Workshop on Microplastic Pollution in the Aquatic Environment

Tuesday, 12th December 2023

10:00-13:00 - room 001

University of Geneva
Bvd Carl-Vogt 66

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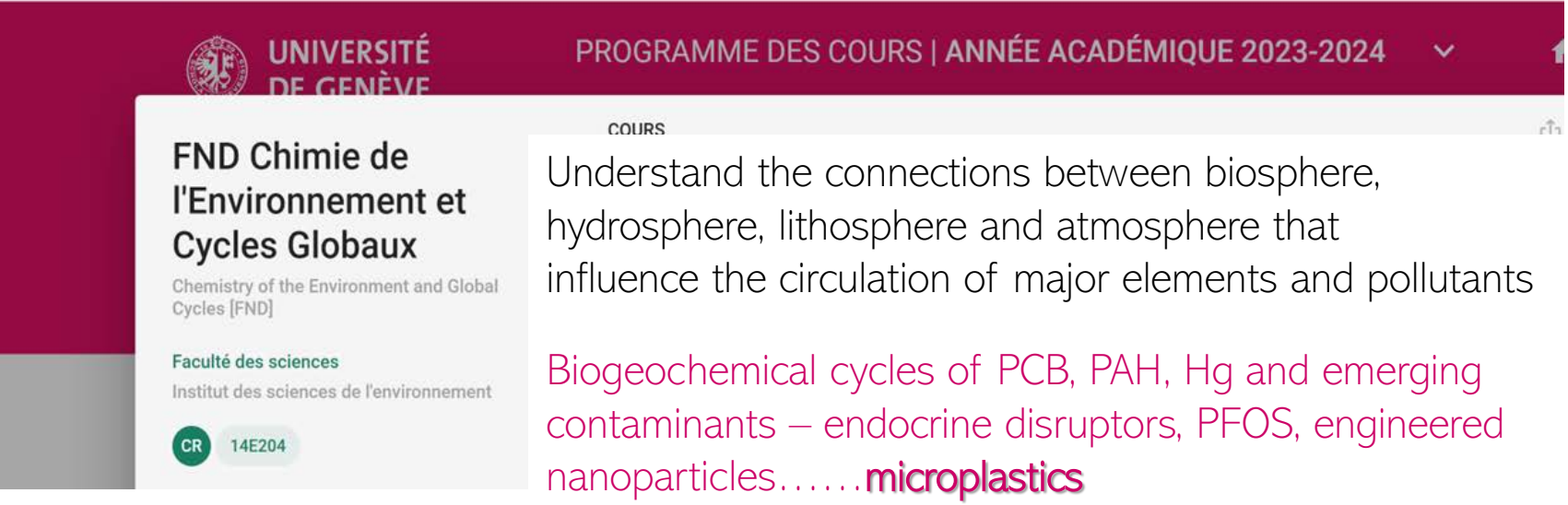
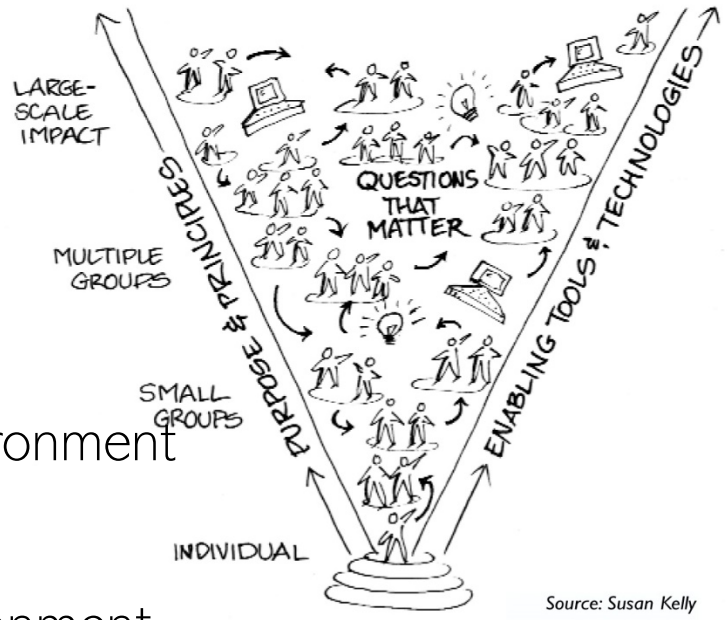


