
Biodegradable plastics in open environments - Scientific answers and tools for a holistic evaluation

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Abstract

Biodegradable polymers are gaining ground in plastic manufacturing and are considered more sustainable materials for various applications. In cases where plastics are intentionally introduced into the environment, where loss is intrinsic to use, or where there is a high risk of loss, biodegradability can be part of the solution to reduce the accumulation of plastics in nature. For product safety, new materials need to be known in terms of their performance, including their fate and impact on the environment, and policy and legislation are increasingly demanding clear definitions and evidence of this. If ending up in the sea, our rivers, lakes and soils biodegradable plastics are assumed to be less persistent than conventional ones. However, reliable methods and data on the biodegradation of any plastic material in the open environment are not systematically available. We explain a multi-tier test scheme of reliable and environmentally relevant methods that can solve this problem. Results include the evidence of biodegradability, the assessment of biodegradation rates in relevant conditions and environmental impact. The data can then be used for Life Cycle Assessments and Life Cycle Impact Assessments and thus to evaluate any plastic material or product. Based on the SAPEA (Scientific Advice for Policy by European Academics) report we also give an overview on the existing standard test methods and specifications, including which gaps should be filled for a comprehensive evaluation and certification scheme.

Keywords: Biodegradability, Biodegradation rates, screening, simulation, open environment

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