

BIOPLASTICS

QUICK REFERENCE

“Bioplastics” can refer to a plastic that is designed to be biodegradable/compostable, a plastic that comes from bio-based feedstocks, or both.

Biodegradable/Compostable

PETROLEUM-BASED, COMPOSTABLE BIOPLASTICS

- **Structure:** fossil-based PBAT and PCL
- **Formulation:** New formulation - not made to behave like a traditional plastic
- **End of life:** May be compostable; check for certification. Not recyclable.



BIO-BASED, COMPOSTABLE BIOPLASTICS

- **Structure:** Typically PLA or PHA
- **Formulation:** New formulation - not made to behave like a traditional plastic
- **End of life:** May be compostable; check for certification. Not recyclable.



100% Petroleum-based

20%-100% Renewable inputs

TRADITIONAL PLASTICS

- **Structure:** Made of fossil-based petrochemicals to create PE, PP, PS, and more
- **Formulation:** “Drop-in” formulation - is a traditional plastic
- **End of life:** While all are recyclable, some are not practical to recycle



BIO-BASED, OFTEN RECYCLABLE BIOPLASTICS

- **Structure:** Typically made of bio-based PE or bio-based PET
- **Formulation:** “Drop-in” formulation - behaves like a traditional plastic
- **End of life:** Often recyclable; not compostable or biodegradable



Non-Biodegradable/Compostable

BIOPLASTIC FAQs

- **Do bioplastics solve the plastic waste problem?** Not on their own, but they will likely be part of the solution!
- **Do bioplastics have lower environmental footprints than petro-plastic?** Oftentimes yes, but this depends on many factors of the particular bioplastic in question.
- **What type of bioplastic is best?** It depends on what you’re optimizing for- compostability? Recyclability? Carbon footprint? There’s no short answer.
- **Do biodegradable/compostable bioplastics break down in the environment or in a landfill?** Probably not very well- and most consumers don’t know that!
- **Are bioplastics recyclable?** Some are, some aren’t— recycling non-recyclable bioplastics causes a lot of contamination.

SUSTAINABILITY CONCERNS

- What kind of agricultural methods are used to grow feedstocks for bioplastics? Are those methods sustainable?
- Are we accidentally incentivizing more land use changes to be used for growing more bioplastics? (e.g., was the land previously a forest or used for food production?)
- How do we ensure consumers know they can’t litter these items since they’re often as harmful to wildlife as petro-plastic?
- How do we educate consumers about the differences between composting and recycling so they don’t try to recycle unrecyclable bioplastics?
- Are we concerned about the greenhouse gas impact bioplastics often have if thrown in landfills?
- How can we expand composting access to compostable plastics actually become compost?

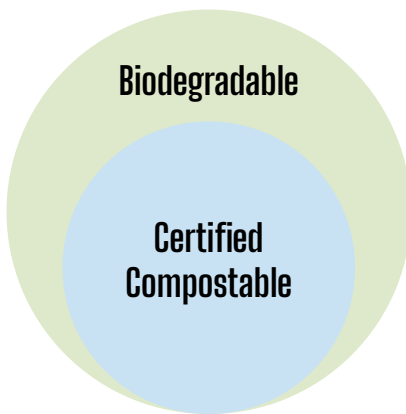
COMPOSTABLES

QUICK REFERENCE

WHAT IS COMPOSTING AND WHY IS IT IMPORTANT?

Composting is the controlled and accelerated breakdown of organic materials, such as kitchen scraps, yard waste, and other biodegradable materials (including some packaging). Just like we can recycle materials like plastic, paper, metal, and glass, composting represents a way to “recycle” organic materials so that it doesn’t go to a landfill, where it releases harmful GHGs.

“BIODEGRADABLE” VS. “COMPOSTABLE”



“Compostable” is a subset of the term “biodegradable.”

“Biodegradable” simply means that the material can be broken down into increasingly smaller pieces over an undefined period. Even plastic, for example, will eventually degrade, but it will leave toxins and microplastics behind.

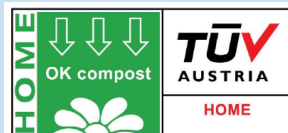
Anything that is compostable is biodegradable, but not everything that is biodegradable is compostable since anything can biodegrade if given enough time. For our purposes, “biodegradable” packaging is not very meaningful. We look for certified compostable packaging.

MOST COMMON COMPOSTABILITY CERTIFICATIONS



BPI – most common in North America

Certifies industrial compostability only



TUV – most common in Europe

Separate certifications for home and industrial compostability



Most Common Test Standards:

ASTM D6400, ASTM D6868, EN 13432

HOME VS. INDUSTRIAL COMPOSTABILITY

HOME OR “BACKYARD”

- Materials break down in home compost environment, usually small piles
- Conditions in home compost more variable than in industrial (less heat, less aeration, variable moisture)
- Home-compostable materials designed to break down more easily than industrially compostable items so they can degrade in these variable environments

INDUSTRIAL OR “COMMERCIAL”

- Materials break down in industrial environments like windows with heavy machinery
- Conditions are engineered to maintain ideal heat, moisture, and aeration
- Industrially compostable materials designed to break down specifically in these special environments; likely will degrade very slowly or not at all if done at home