Understand the connections between biosphere, hydrosphere, lithosphere and atmosphere that influence the circulation of major elements and pollutants

Biogeochemical cycles of PCB, PAH, Hg and emerging contaminants – endocrine disruptors, PFOS, engineered nanoparticles……**microplastics**

https://flexjob.fr/le-world-cafe-outil-facilitation/

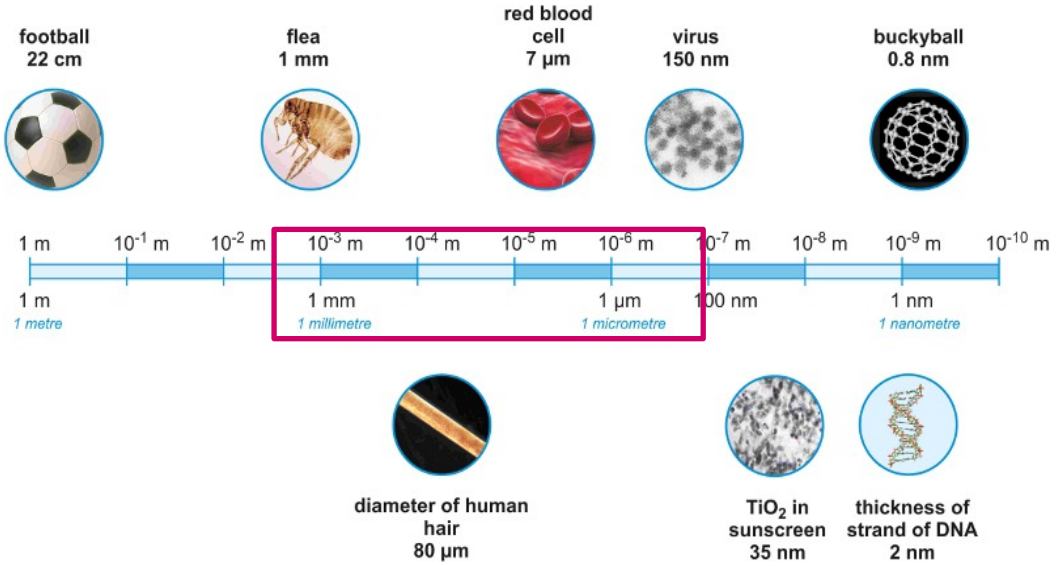
Learning objectives



- What is microplastics
- Where plastic/ microplastics in the environment come from and how they get there
- What is the fate of plastics in the environment
- What is the up-to-date scientific advancements concerning the possible effects and risks by microplastics to the aquatic life
- How this knowledge can support global policy and governance
- What can be done to mitigate plastics pollutions at the individual and societal level

