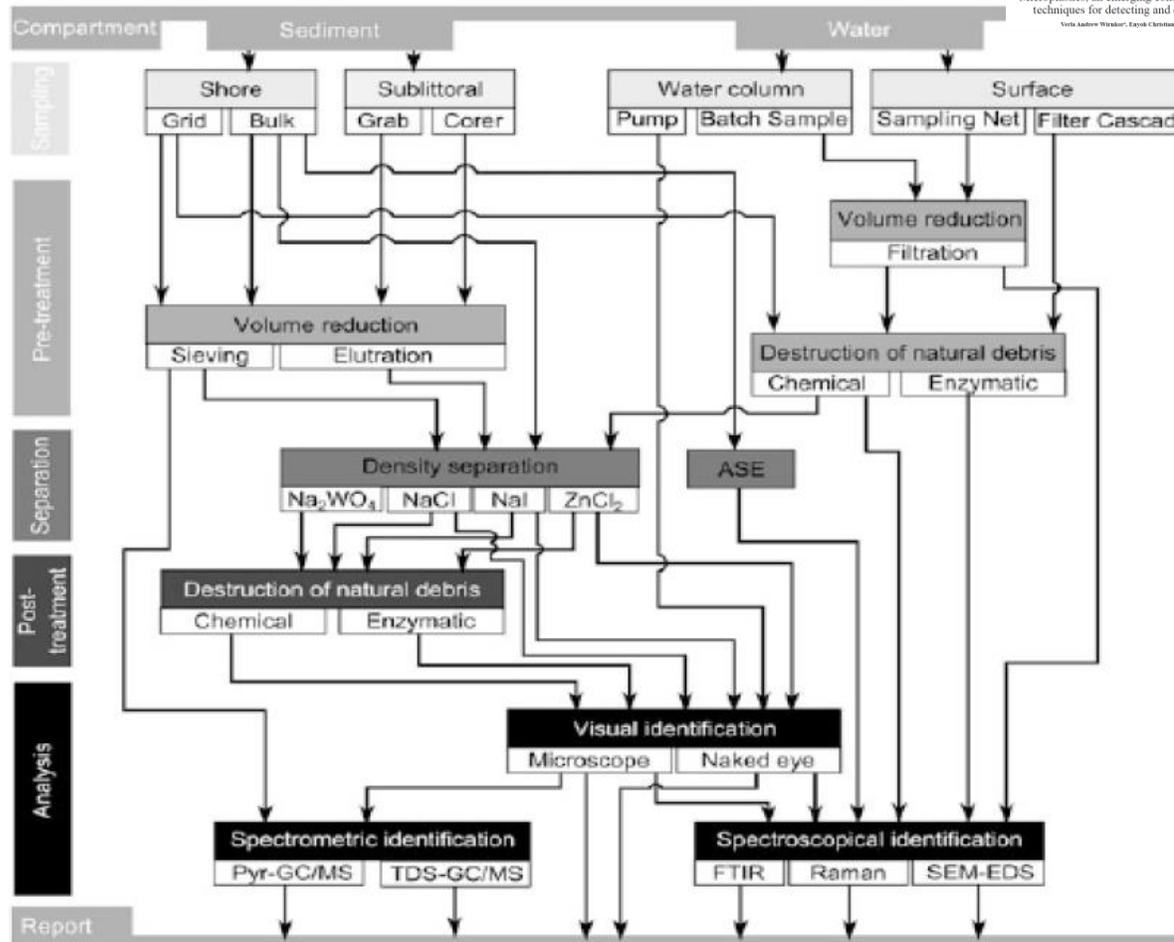


Quantificazione ed identificazione

Analytical Methods in Environmental Chemistry Journal Vol 2 (2019) 15-32



Microplastics, an emerging concern: A review of analytical techniques for detecting and quantifying microplastics
Vivie Andrew Winkler¹, Fayob Christian Elmer^{2*} and Vivie Evelyn Ngwe³



