

# Micro-plastics and organophosphate ester additives in sediments and benthic organisms from the Loire Estuary (France)

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## Résumé

Micro-plastics (MPs) and organophosphate ester (OPE) flame retardants and plasticizers are both emerging threats to the marine environment, presenting multiple sources in the environment and being widely distributed in seas and oceans of the planet. Marine sediments are thought to be a sink for both OPEs and MPs. Therefore, determining their environmental occurrence in sediments becomes crucial to better understand their current stocks, the exposure of benthic organisms, and possible impacts on the global functioning of marine ecosystems. The Loire is the longest river in France representing an important freshwater discharge to the North-East Atlantic Ocean. Its estuary is considered as an ecosystem of high ecological value as well as an ocean/land interface for sea trade and associated industrial activities. Two sampling campaigns conducted in 2021-2022 allowed the collection of surface sediments and the deposit feeder clam *Scrobicularia plana* (SP) in four study areas subjected to different anthropogenic pressures. A large set of OPEs were quantified by isotopic dilution LC-MS/MS after thorough clean-up and MP abundance was determined after matrix digestion and polymer isolation and the fragments were characterized by  $\mu$ -FTIR. Our results confirm the overall presence of both MPs and most abundant chlorinated and non-chlorinated OPEs in sediments from the study area. The OPE concentrations in sediment and SP and geographical distributions are discussed with regards to MP abundances. A first estimation of the field-derived biota-sediment accumulation factors (BSAFs) of OPEs will be also presented. These results emphasize the need to further explore the sources and fate of this class of compounds ubiquitous in the marine environment.

**Mots clés** : Plastic additives, Degradation metabolites, Bioaccumulation, Coastal pollution

## Thème(s) :

- 1/ Sources, Niveaux de contamination, Modélisation
- 3/ Impacts des plastiques et risques sur les organismes et les écosystèmes