

# Bioplastic

## Issues and concerns

"Bioplastic" is a confusing term that can refer to bio-based, biodegradable, and/or compostable plastic.

- **Bio-based plastic** is plastic partly or entirely made from biological feedstocks such as corn or potato starch, but often still contains fossil fuels, and is functionally or even chemically identical to conventional plastic.
- **Biodegradable plastic** is plastic that can, under certain conditions, be broken down by microorganisms like bacteria and fungi into water, carbon dioxide, and naturally occurring minerals. "Biodegradable," therefore, refers to a material's end-of-life behavior, regardless of its component materials, which can include biological material, fossil fuels, or both.
- **Compostable plastic** is a subset of biodegradable plastic that can fully biodegrade under the specific conditions of an industrial composting facility.

\* **Oxo-degradable plastic** is fossil-based and fragments into micro and nano-plastics in presence of UV light or heat; it is [banned in the EU](#).

These detailed but important distinctions cause significant consumer confusion when it comes to the question of how to dispose of bioplastic. Some bio-based plastic can be recycled while others cannot, biodegradable plastic should not be sent to recycling, and compostable plastic should only be composted at certified facilities. In addition to these confusing disposal guidelines, "bioplastic" as a group presents other fundamental problems:

- Bio-based plastic can be just as harmful or even worse than conventional plastic when it comes to energy use, climate change, air pollution, and ecotoxicity. In some cases, [plastic only have to be 20% bio-based to meet certification requirements](#), with fossil fuel-based materials and additives making up the other 80%. Moreover the water, energy, pesticides, and fertilizers used for the typical, commercial farming of biological feedstocks for bio-based plastic make the process [highly resource-intensive](#), and undercut the potential sustainability of bio-based plastic. If bio-based plastic replaced conventional plastic completely, their feedstock crops could demand [as much as 7% of global arable land](#), potentially driving up food costs, and further incentivizing the conversion of forests to agricultural land. Bio-based plastic is [inherently toxic](#), generates toxic byproducts during production, and/or contains toxic additives.
- The widespread use of biodegradable and compostable plastic is not compatible with a low-waste, reuse-based economy. "Bioplastic" items are knowingly sold in places that do not offer industrial/municipal composting despite the fact that they may only degrade at industrial compost sites. They can contaminate recycling systems, [reduce the quality of mixed recyclable materials](#), and contribute to plastic pollution in the environment much like conventional plastic does. Neither compostable nor biodegradable plastic is intended or well-suited for reuse, as they are designed to degrade more readily than conventional plastic.
- Finally, many studies show that biodegradable plastic [fails to fully biodegrade](#) in real world environments, and can remain intact for years before fragmenting into equally persistent microplastics.

## Recommendations

The global plastics treaty must:

- **Focus on plastic reduction and reuse, instead of substituting a plastic single-use item for a bio-based, biodegradable, or compostable one.** Regulatory efforts need to steer policy away from replacing conventional plastic with bioplastic and toward efforts to reduce plastic production, promote reuse, and ban single-use plastic, regardless of material.
- **Provide clear guidance on the use of “bioplastic” in limited circumstances.**
  - In principle, compostable plastic should only be addressed in the context of organic waste diversion; the use of certified compostable [plastic bags as liners for food waste bins](#) can improve organic waste separation and management.
  - Compostable plastic could be an acceptable alternative, with appropriate collection of compostables, during disaster relief operations or for people with disabilities.
  - Bio-based plastic may contribute to moving away from fossil fuels, provided that it is used for reusable and durable products and that the feedstock is actually sustainable.
- **Mandate the development of sustainability criteria on biodegradability and compostability, based on robust assessment and accounting methodologies.** As existing voluntary standards do not provide sufficient environmental safeguards, there needs to be a reliable and accountable certification system for bio-based, biodegradable, and compostable plastic.

## Pitfalls to avoid

- Widespread use of compostable plastic which will risk continued confusion around disposal and cross contamination at recycling facilities.
- Use or development of standards on biodegradability in open environments or in the marine environment, as no plastic should be designed to be thrown into nature to degrade. The efforts to develop environmentally robust testing and verification methods would distract from upstream solutions.

## Further reading

- Kerge, Kristiina. 2020. “What are biodegradable plastics? The need for a clarified terminology.” Let’s Do It Foundation. <https://letsdoitfoundation.org/2020/09/04/what-are-biodegradable-plastics-the-need-for-a-clarified-terminology>
- Rethink Plastic Alliance. 2018. “Why bioplastics won’t solve plastic pollution.” <https://ecostandard.org/wp-content/uploads/Rethink-Plastic-infographic-Bioplastics.pdf>
- Rethink Plastic Alliance. 2021. “Position paper: Response to the roadmap for an EU policy framework for bio-based, biodegradable and compostable plastics.” <https://rethinkplasticalliance.eu/ressource/rpa-position-paper-response-to-the-roadmap-for-an-eu-policy-framework-for-bio-based-biodegradable-and-compostable-plastics>
- Center for International Environmental Law. 2021. “Plastic is Carbon: Unwrapping the “Net Zero” Myth.” <https://www.ciel.org/reports/plastic-is-carbon-unwrapping-the-net-zero-myth>