FARA

Controllo
qualità

Minderoo Plastic Free Lab

The University of Queensland

Project Size

150m²

Project Cost

\$1M - \$3M

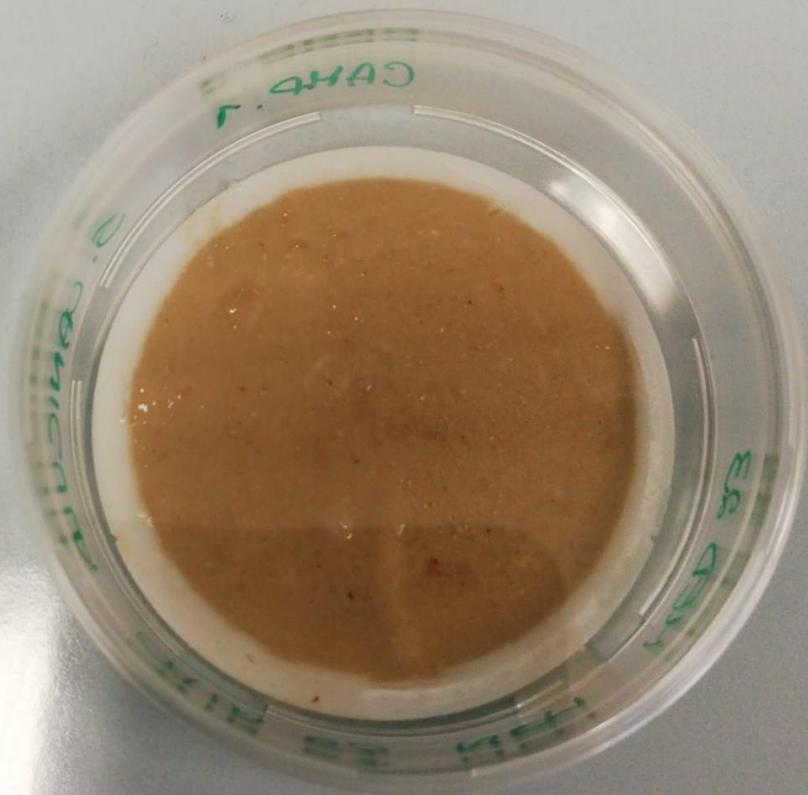
Project Duration

24 weeks

Continuo uso di bianchi (di campionamento, di preparazione del campione, di laboratorio)

Mancanza di materiali certificati (esistono materiali di riferimento)

