Episode 1

Your Biodegradability Q&A

scanae
Expert lab in biodegradability

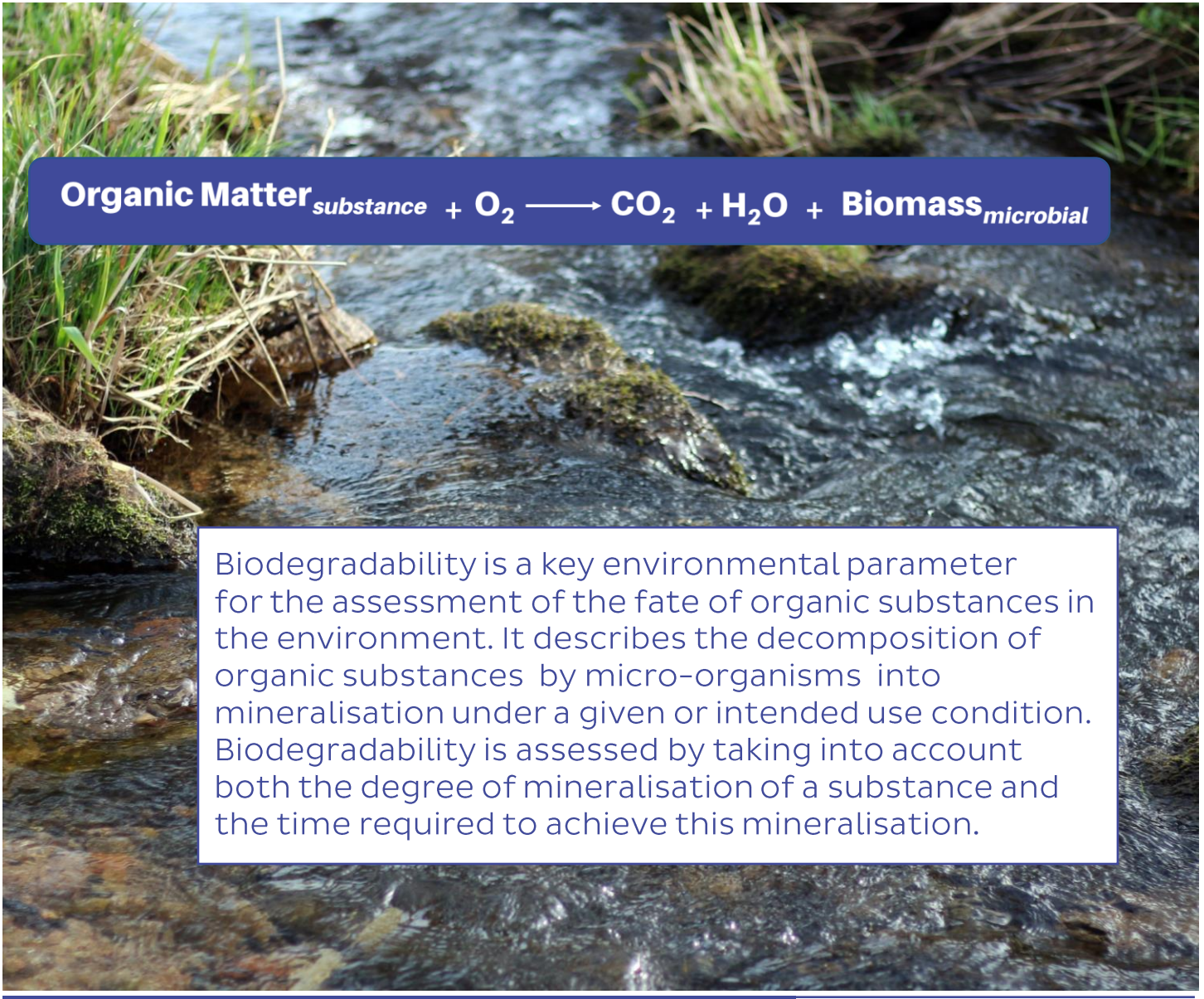
Q&A #1 | November 2022

Are you struggling with biodegradability ? As scientists, Scanae designed this Q&A as a tool to share our knowledge and make biodegradability accessible to all of you. Send your question to participate in this Biodegradability Q&A project.

How to participate ?

Follow us to receive more information on biodegradability.

What is biodegradability ?



$$\text{Organic Matter}_{substance} + O_2 \longrightarrow CO_2 + H_2O + \text{Biomass}_{microbial}$$

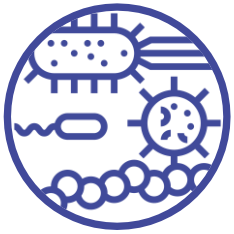
Biodegradability is a key environmental parameter for the assessment of the fate of organic substances in the environment. It describes the decomposition of organic substances by micro-organisms into mineralisation under a given or intended use condition. Biodegradability is assessed by taking into account both the degree of mineralisation of a substance and the time required to achieve this mineralisation.

What are the main steps of biodegradability ?

1. ACCESSIBILITY
The physicochemical characteristics of organic compounds that make them more or less readily accessible to bacteria.

2. (BIO)DEGRADATION
Physicochemical or biological hydrolysis into smaller molecules, into monomers.

Abiotic factors : water, UV, O_2
Biotic factors : extracellular enzymes



3. ASSIMILATION / MINERALISATION
Bacterial assimilation for mineralisation of the organic substance into water, CO_2, and production of bacterial biomass

Choose a method: Ready biodegradability tests ?

These are stringent screening tests, carried out under aerobic conditions. A positive result in a ready biodegradability test may be taken as an indicator of rapid and ultimate degradation in most environments.

End Point : DOC, CO_2, O_2

Substance Conc. : High range in form 2 to 100 mg/l

Standardised test duration : 28d

Inoculum : WWTP effluent
Without prior substance adaptation
At a low range concentration

Choose a method: Inherent biodegradability tests?

OECD 302

These are high degradation tests, in which the rate or extent of aerobic biodegradation is measured.
The low test substance to biomass ratio, and possible prior substance adaptation increase the likelihood of a positive result compared to environmental fate.

Substance : Soluble substance
low range concentration

Inoculum : WWTP effluent
Possible prior substance adaptation
High range concentration

Choose a method: What about simulation tests ?

These tests simulate degradation in a specific environment through the use of indigenous biomass, different media at a specific temperature representative of the particular environment.



The objectives of the simulation tests are either to determine biodegradable rate constant or to identify the transformation products under assays conditions representative of natural environment.

SO WHAT'S NEXT

OECD 301 F

Our first recommended biodegradability test, Why ?

Episode 2 – 2/12/2022

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Expert lab in biodegradability

Want to know more ?

Please contact Nathalie :

nathalie.pautremat@scanae.com
+33 (0)7 63 62 34 34

Scanae
Cap Delta, 1682 rue de la Valsière
34790 GRABELS - FRANCE