

Practical considerations to optimize aquatic testing of particulate material, with focus on nanomaterials

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Table S1 Definitions of degradability (adapted from OECD TG 301 (OECD, 1992) and ECHA Chapter R.7b/R.11 (ECHA, 2017b) (ECHA, 2017a))

Degradation type	Expanded definitions
Primary biodegradation	The structural change (transformation) of a chemical substance by microorganisms resulting in the loss of the original chemical identity. Primary biodegradation is the initial step in the biodegradation of chemicals and requires analytical chemistry to properly quantify.
Inherent biodegradation	Chemicals that show any indication of (primary or ultimate) biodegradation. Chemicals with a biodegradation of at least 20 % of theoretical maximum are regarded as inherently primary biodegradable. Chemicals can be inherently degradable but not readily biodegradable and inherent biodegradability is not automatically an indication of non-persistence. Usually, higher-tier testing (e.g., OECD 307/308/309) is required for chemicals that show only inherent primary biodegradability.
Ultimate biodegradation (mineralisation)	The level of degradation achieved when the test compound is completely utilised by micro-organisms resulting in the production of carbon dioxide, water, mineral salts, and new biomass. Substances can be ultimately biodegradable in the environment but not readily biodegradable. Biodegradation >70 % of theoretical maximum is regarded as evidence of potential inherent ultimate biodegradability.
Ready biodegradation	An arbitrary classification of chemicals which have passed certain specified screening tests for (ready) biodegradability; these tests are so stringent that it is assumed that such compounds will rapidly and completely biodegrade in aquatic environments under aerobic conditions. Readily biodegradable substances are deemed to be non-persistent.

Table S2 Standard OECD and ISO test guidelines considered in Figure 2

	OECD guideline	ISO guideline
Methods for Particle Size and Particle size Distribution	OECD 110	ISO 13317 ISO 3319:2021 ISO 3320:2020 ISO 1501:2019
Solubility	OECD 105	
Dispersion stability in water	OECD 318	ISO 3097:2013
Particle shape	OECD 110 Draft OECD "PARTICLE SIZE AND PARTICLE SIZE DISTRIBUTION OF NANOMATERIALS " 2021	
Particle surface chemistry		ISO 13014:2012 ISO 14187:2011 ISO 20579:2018
Biodegradation	OECD 301 OECD 302 OECD 303 OECD 304 OECD 306 OECD 309 OECD 310 OECD 311 OECD 314	ISO 14851:2019 ISO 14852:2021 ISO 17556:2019 ISO 18830:2016 ISO 22404:2019
Bioaccumulation	OECD 305	
Ecotoxicology	All OECD 200 series aquatic and aquatic-sediment system tests	

ECHA. (2017a). Guidance on Information Requirements and Chemical Safety Assessment Chapter R.7b: Endpoint specific guidance Version 4.0 Retrieved 08 April 2022 from https://echa.europa.eu/documents/10162/13632/information_requirements_r7b_en.pdf/1a551efc-bd6a-4d1f-b719-16e0d3a01919

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