BPL



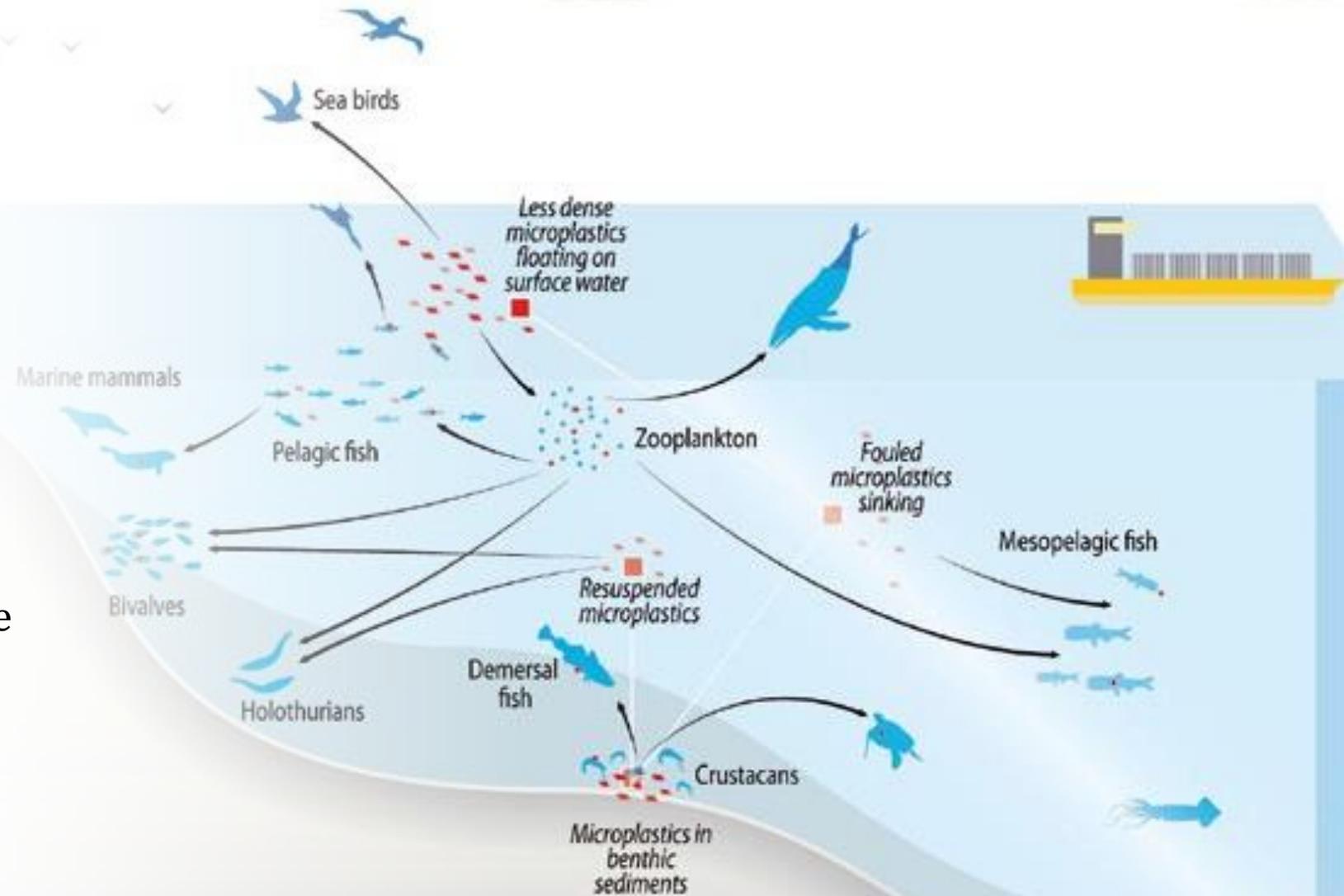
Matrice

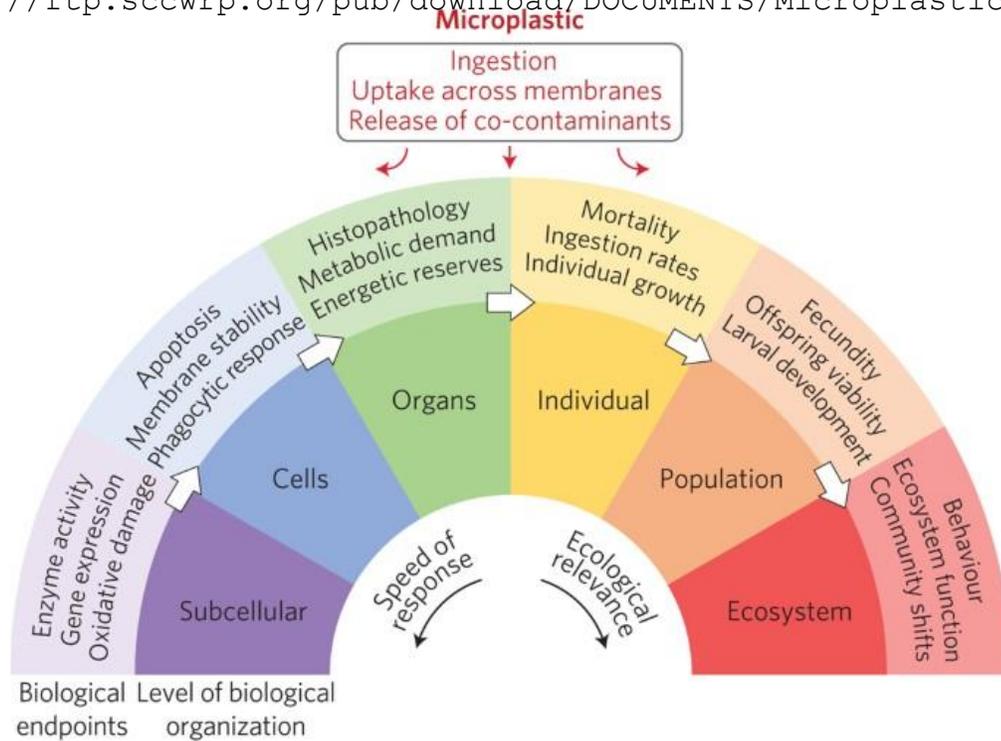
18/07/2025

XV Convegno Nazionale INBB, Roma

Dobbiamo preoccuparci delle MPs?

- In ambiente marino, le plastiche vanno incontro a processi di “weathering” e frammentazione che rompono i rifiuti in micro- e nanorifiuti.
- Le MPs stesse possono entrare nella catena trofica e porre importanti problemi di salute pubblica.

