PLASTOX: Direct and Indirect Ecotoxicological Impacts of Microplastics on Marine Organisms

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PLASTOX is one of four consortia under the JPI Oceans Pilot Action "Ecological Aspects of Microplastics" and consists of 15 partners from 11 Member States. The project will investigate the ingestion, food web transfer, and ecotoxicological impact of microplastics (MPs), together with persistent organic pollutants (POPs), metals and plastic additive chemicals, on key European marine species and ecosystems. It will also study the temporal dynamics of MP colonization by microbial communities and the influence of microbial biofilms on ingestion rates and POP toxicity. The influence of MP physicochemical properties (size, shape, surface area, and composition) on these processes will be evaluated. To study ecological effects of MPs, laboratory tests and mesocosm studies will be combined with field-based observations and manipulative field experiments at stations representing a wide range of European marine environments (Mediterranean, Adriatic, North, and Baltic Seas, and the Atlantic). To bridge the current gap between laboratory assessment using commercially available feedstock MPs and the additive/pollutant-loaded MPs that dominate the marine environment, macrosized plastic litter collected from the marine environment will be milled into MPs.

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PLASTOX: Direct and indirect ecotoxicological impacts of microplastics on marine organisms

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Background and aims

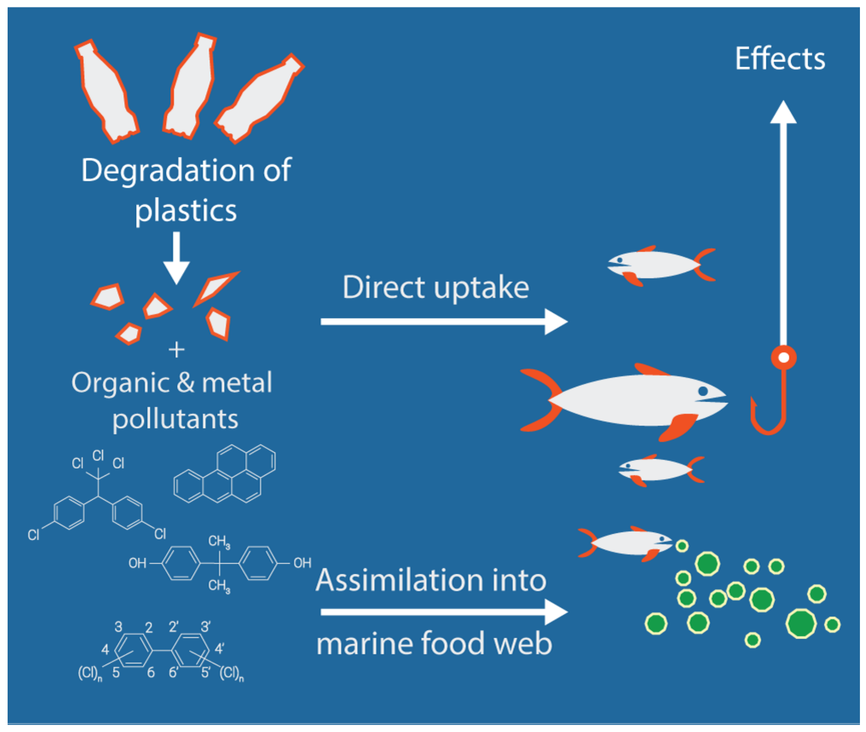
PLASTOX will investigate the ingestion, foodweb transfer, and ecotoxicological impact of microplastics (MPs), together with persistent organic pollutants (POPs), metals and plastic additive chemicals, on key European species and ecosystems.

It will also study:

- Influence of MP physicochemical properties (size, shape, surface area and composition) on these processes.
- Temporal dynamics of MP colonisation by microbial communities
- Influence of microbial biofilms on ingestion rates and POP toxicity.
- Ecological effects of MPs

Laboratory tests and mesocosm studies will be combined with field-based observations and manipulative field experiments at stations representing a wide range of European marine environments (Mediterranean, Adriatic, North, and Baltic Seas and the Atlantic).

PLASTOX will bridge the current gap between laboratory assessment using commercially available feedstock MPs and the additive-loaded and degrading MPs which dominate the marine environment.



Plastic debris collected from the marine environment will be milled into MPs, providing a common reference material for partners.

Approaches

Adsorption and desorption behaviour

Will be investigated using a range of common POP and metal contaminants, identifying which physicochemical properties are most influential.

Uptake through ingestion and other routes

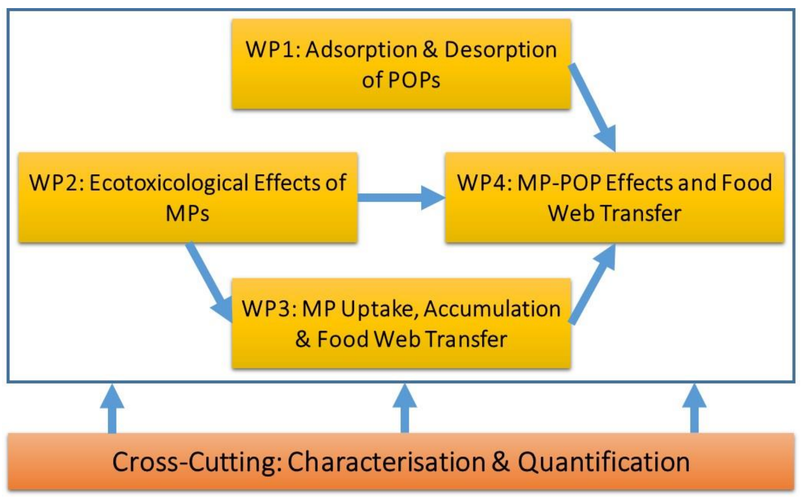
Will be investigated and attempts made to quantify MP accumulation in marine organism tissues using state of the art analytical approaches.

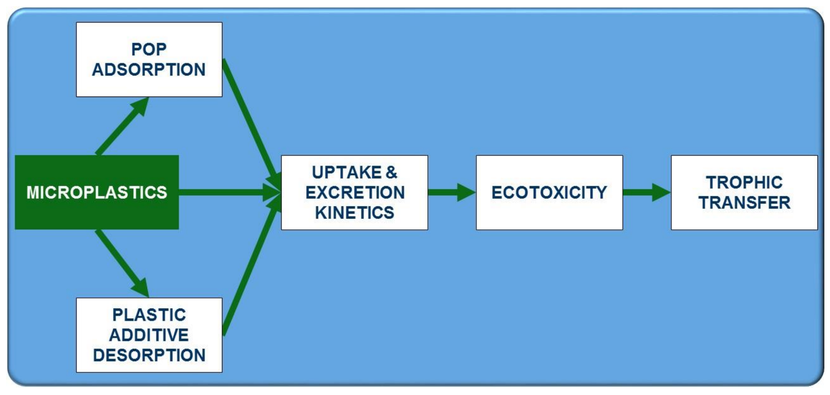
Acute and sublethal ecotoxicological effects

Will be assessed on marine organisms from phyto- and zooplankton to (shell)fish and seabirds, representative of the full range of economically important marine living resources in the EU.

Food web transfer

PLASTOX will culminate in a series of experiments bringing together the knowledge generated about MPs and POPs/metals to study their combined fate and effects in marine food webs.





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