Proposals for NORMAN Joint Programme of Activities 2025

Title	**How to integrate persistence testing and assessment within the NORMAN network?**
Type of activity	Exploration and planning in 2025.
Leader	Philipp Mayer (Technical University of Denmark)
Topic / activities	***Background / Justification for the proposed activity:*** Persistence is becoming increasingly important within the environmental risk assessments and management of chemicals. Persistent chemicals (1) can remain in the environment for extended periods of times, (2) can be prone to long range transport, (3) have time to distribute and contaminate other media including groundwater if mobile and (4) are notoriously difficult to clean-up. Persistence is thus one of the most important criteria to prioritize organic pollutants as well as identify hazardous chemicals of emerging concern. Biodegradation and persistence are traditionally assessed in standardized single substance tests. However, several NORMAN partners are conducting biodegradation and persistence research where multiple chemicals are tested simultaneously. Birch et al conducted for instance biodegradation tests of around 50 hydrocarbons covering 5 and 9 orders of magnitude in K_{ow} and K_{aw}, and determined persistence based on peak area ratios between biotic and abiotic test systems (Birch et al, 2018). This research has since been extended to a much wider range of chemicals (Birch et al, 2023) and very recently also to complex discharge samples (Møller, 2024). Several NORMAN partners are testing multiple more polar chemicals and then using chemical specific analysis to determine biodegradation kinetics, persistence and even transformation products. We foresee significant new research opportunities in the cross-field between persistence research and non-targeted analysis. ***Description of the proposed activity and expected outcomes for 2025:*** The aim for 2025 are to start discussions so that we at the next general assembly can present concrete ideas and plans for the next years. Within 2025 we envisage: - Formation of a small core-group by March 2025, and then exploring interest within NORMAN partners to join, participate & contribute (larger interest group) by June 2025. - Discussion items within prioritizing groups: How can this new type of persistence testing inform the activities of the NORMAN prioritization group? How can the NORMAN prioritization group help during the substance selection within upcoming biodegradation testing and research of chemicals? - Discussion items within non-target screening group: Are some of the strong analytical groups within NORMAN interested to engage in coupling persistence testing of complex mixtures with suspect and non-targeted screening? Can the new type of persistence testing help prioritizing the suspect screening and non-targeted screening within NORMAN, by focusing on the most persistent chemicals in the chromatograms. - Discussions on how to integrate future persistence research activities within the current NORMAN structure, facilitate collaboration between NORMAN partners and support future collaborative proposals. ***Added value / Link with other NORMAN activities and / or other projects*** This NORMAN activity is envisaged to be complementary to the activities of the SETAC persistence group. The strongest representation in the SETAC persistence group is industry and contract research institutes serving industry. We envisage that this NORMAN group will have a much stronger representation from Universities, National Research Institutes and National Environmental Protection Agencies. The SETAC persistence group has a focus on the testing of chemicals, whereas the NORMAN Network has a focus on prioritizing, monitoring and assessing pollutants of emerging concern. NORMAN WG 1: Persistence as a criterion for prioritisation NORMAN CWG NTS: Persistence as a criterion for NTS. Combining biodegradation experiments with NTS for finding the most persistent chemicals in complex mixtures. (NORMAN WG2 on bioassays: Possibly linking mixture toxicity and biodegradation) (NORMAN WG5 on water reuse: Identifying and avoiding persistent chemicals in water for reuse)
Participants	Technical University of Denmark, Umweltbundesamt, EI, NKUA, EAWAG, INERIS & other interested members
Proposed in-kind contribution	>50 000 Euro (for 2025) In kind contribution within ongoing biodegradation research that might be of relevance to NORMAN plus our time for networking and planning.
Contribution needed from NORMAN Association[1]	0 Euro (for 2025) networking and planning activities can be covered within ongoing projects. (6.500 Euro contribution to travel, meetings and NTS analytics for front runner feasibility studies, if free budget is available)

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[1] Please, provide here a transparent justification of the requested resources and of the in-kind contribution, thereby distinguishing between the costs associated with "person-months" for the organisation, the "travelling costs" for invited speakers and the costs for the logistics (e.g. meals, room rental etc.)

Birch, H., Hammershøj, R., Mayer, P., 2018. Determining biodegradation kinetics of hydrocarbons at low concentrations: covering 5 and 9 orders of magnitude of kow and kaw. Environ. Sci. Technol. 52 (4), 2143–2151. https://pubs.acs.org/doi/10.1021/acs.est.7b05624

Birch, H., Hammershøj, R., Møller, M.T., Mayer, P., 2023. Technical guidance on biodegradation testing of difficult substances and mixtures in surface water. MethodsX 10. https://doi.org/10.1016/j.mex.2023.102138

Møller, M.T., Birch, H., Sjøholm, K.K., Skjolding, L.M., Xie, H., Papazian, S., Mayer, P., 2024. Determining marine biodegradation kinetics of chemicals discharged from offshore oil Platforms–Whole mixture testing at high dilutions increases environmental relevance. Environ. Sci. Technol. 58 (39), 17454–17463. https://pubs.acs.org/doi/full/10.1021/acs.est.4c05692