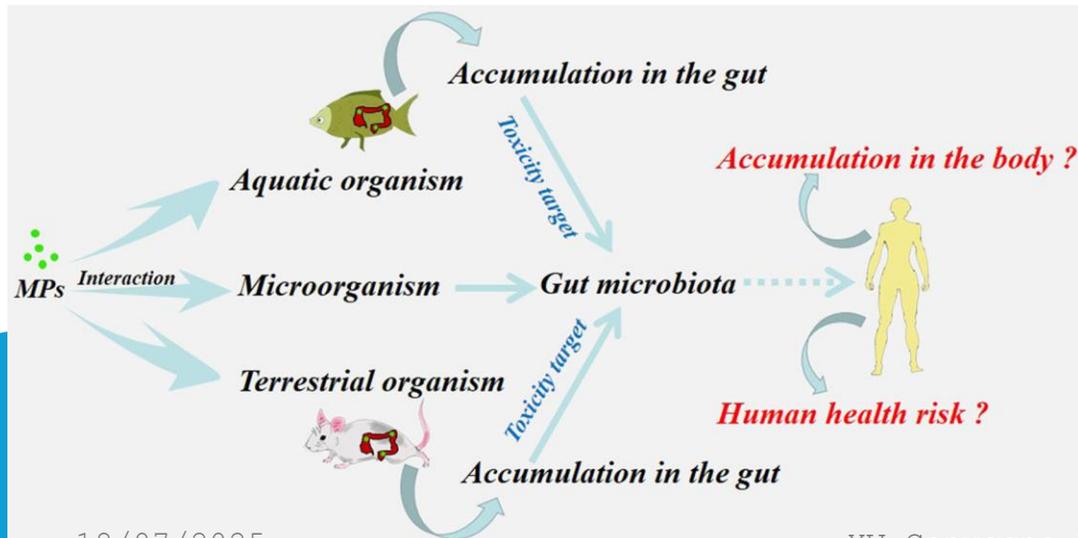


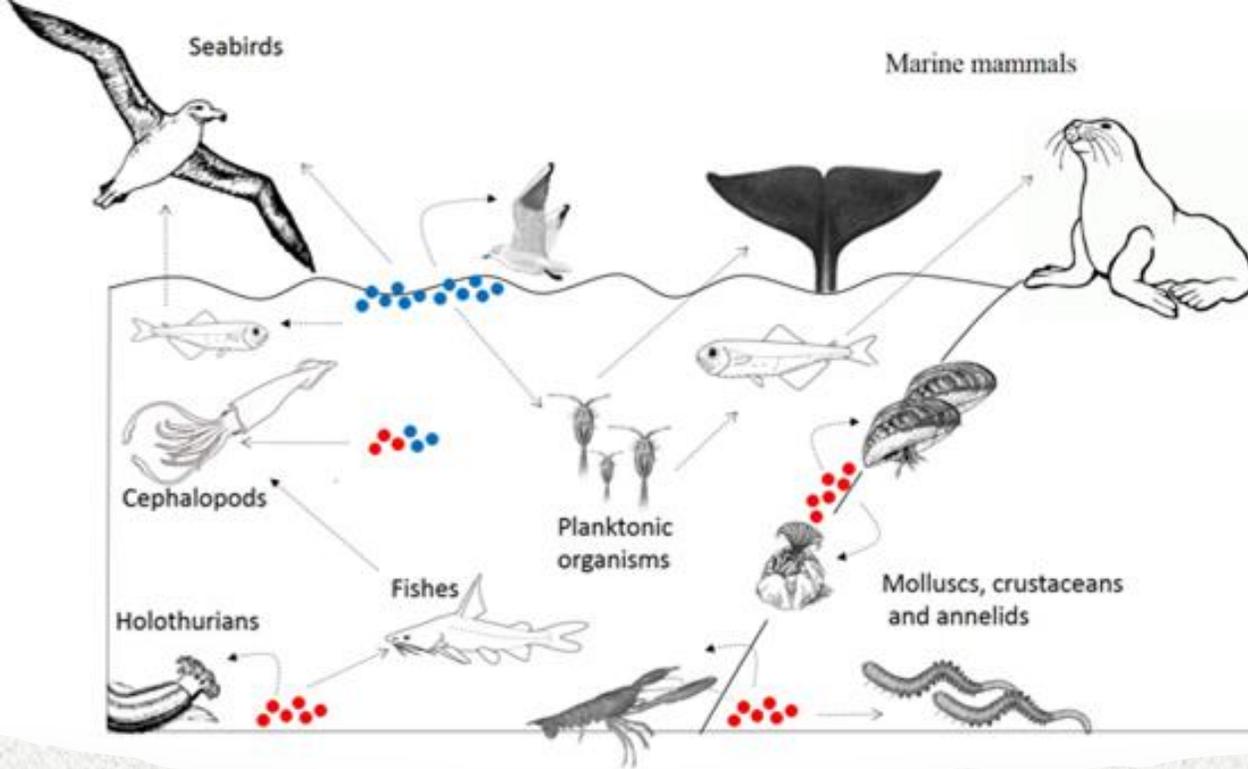


Effetti sugli animali e l'uomo

Il materiale plastico può adsorbire altri contaminanti ambientali, come i metalli, i farmaci, i PCP, etc.

Conseguentemente, le MPs possono causare malattie come il cancro e malformazioni negli animali e nell'uomo, alterata attività riproduttiva, e immunocompromissione.

