Microplastic ingestion by zebrafish (Danio rerio): an experimental approach

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Abstract

Microplastic (MP) pollution in the environment is a well-recorded and growing problem. Despite many ecosystems and animals becoming contaminated with MP we know little about how MP enters animal's guts and tissues. Is it a passive process with MP being accidentally introduced? Or do animals actively (but mistakenly) ingest MP?

Here we expose the Zebrafish (*Danio rerio*) to microplastics (MP) of different densities, morphologies and sizes, to determine whether they are prone to ingest MP and if the polymer characteristics have any influence on its uptake. Moreover, this study aims to determine whether there are biases to which type of MP the fish ingest, whether MP with different characteristics accumulate in different parts of the animal and whether this is passive or is active. Preliminary results reveal that fish exposed to equal concentrations of Polyethylene Terephthalate (PET) and Polypropylene (PP) preferentially present with PET in the gastrointestinal tract and PP in gill tissue. This supports the idea that different polymers accumulate in different parts of the fish anatomy. The number of MP ingested also varies depending on the MP size.

Future work will investigate, with a wider set of experiments, whether other MP characteristics as colour and shape could influence MP ingestion, as well as whether there is a difference in uptake when polymers (PET and PP) are presented mixed together or separately.

Our data will aid fisheries in their understanding of the link between fish feeding behaviour and potential contamination of fish by MP.

Keywords: Microplastic, Ingestion, Zebrafish

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