



Refined analysis of microplastics in endemic fish species from Lake Victoria using μ -FTIR and pyrolysis GC-MS

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Abstract Pyrolysis–gas chromatography–mass spectrometry (Pyr-GC-MS) has evolved into one of the most powerful methods for microplastics (MPs) analysis. However, analytical challenges are still encountered whenever Pyr-GC-MS is applied to matrices with high organic matter, protein and lipid contents. In this study, a workflow integrating stereomicroscopy, micro-Fourier transform infrared (μ -FTIR) spectroscopy and Pyr-GC-MS was extended to analyse MPs in three endemic fish species (*Protopterus aethiopicus*,

Rastrineobola argentea and *Synodontis victoriae*) from Lake Victoria. Stereomicroscopic analysis only detected MPs in the gastrointestinal tracts of *P. aethiopicus* and *S. victoriae*, with the highest mean particle numbers being 16.0 ± 7.8 and 14.7 ± 6.7 items/fish taxon, respectively. No MPs were found in whole samples of *R. argentea*. The microparticles were mostly blue and brown 0.3–1.9-mm fragments and filaments, which μ -FTIR analysis confirmed to be composed of nylon 66, nylon 6/66, nylon 6/10, nylon 11, polyethylene and polypropylene. Retention time locking and post-column backflush considerably reduced the cycle time and increased stability of the Pyr-GC-MS method. Nylon 66 (243 $\mu\text{g/g}$ in *S. victoriae*), nylon 6

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