



**GUIDE:**

# Bioplastics in Packaging

At Berlin Packaging, sustainability is part of our holistic approach to unpacking our customers' full potential. In this guide, we break down everything you need to know about bioplastics and what makes a package compostable.

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## **External References**

*This information is updated as of May 2023.*



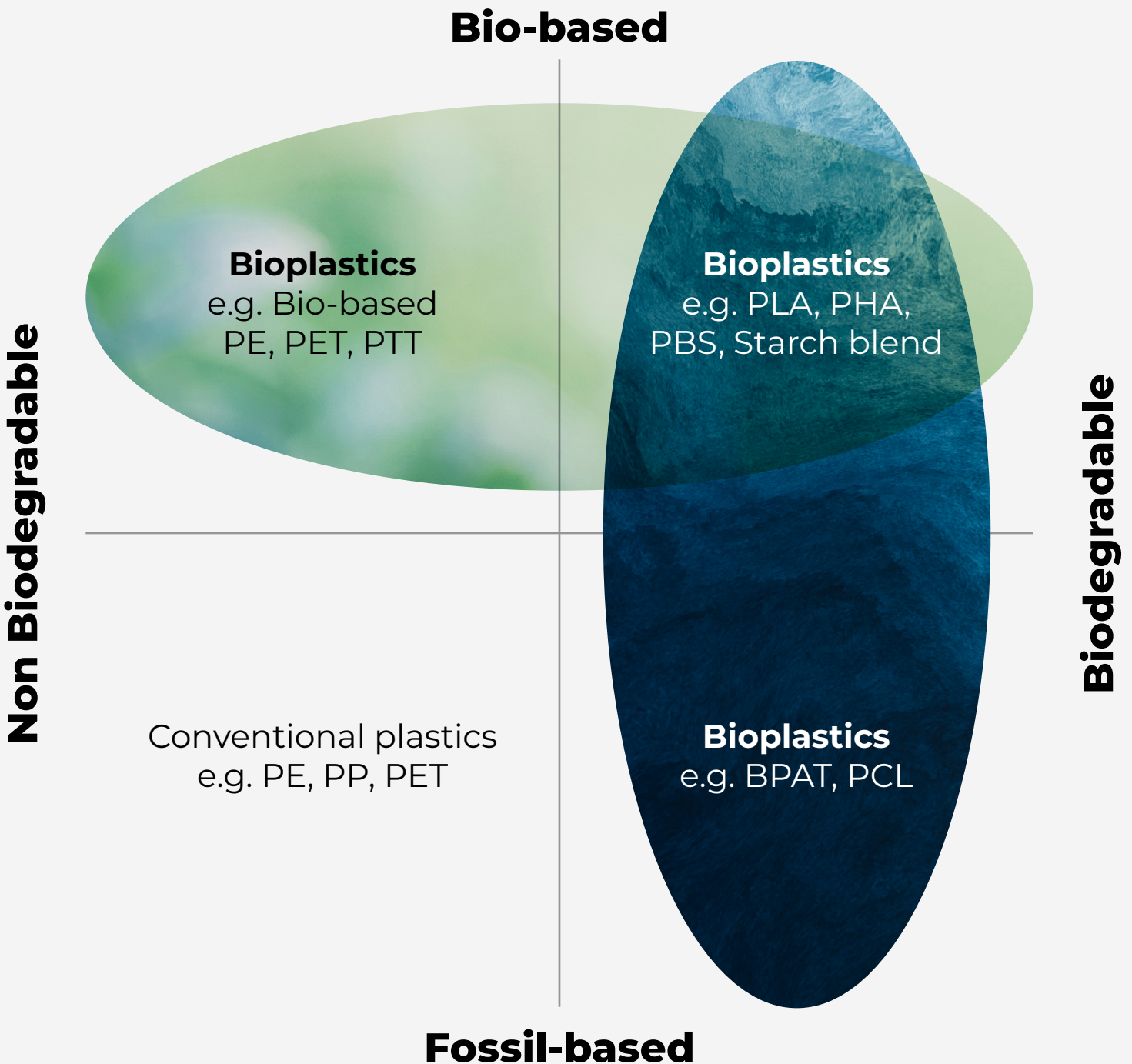
# The Basics

# Defining Bioplastics

Bioplastics is a term that takes into account two main attributes:

