



PATROLS

Advanced Tools for NanoSafety Testing

Increasing regulatory reliability of ecotoxicity tests of nanomaterials

Background

For pre- and post-market registration of chemicals by European and international regulations, e.g. REACH, ecotoxicity data are required. For these data to be acceptable for regulatory decision-making, the test results must be both relevant and reliable for classification, labeling, and safety assessment purposes.

To ensure regulatory reliability, standardized tests and test guidelines are available from ISO and OECD. In PATROLS, we have had a strong focus on optimizing the regulatory reliability of the algal toxicity test which is one of the three mandatory ecotoxicity tests used by industry for regulatory purposes.

Challenge

When nanomaterials are tested, the regulatory reliability of the standard algal test is often compromised. A major reason for this is that stable and uniform conditions are difficult to maintain during testing. This causes a large variation in results obtained from algal tests affecting their reliability and reproducibility and hence their regulatory acceptance.

Features of LEVITATT

- Compact size
- Homogenous light field
- Ease of increasing/decreasing light intensity
- Temperature easily controlled
- Constant CO₂ influx enable pH stability during testing
- Sufficient sample volume for destructive sampling & biomass determination
- Testing of volatile compounds
- Easy to implement in regular laboratories





PATROLS

Advanced Tools for NanoSafety Testing

Increasing regulatory reliability of ecotoxicity tests of nanomaterials

Solution

To address these challenges, we have developed a testing platform, LEVITATT (LED Vertical Illumination Table for Algal Toxicity Tests). The main benefit of the LEVITATT is that it provides flexibility in testing options, while ensuring uniform and reproducible testing conditions.

Performance

LEVITATT has a compact design enabling transferability to a wide range of laboratories due to the limited resource and equipment required to implement the test setup. The test setup complies with ISO standard and OECD guidelines for algal toxicity testing and has been successfully validated inter-laboratory testing with reference toxicants as well as applied for testing of a range of reference nanomaterials - TiO_2 , ZnO , CeO_2 and BaSO_4 .

The LEVITATT testing setup was named as an “Excellent Innovation”
by the European Innovation Radar

Significance

The LEVITATT testing platform developed by PATROLS assist in ensuring high regulatory reliability of algal tests for classification, labeling and safety assessment of nanomaterials. The LEVITATT testing setup was named as an “Excellent Innovation” by the European Innovation Radar in 2020.



Documentation:

Skjolding, L.M., Kruse, S., Sørensen, S.N., Hjorth, R., Baun, A. (2020) A Small-Scale Setup for Algal Toxicity Testing of Nanomaterials and Other Difficult Substances. *J.Vis.Exp.*, e61209, doi:10.3791/61209.

www.patrols-H2020.eu



This project has received €12.7M in funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 760813

