Towards Streamlined Environmental Persistence Assays for Trace Organic Contaminants: Preliminary Findings from High-Throughput Biodegradation Testing

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The 2022 European Commission framework entitled “Safe and Sustainable by Design chemicals and materials” emphasizes the need for early assessment of the hazardous properties of chemicals during their design. However, evaluating the environmental persistence of the large number of candidate molecules generated through the design process requires innovative methods that are high-throughput, automatable, and time-efficient. This poster presents preliminary findings on the adaptation of standard large-volume biodegradation tests into a small-volume 96-well plate format suitable for automation. We carried out comparative biodegradation tests in activated sludge at multiple scales using a test set of 30 chemicals, mainly agrochemicals, selected due to their reproducible degradation behaviour in activated sludge experiments.[1] Tests were conducted over a 48-hour timeframe using reverse phase liquid chromatography (LC) tandem high-resolution mass spectrometry (HRMS). We discuss the variability observed across different experimental scales and evaluate the replicability of results within the 96-well plate setup.

(1) Fenner, K.; Screpanti, C.; Renold, P.; Rouchdi, M.; Vogler, B.; Rich, S. Comparison of Small Molecule Biotransformation Half-Lives between Activated Sludge and Soil: Opportunities for Read-Across? *Environ. Sci. Technol.* **2020**, *54* (6), 3148–3158. https://doi.org/10.1021/acs.est.9b05104.