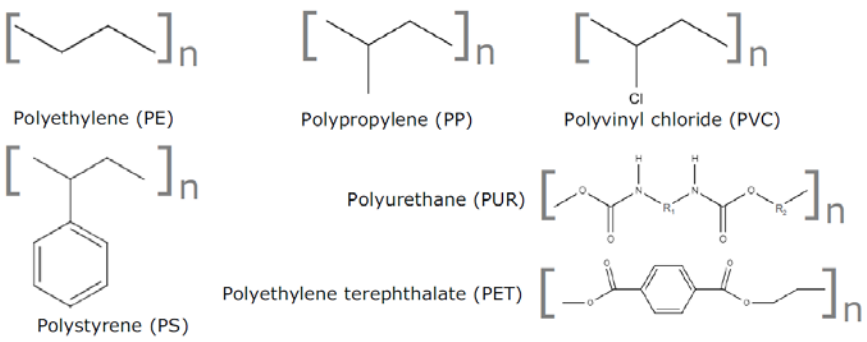
Microplastics

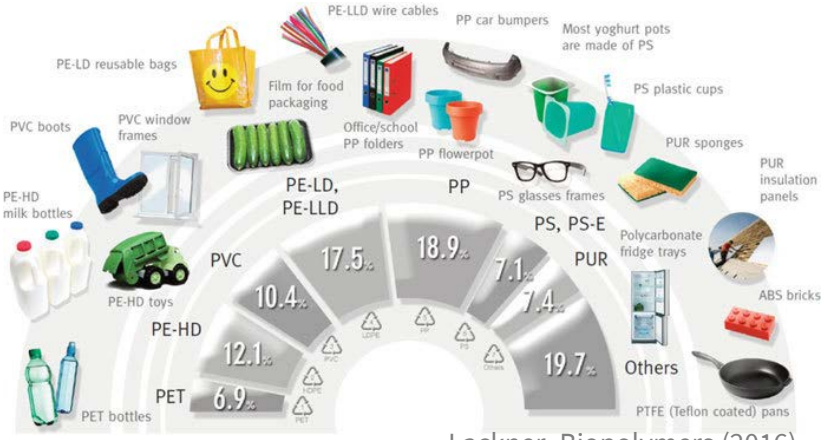
Size : 100nm - 5mm (ECHA, 2020)



- Highly diverse
  - in polymer composition
  - in size
  - in density

Example of plastics polymers



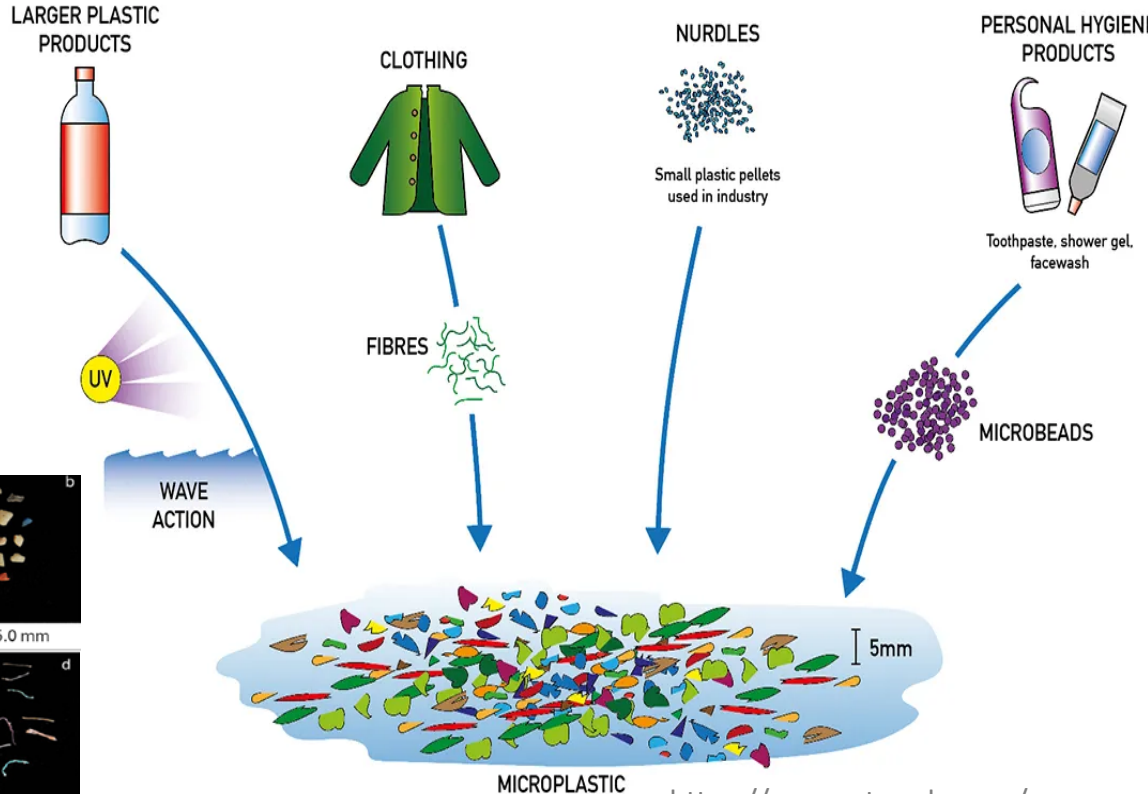


Lackner, Biopolymers (2016)

Where microplastics come from?