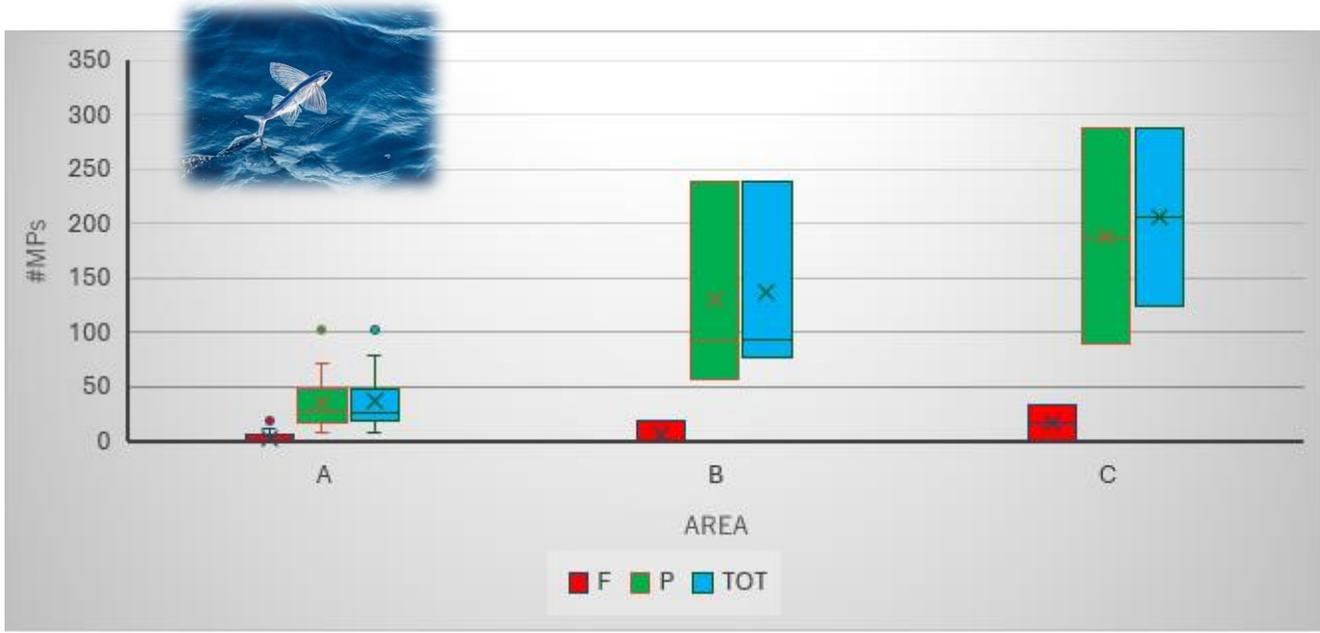




<https://ftp.sccwrp.org/pub/download/DOCUMENTS/Microplastics/Health>

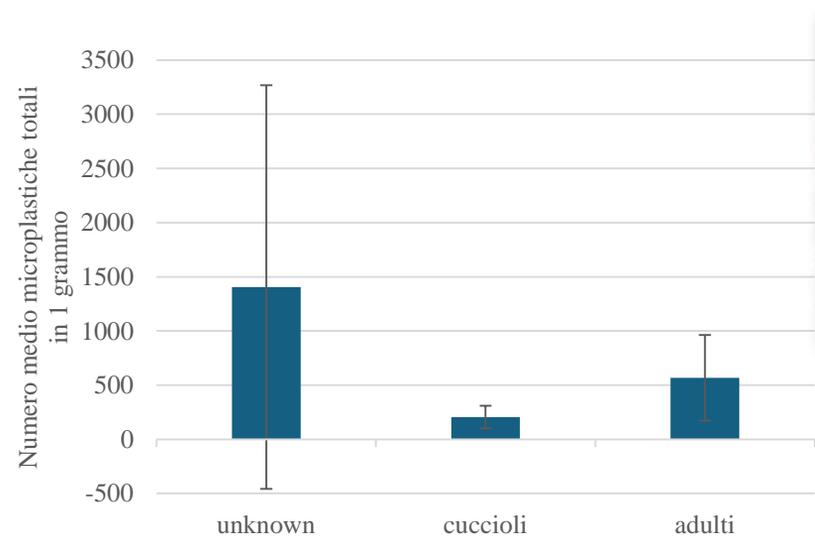
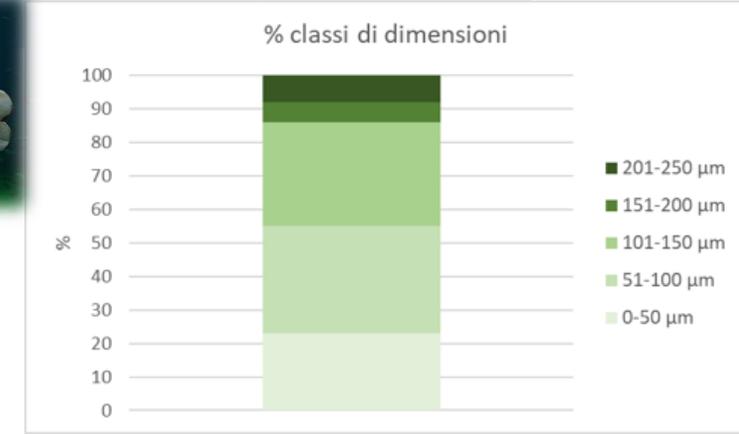
Environmental Advances
 Volume 17, October 2024, 100579
 Addressing the microplastic crisis: A
 multifaceted approach to removal and
 regulation
 Sina Matavos-Aramyan

