

Microplastics in sewer sediments of the Parisian combined sewer network



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Concept

Combined sewer networks convey a mixture of domestic wastewater and stormwater to wastewater treatment plants (WWTPs) for purification

Combined sewer overflows (CSOs) are discharges from combined sewer networks to surrounding water bodies without treatment during intense wet weather events

Sewer sediments are wet deposits of particulate contaminants inside sewer network

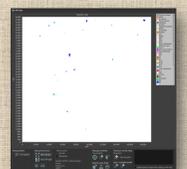
Context

Microplastics (MPs) are present in our households, therefore in wastewater. Their occurrence and fate in WWTPs has been investigated in the last decades^[1,2], while it was not the case of (combined) sewer networks. The accumulation of MPs in sewer sediments and its contribution to amount of plastics entering the environment along with CSOs are however unknown. This study aims to provide a first idea about MPs content inside sewer sediments, thereby increase the knowledge on MPs occurrence and fate in the sewer network – WWTP continuum and their pathways in urban waters before entering the environment.

Materials and Methods



H₂O₂ 30% 24h 45°C



Freeze drying

Sieving at 5mm

Digestion I

Density separation

Digestion II

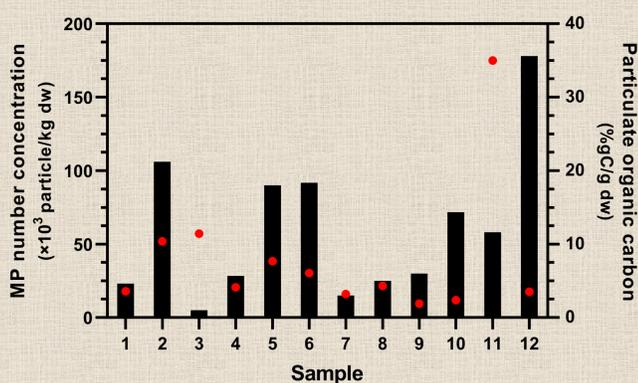
μ-FTIR mapping

siMPle software

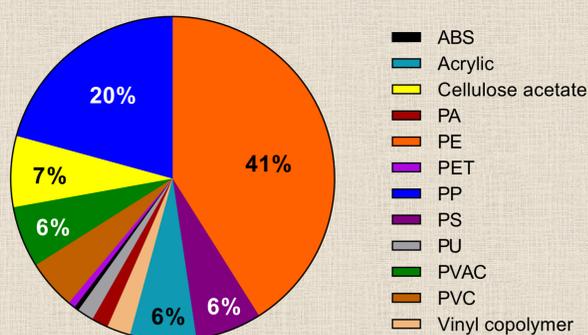
*Particulate organic carbon was measured in all samples

Results

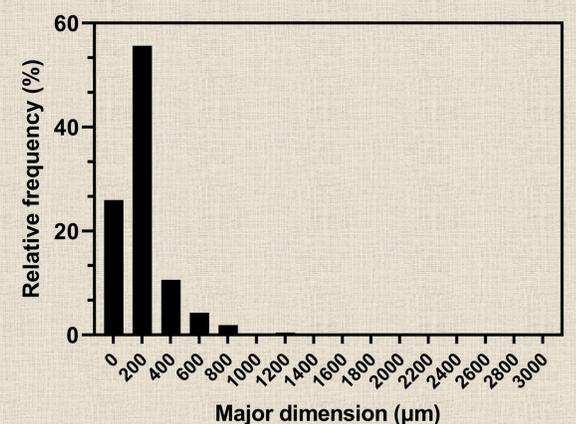
Microplastic contamination



Polymer composition



Size distribution



Highlights

- MPs are detected in all sewer sediment samples
- No clear relation between MP contamination and particulate organic carbon content
- PE, PP, PS and Cellulose acetate are most common
- Majority of MPs < 500μm

Outlook

- Monitor MPs content in sewer sediment
- Assess amount of MPs discharged along with CSOs

[1] Talvitie, J., Mikola, A., Setälä, O., Heinonen, M., & Koistinen, A. (2017). How well is microlitter purified from wastewater?—A detailed study on the stepwise removal of microlitter in a tertiary level wastewater treatment plant. *Water research*, 109, 164-172.
 [2] Ziajahromi, S., Neale, P. A., Rintoul, L., & Leusch, F. D. (2017). Wastewater treatment plants as a pathway for microplastics: development of a new approach to sample wastewater-based microplastics. *Water research*, 112, 93-99.

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