Secondary microplastics

Primary microplastics



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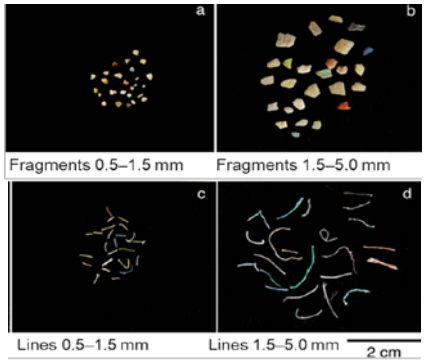
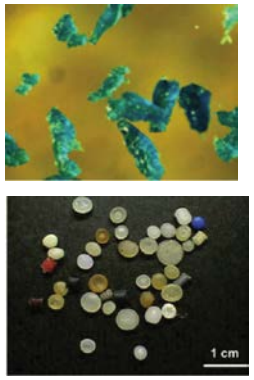
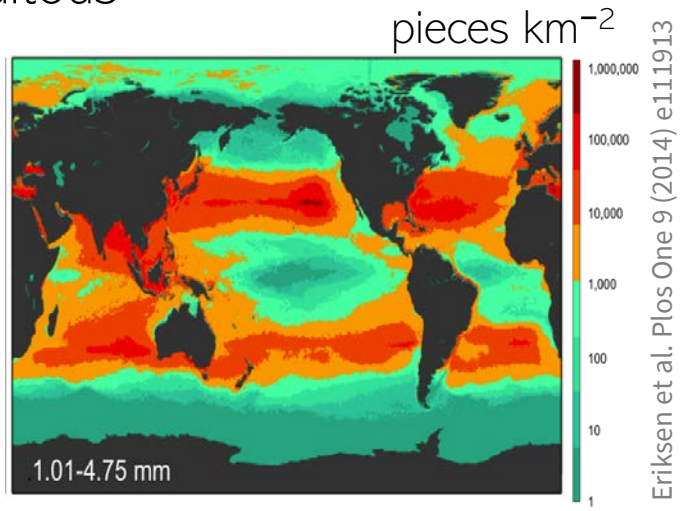


Kooi et al. Scientific Reports 6 (2016) 338826

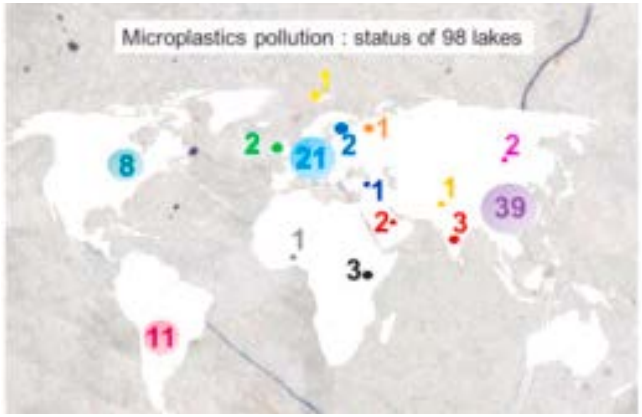


Where are microplastics found?

- MPs pollution is widespread and ubiquitous



hotspots of microplastic accumulation



Dusaucy et al. Environmental pollution 284 (2021) 117075

MP counts in lake water ranged from 10 900 to 2 090 000 MP/km^2

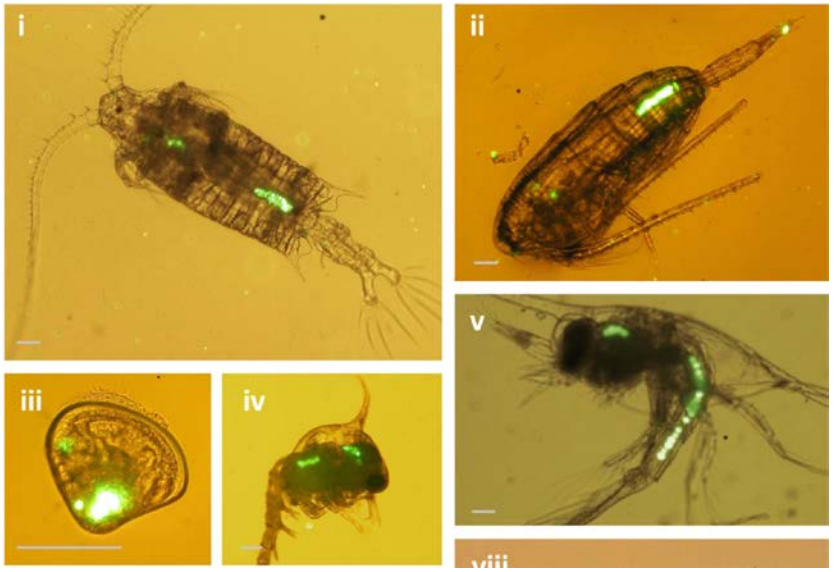
- Increase of plastic leak into the aquatic environment

  UNEP estimations 19-23 M tons plastics leak every year to the aquatic environment

Are microplastics taken up by marine biota?