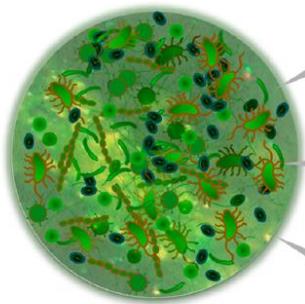
- Importante fonte di POPs, polipropilene, polietilene, FTALATI ed INTERFERENTI ENDOCRINI



Media MP in 100 mL

Media MP totali	Media Particelle totali	Media Fibre totali





Algae

Diatoms (*Amphora*, *Achnanthes*, *Cocconeis*, *Cymbella*, *Grammatophora*, *Haslea*, *Licmophora*), Coccoliths (*Calcidiscus*, *Emiliania*, *Gephyrocapsa*, *Umbellosphaera*, *Umbilicosphaera*, *Coccolithus*, *Calciosolenia*), Microalgae, Cyanobacteria...

Fungus

Lecanoromycetes, Chytridiomycota, Cryptomycota, Ascomycota (Yeast *Papiliotrema laurentii*) *Zalerion maritimum*...

Bacteria

Proteobacteria (*Pseudomonas montelii*, *Pseudomonas mendocina*, *Pseudomonas syringae*, *Arcobacter*, *Acinetobacter*, *Nocardiaceae*, *Vibrio*), Bacteroidetes, Firmicutes,

Plasticsphere

Plasticsphere

- Microambiente con una particolare capacità di adsorbire i contaminanti (aumentata)

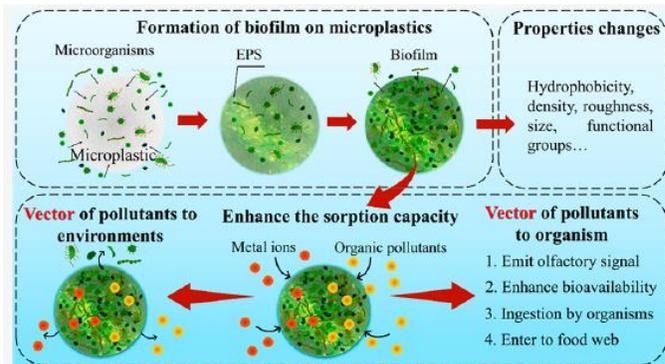
690 specie contribuiscono alla formazione del biofilm

