NanoFASE

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POLICY AND EXPLOITATION FACTSHEETS

FACTSHEET 8

BIOTA UPTAKE OF NANOMATERIALS FOR ENVIRONMENTAL RISK ASSESSMENT

Nanomaterials (NMs) are thermodynamically unstable, and assumptions underlying the use of simple accumulation factors or Biotic Ligand Models are generally not met. Physiologically based pharmacokinetic models are a better fit for modelling accumulation patterns of nanomaterials in organisms, although the quantification of the proper rate constant parameters may be challenging. Biota uptake testing of nanomaterials can build on decades of regulatory testing of 'conventional' chemicals, although specific conditions and additional requirements may apply.

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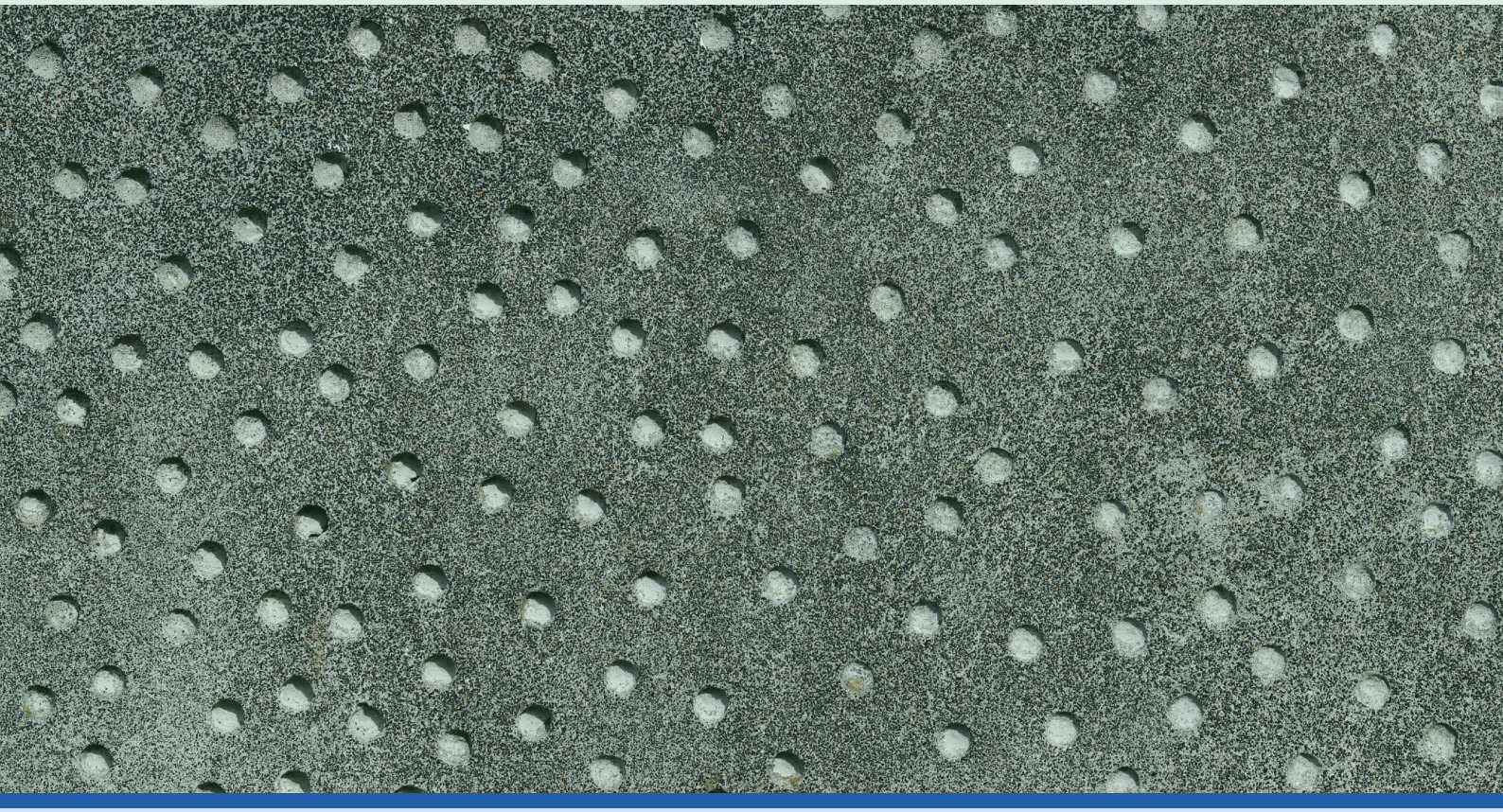
RECOMMENDATIONS

Since nanomaterials may age after their release in the environment, associated potential for accumulation and hazards may also evolve over time. The form of the nanomaterial to be tested is therefore of prime importance, being essential not just to test the pristine nanomaterials but also to test relevant forms that result in the environment.

This may increase the complexity of regulatory testing considerably; therefore, it is essential that tests are as simple as possible and only as complex as needed. A recently reported tiered approach (based on OECD 305 guidelines) meets these requirements, starting with simple *in silico/in vitro* tests and progressing to complex in vivo tests when needed. Analytical techniques to quantify the different relevant forms of NMs in biological matrices are becoming more available in scientific settings but need to be further developed for application in standard test-laboratory facilities (e.g. sp-ICPMS for metal nanomaterials).

In order to test environmentally relevant forms, incubation reactors are needed to facilitate accelerated ageing of nanomaterials under relevant environmental conditions, through which the appropriate forms of nanomaterials can be produced in quantities needed for testing. Future hazard testing should focus on those forms of aged nanomaterials that result from the accelerated ageing. This approach would minimise the need to perform long exposure tests.



RELATED NANOFASE DELIVERABLE REPORTS

D9.3: Report on effects of ageing NMs on in vitro uptake and translocation under relevant gut conditions, including additional parameter sets.

D9.5: Report on modelling the uptake and toxicokinetics of aged NMs in different species under environmental relevant conditions in mesocosms.

All NanoFASE deliverable reports are available at: **http://www.nanofase.eu/documents/reports**