1. **MPs are ingested by aquatic organisms**

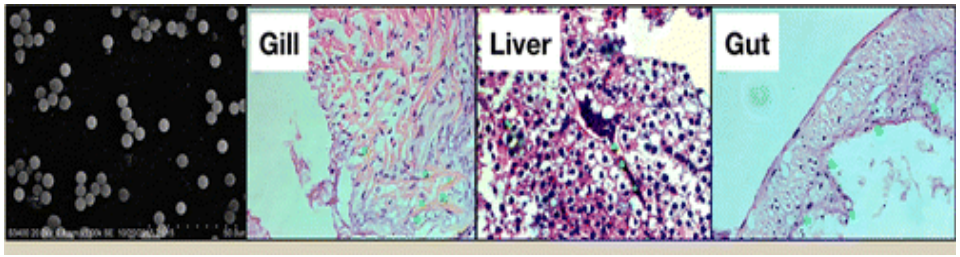
   Microplastics have similar size to phytoplankton and can be ingested by filter feeding or zooplankton; as well as excreted

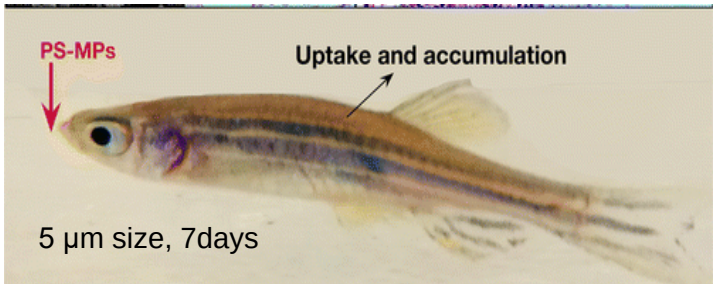


Cole et al. , Environ. Sci. Technol. 47 (2013) 6646

2. **Ingested MPs are transported into food webs**

3. **MPs contaminate different organs**

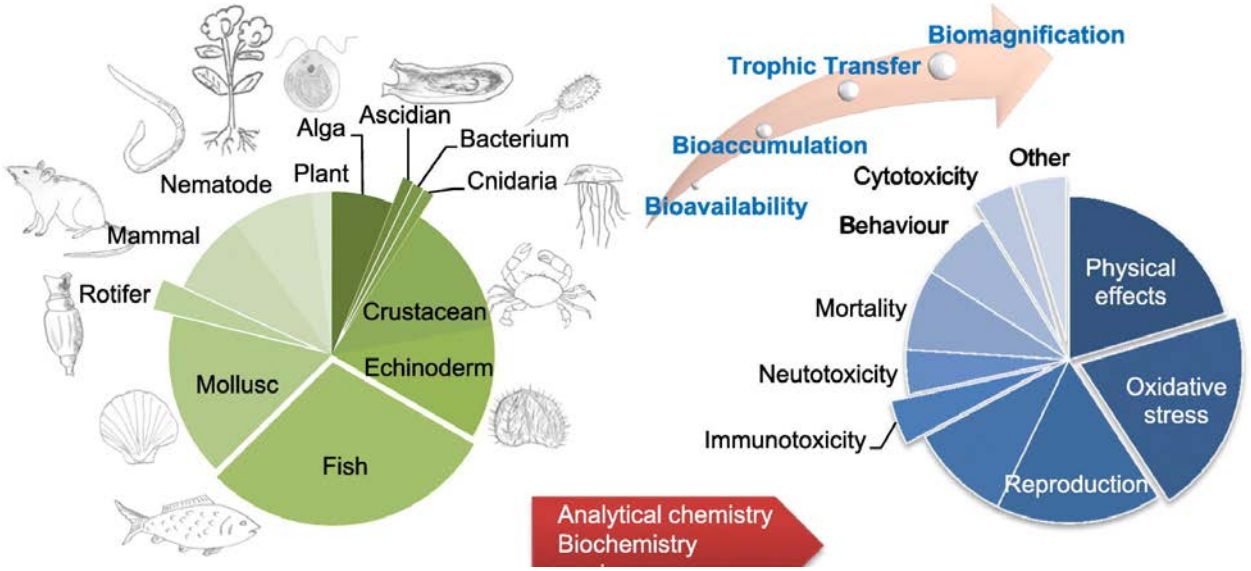




Lu et al. Environ. Sci. Technol. 50 (2016), 50, 4054

Are microplastics harmful for aquatic life?

