

# **Polymer Biodegradability 2.0: A Holistic View on Polymer Biodegradation in Natural and Engineered Environments**

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## Abstract

Biodegradable polymers are an important part of the solution toolbox to achieve circularity in the plastic economy and overcome negative impacts of a linear plastic economy. Biodegradable polymers need to excel not only on a mechanical performance level in the application to fulfill their function during the use phase but also on a biodegradation performance level after use. The biodegradation performance is tailored to the application and the receiving environment of the polymer product after use, which can be both engineered systems (e.g., compost, anaerobic digestors, wastewater treatment plants) and natural systems (e.g., soils, freshwater, or marine environments).

This presentation addresses key aspects of polymer biodegradability and biodegradation in both natural and engineered systems with the goal to advance a more holistic view on the topic and, thereby, provide guidance for all stakeholders working on developing, testing, and regulating biodegradable polymers.

These aspects include definitions of biodegradability and biodegradation, elucidating polymer- and environmental factors that control the biodegradation process, a discussion of the analytical chemistry of polymer biodegradation, polymer biodegradability testing and certification, as well as a brief overview of research needs. The presentation targets all stakeholder groups from academics to industry and regulators.

Keywords Polymer biodegradation · Biodegradability