



Biodegradable plastics

- > *Biodegradable, bio-based and oxo-degradable plastics do not have the same characteristics but are often confused with each other.*
- > *In most cases, biodegradable plastics can only be biologically degraded in specialised plants, in nature they mostly degrade very slowly and incompletely.*
- > *When biodegradable plastics degrade, no useful materials or products are produced which can be used to form humus or as fertilisers.*

Biodegradable, bio-based and oxo-degradable plastics

Biodegradable, bio-based and oxo-degradable plastics are often mistaken and commonly referred to as “bioplastics”. However, they describe different characteristics, which are summarised in the table below. Although oxo-degradable plastics are frequently marketed as biodegradable, they only decompose into microplastic particles, which do not degrade any further.

Where biodegradable plastics are used

Biodegradable plastics are mainly used in Switzerland for single-use articles such as drinking cups, compost bags or agricultural films.

	BIODEGRADABLE	BIO-BASED	OXO-DEGRADABLE
Raw material			
Product			
Recycling			
Synonyms	“Biologically degradable” “Compostable” “Biologically degradable materials”	“From renewable resources”	“Oxo-biodegradable”
Raw materials	Fossil-based resources or biological/organic resources	Organic resources (e.g. sugar cane, palm leaves, sugar beet, maize)	Fossil-based resources or biological/organic resources
Characteristics	Fully degradable by natural micro-organisms under certain conditions (into water, carbon dioxide and biomass)	Made from biomass, therefore from plant-based raw materials	These plastics contain additives and decompose into smaller particles only when heated or in sunlight; they are not fully degraded, but fragmented into microplastics
Comments	Degradability can be certified, but there is no guarantee of complete biodegradability in nature	No guarantee of biodegradability	Microplastics are difficult to degrade

The best disposal route is often incineration

Often, biodegradable plastics can only be recycled within a reasonable period in industrial fermentation or composting plants, since only these plants meet the conditions (e.g. temperature) for full decomposition. However, not all biodegradable plastics are suitable for all types of plant (as shown by the *Implementation tool* of the *Waste Ordinance*), which makes proper disposal difficult.

Operators of composting plants find it difficult to determine whether the plastics contained in the biowaste are suitable for their plant or not. Unsuitable plastics are not fully degraded in the plant and will enter the environment (see *"Plastics in biowaste collections"* factsheet). Complete degradation is very slow in the environment (see

"Soil" factsheet). Non-degradable and other conventional plastics therefore have to be removed from the biowaste by complex means; if this proves impossible, the biowaste has to be incinerated.

According to life cycle assessment (LCA) studies¹, incineration or fermentation (followed by incineration) may be more appropriate than composting even with biodegradable plastics. The manufacturing process is critical for the LCA, since the ecological benefit due to composting is usually insignificant. This is because the degradation of biodegradable plastics does normally not contribute to the formation of humus or the addition of nutrients and therefore does not add value. The incineration of these plastics can be used to recover energy.

Possible measures

- **Increase research into improving biodegradability** in different types of plant and under normal local environmental conditions.
- **Improve the ability** of consumers and plant staff **to distinguish between biodegradable and non-biodegradable plastics**.
- **Consumers:** unless explicitly permitted by the local composting or fermentation plant, biodegradable plastics should not be disposed of with biowaste, but in residential waste. The same applies to domestic and garden composting.
- **Never dispose of plastics in the environment.** This includes biodegradable plastics.

¹ Carbotech 2013: Ökobilanz Entsorgung BAW (in German)

Further information

- Bioplastics – are they degradable?
(FOEN dossier in German, French and Italian)
- Biogenic waste
(FOEN enforcement aid with abstract in English)
- Round Table on biodegradable materials