Plethora of possible effects induced upon MPs exposure



Thomas et al. Sci. Total Env.. 780 (2021) 146534

Physical effect of microparticles

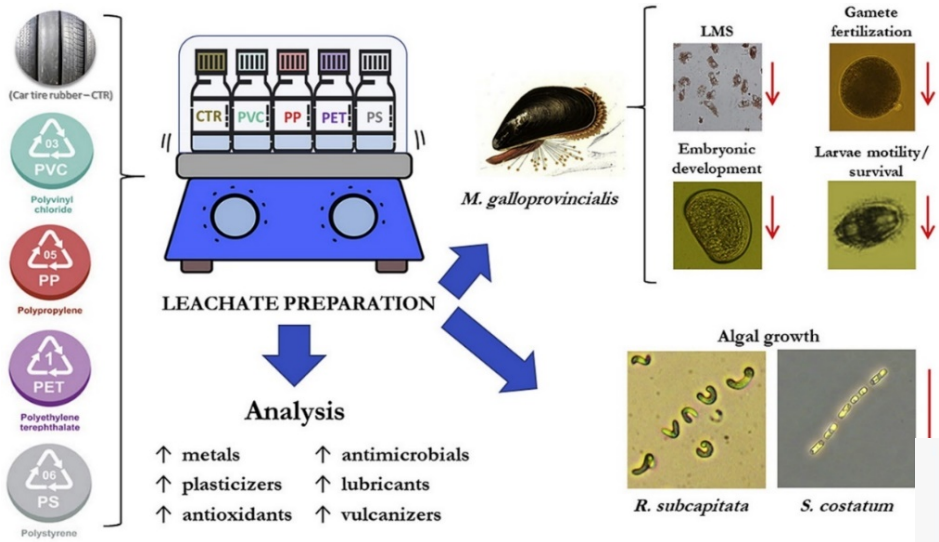
inhibition of food assimilation and/or decreased nutritional value of food, physical stress or damage

Chemical effects as MPs act as "platforms for chemical cocktails"

effects related with the additives, adsorbed hydrophobic contaminants or toxic metals, pathogens forming biofilms on the particles

Are microplastics harmful for aquatic life?

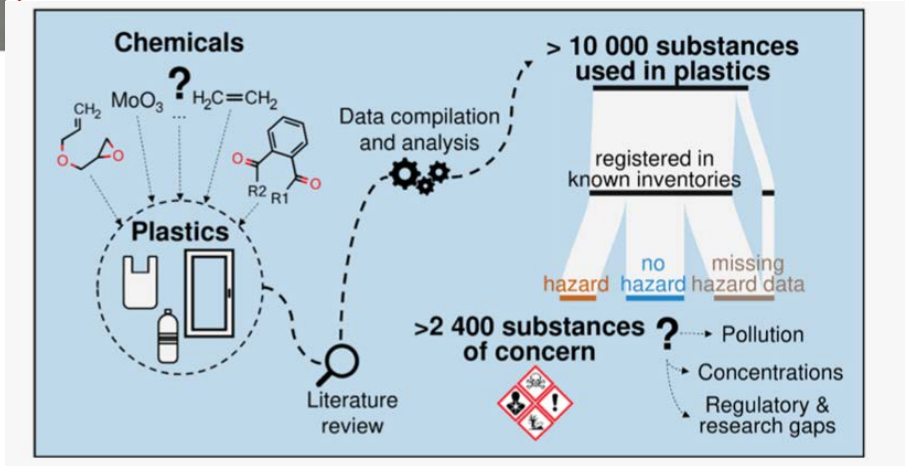
Leaching of chemicals from microplastics