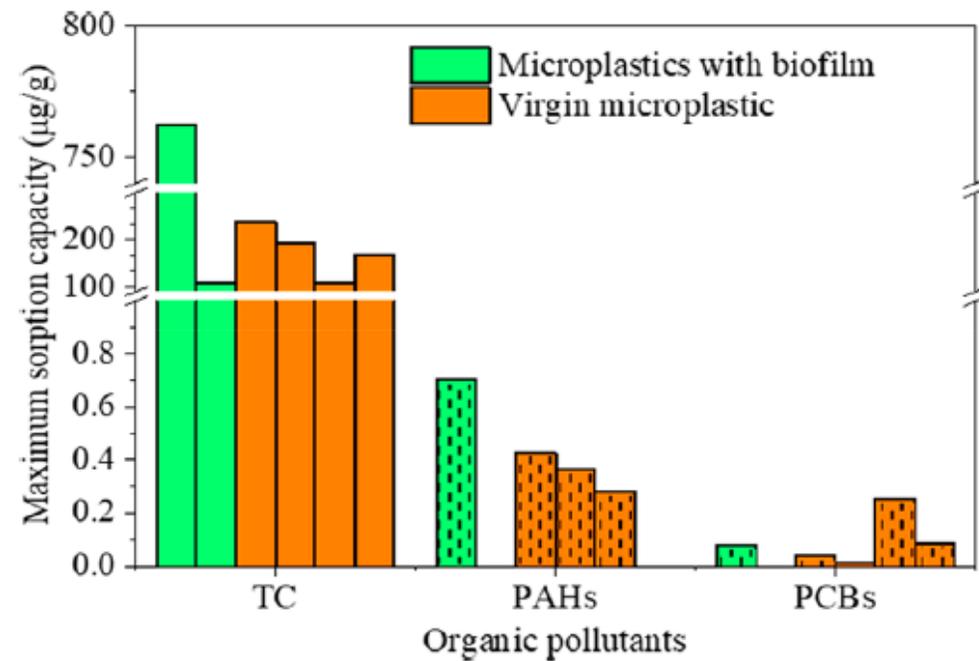
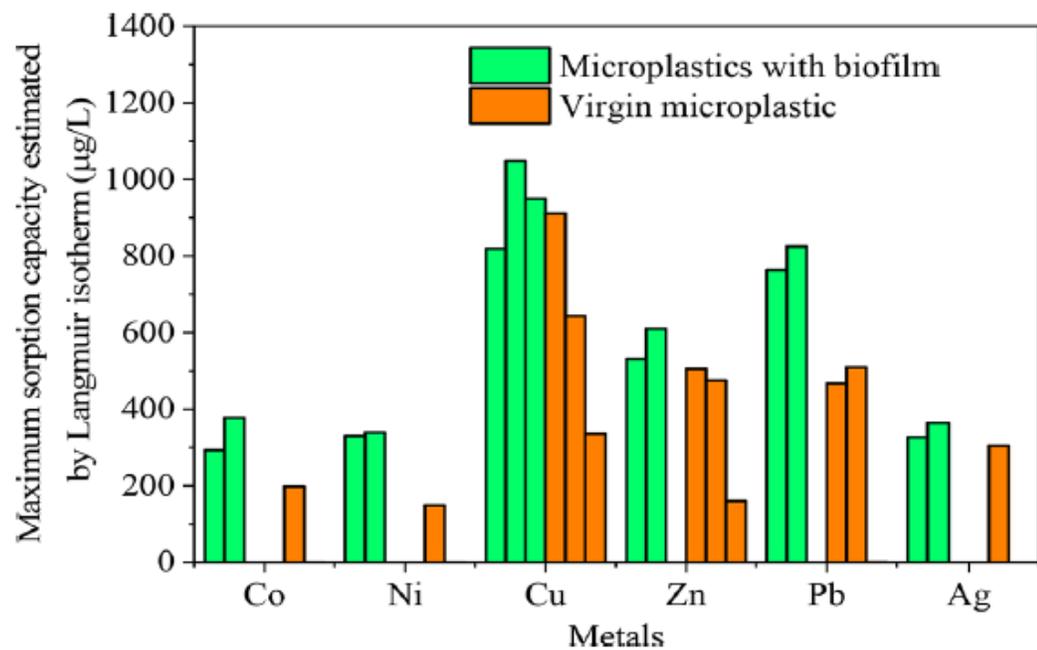
Biofilm-Developed Microplastics As Vectors of Pollutants in Aquatic Environments

Jianlong Wang,* Xuan Guo, and Jianming Xue*

Cite This: *Environ. Sci. Technol.* 2021, 55, 12780–12790

Read Online





An underwater scene with a teal background. Two large sea turtles are swimming. The water is filled with many small, colorful confetti pieces in shades of purple, pink, blue, and white. The text "GRAZIE PER L'ATTENZIONE" is centered in a white, serif font.

GRAZIE PER L'ATTENZIONE