1. A plastic's **material source**, which refers to bio-based plastics
2. Its **end-of-life**, which refers to its biodegradability

**As such, bioplastics can be bio-based, biodegradable, or both.**





# Defining Bioplastics

| Source             | Plastic Type                           | Biodegradable | *Compostable |
|--------------------|--|---------------|--------------|
| <b>Bio-Based</b>   | PLA                                    | ✓             | ✓            |
|                    | PHA                                    | ✓             | ✓            |
|                    | PBS                                    | ✓             | ✓            |
|                    | Starch Blends                          | ✓             | ✓            |
|                    | Bio-PET                                | ✗             | ✗            |
|                    | Bio-PE                                 | ✗             | ✗            |
|                    | PTT                                    | ✗             | ✗            |
|                    | PEF                                    | ✗             | ✗            |
| <b>Fossil Fuel</b> | PBAT                                   | ✓             | ✓            |
|                    | PCL                                    | ✓             | ✓            |
|                    | Conventional Plastics<br>(PET, PE, PP) | ✗             | ✗            |

\*For a package to be compostable, both its material and structure must be adequate. Compostable packaging must be verified by third-party certification standards, such as:

- ASTM D6400 standards for industrially compostable packaging
- Australian standard AS 5810-2010 and/or European standard EN 13432 for home compostable packaging

See [page 14](#) for more info.

# Key Differences: Biodegradable & Compostable Packaging



## Biodegradable does not always mean compostable.

While compostable packaging is a type of biodegradable packaging, not all biodegradable packaging is compostable.

Source: [Sustainable Packaging Coalition](#)

### Biodegradable:

Can break down by biological means into natural elements



Specific Time Frame



Specific Environment



Tested for Environmental Toxicity



Specific Time Frame



Specific Environment



Tested for Environmental Toxicity

### Certified Compostable:

Meets third-party standards and breaks down into organic material (such as nutrient-rich soil), CO<sub>2</sub>, and water

# Definitions

## Bioplastics

Type of material that is either bio-based, biodegradable, or both

## Bio-Based Plastics

Type of material derived partially or completely from organic sources (i.e., plants, vegetables, and microorganisms like corn, potato, and yeast)

Not the same as “biodegradable”

## Biodegradable

Material that can be broken down by living organisms into biomass, CO<sub>2</sub>, and water within an unspecified time frame and under undefined conditions

May take years to break down

May release harmful chemicals during the biodegradation process

If disposed of in landfill, will likely produce methane — a more potent greenhouse gas than CO<sub>2</sub>

\*As a term, “biodegradable” is not well-defined and can be misleading. For more information, go to [page 11](#).



# Compostable

Type of material that completely breaks down within a specified time frame and under a predetermined set of conditions

Breakdown process can be measured and certified by stringent third-party standards

Requires specific conditions (i.e., temperature, humidity, pH, oxygen)

Decomposes into organic matter (i.e., nutrient-rich soil) without releasing harmful chemicals or microplastics

If disposed of in landfill, will not compost

**For certified compostable packaging:** breakdown process can be measured and certified by stringent third-party standards

**To be certified compostable, compostability must be an attribute of the finished product, rather than the material itself.**

For instance, the package may be too thick to degrade within certain time frames and under certain conditions.

That's why third-party testing standards are crucial: they differentiate the packaging that is truly compostable from the ones that are not.

# Disintegration

Physical process that breaks down material into smaller fragments through factors such as wind, weather, and UV radiation

Misleading claims that certain additives (i.e. oxo-degradable) can make a product biodegradable

Can only break down a package into smaller, sometimes microscopic fragments (also known as microplastics)

Known to create microplastics and contaminate conventional plastic recycling streams



A close-up photograph of several green leaves, likely from a plant, covered in numerous small, glistening water droplets. The leaves are arranged diagonally across the frame, and the background is dark, making the vibrant green and the white highlights of the water droplets stand out. The overall mood is fresh and natural.