Capolupo et al, Wat res., 169 (2020) 115270

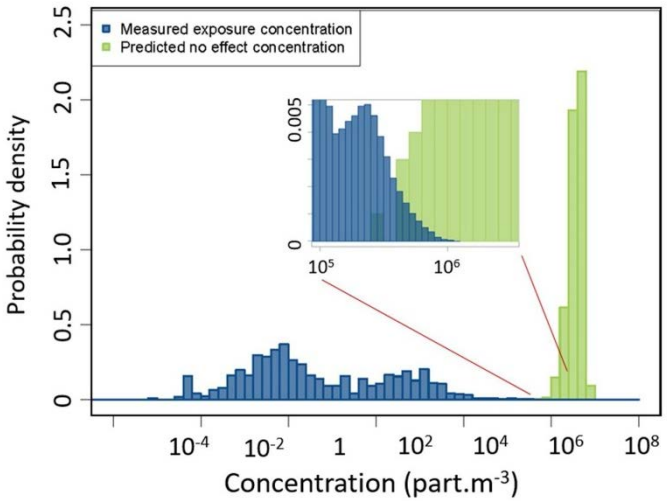
- "Platforms for chemical cocktails" the additives, adsorbed hydrophobic contaminants or toxic metals, pathogens

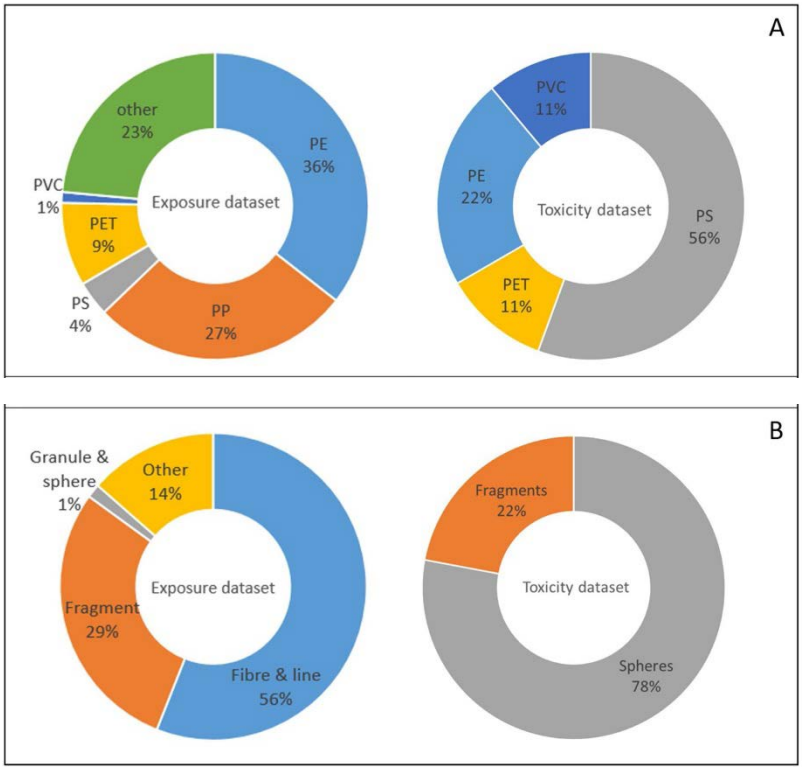
- Polymer-specific mixtures with effect to aquatic biota



Wiesinger et al. Environ.Sci.Technol. 55 (2021) 9339

Do MPs represent risk for aquatic life?





Risks of MPs towards marine organisms are unlikely, although they cannot be excluded since parts of the MEC and PNEC distributions overlap

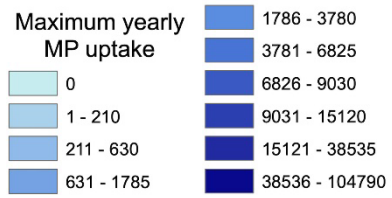
Adam et al Aquatic Toxicology, 230, 2021, 105689

Many critical uncertainties regarding their complex toxicological profiles still remain, and overall much remains poorly understood

Are MPs transfered from seafood to humans?

Seafood - one of the two major uptake routes identified for human exposure

maximum annual consumption of 55,000 particles



Danopoulos et al. Env Health Pers. 128. 2020.
Wendee. Env Health Pers. 128. 2021

Are MPs hazardous for human health?

The impacts of microplastics on health is as yet unknown

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Full length article

Discovery and quantification of plastic particle pollution in human blood

80%

Heather A. Leslie [a], Martin J.M. van Velzen [a], Sicco H. Brandsma [a], A. Dick Vethaak [a,b], Juan J. Garcia-Vallejo [c], Marja H. Lamoree [a,*]

[a] Dept. of Environment and Health, Faculty of Science, Vrije Universiteit Amsterdam, De Boelelaan 1108, 1081 HZ Amsterdam, the Netherlands
[b] Deltares, Delft, the Netherlands
[c] Cancer Center Amsterdam and Amsterdam Infection and Immunity, Amsterdam University Medical Center (VUmc location), De Boelelaan 1108, 1081 HZ Amsterdam, the Netherlands

- 50% - samples contained PET plastic, which is commonly used in drinks bottles,
- 30% - polystyrene, used for packaging food and other products.
- 25% - polyethylene, from which plastic carrier bags are made

World Café

- The World Cafe is a method, which makes use of an informal cafe setting so that participants can explore an issue by discussing it in small table groups.
- Discussion is held in multiple rounds, with the cafe ambiance intended to allow for more relaxed and open conversations to take place.
- Allow the students to engage with experts from different sectors while at the same time encouraging a dialogue between academia and the professional world

https://flexjob.fr/le-world-cafe-outil-facilitation/

Guest Experts

Monica Patry
Léa Jacquat

Mr. Tomasz Blasiak, Group Purchasing Leader at Coats Footwear

Mr. Andrea Cararo, Programme Management Officer at UN Environment, Science and Technical Assistance Branch, Basel Rotterdam Stockholm Conventions

Ms. Lynn Sorrentino, Programme Officer at International Union for Conservation of Nature, Ocean Plastic Pollution, Plastics Treaty IUCN Centre for Conservation Action

Mr. Alexis Pochelon, Project Manager at L'Association pour la Sauvegarde du Léman

Ms. Andrea Zbinden, Federal Office for the Environment FOEN

Discussion topics

1. Vehicles tires and microplastic pollution

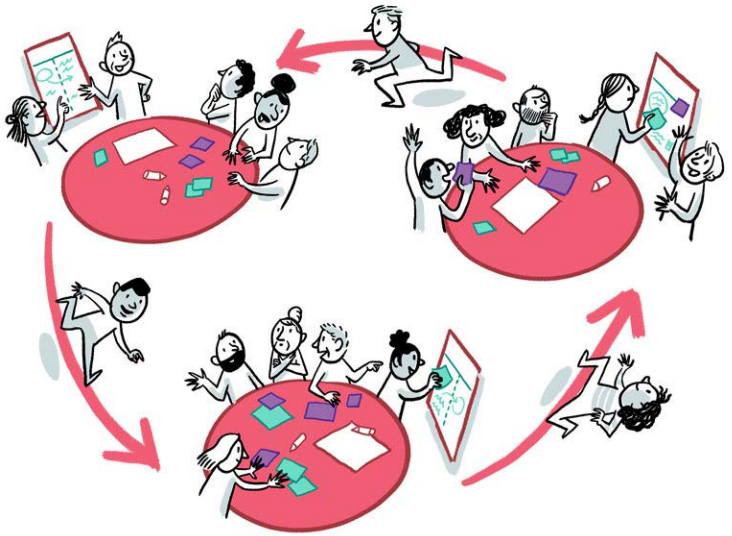
2. Packaging and microplastic pollution

3. Synthetic textile and microplastic pollution

4. Personal care and cosmetics and microplastic pollution

Setting and programme

Setting: 4 tables with one expert at each table; 4 groups of 10 participants



https://manageduc.fr/contenu/world-cafe

Programme:

10:00 – 10:15	Welcome coffee outside the classroom
10:15 – 10:25	Welcome and overall explanation of the workshop
10:25 – 10:50	Group discussion (25 minutes at each table, of which 5 for wrap-up)
10:50 – 11:15	Group discussion (25 minutes at each table, of which 5 for wrap-up)
11:15 – 11:40	Group discussion (25 minutes at each table, of which 5 for wrap-up
11:40 – 11:55	Break
11:55 – 12:20	Group discussion (25 minutes at each table, of which 5 for wrap-up)
12:20 – 12:55	**Wrap-up (each group has 5 minutes to present) NO ppt.**
12:55 – 13:00	Closing

start wrap-up

move to the next table