# **Bioplastics: Issues & Concerns**



# 1. Widespread consumer confusion & misconceptions

Contributes to littering, incorrect sorting, and contamination of compost/recycling streams

## Contamination from Look-alike Packaging



### Not made of 100% compostable materials

Without prominent labeling, it can be difficult for composters to distinguish between a compostable bioplastic and a conventional plastic, or between a bioplastic-lined container and a polycoated container.



### Certified Compostable Packaging

Because composters use machinery to handle high amounts of compostable material, product labeling should be visible from a distance, using prominent striping or color-coding.

Source: [Sustainable Packaging Coalition](#)

Difficult for consumers to distinguish between truly compostable packaging and conventional plastic packaging due to:

- Consumer misconceptions
- Look-alike packaging
- Lack of prominent labeling and industry-wide labeling standard that mislead consumers



## 2. Unlawful “biodegradable” marketing claims

Contributes to greenwashing and consumer confusion



“biodegradable”  
does not always mean  
compostable

- Term “biodegradable” is not regulated — meaning that not all “biodegradable” packaging is created equal
- Unlawful marketing claims mislead consumers by promoting products that are not actually compostable
  - When a consumer sees a biodegradability label, they may make incorrect conclusions (i.e., product is compostable or more sustainable)
  - Federal Trade Commission (FTC) has issued fines for unsubstantiated and misleading claims
- Some states are banning or regulating the term “biodegradable” due to ambiguity and lack of clarity, as well as to combat greenwashing
  - It is illegal to make marketing claims that plastic goods and/or bags are “biodegradable” in California, Maryland, Minnesota, Washington
- [FTC Green Guides](#) advise marketers on how to refrain from using these terms in ways that deceive consumers

# 3. Claims not adhering to third-party standards

Contributes to greenwashing and consumer confusion

## Why Certifications Are Important



Differentiates truly compostable packaging from look-alikes



Prominent labeling supports consumer education and reduces contamination rates



Combats consumer confusion from use of false biodegradable and compostable claims

- Some products are labeled “biodegradable” or “compostable” despite not meeting third-party certification requirements
- To claim label “compostable,” the actual product (and not just the material) must undergo independent testing and certification for biodegradation in an industrial composting facility
- Unless otherwise noted, all certified compostable products must be industrially composted

### Meeting Compostability Certification Requirements

- Test the complete packaging, not just the components or material
- Check within a customer’s specific region as different countries and regions may have their own specific testing standards for compostability
- Refer to [BPI Guidelines for the Labeling and Identification of Compostable Products and Packaging](#)

*\*In North America, the Biodegradable Products Institute (BPI) is the widely-recognized certifier of compostable packaging. BPI certifies packaging for industrial composting environments.*

# Specific Regional Standards Apply to Compostable Packaging Certifications

Certifications outline shared industry standards for identifying truly compostable packaging. As each region has specific compostability standards, it's important to check with each customer's region.

## Industrial Composting

- Temperature: 40 ° to 60 ° C
- Time frame: within 180 days
- Most industrial composters will accept 90% biodegradation within 180 days.

## Home Composting

- Temperature: 20 ° to 35 ° C
- Time frame: up to 1 year

## Compostability Certifications Around the World

|                  | Certification Body                   | Composting Environment | Standards Used  | For  |
|------------------|--------------------------------------|------------------------|---|--|
| North America    | Biodegradable Products Institute     | Industrial             | ASTM D6400 and ASTM D6868   | Compostable packaging associated with food scraps and other organics |
|                  | Compost Manufacturing Alliance       | Industrial             | No current standard available for field testing   | Compostable packaging  |
|                  | Compost Council of Canada            | Industrial             | BNQ 9011-911/2007, BNQ 0017-988   | Compostable packaging  |
| Europe           | TUV Austria                          | Industrial             | EN 13432  | Compostable products and packaging                                   |
|                  | TUV Austria                          | Home                   | Not based on external standard, but is itself the basis for several standards such as NF T 51-800 | Compostable products and packaging                                   |
|                  | European Bioplastics                 | Industrial             | EN 13432  | Compostable products and packaging                                   |
| Australia & Asia | Australasian Bioplastics Association | Home                   | AS 5810-2010  | Compostable products and packaging                                   |
|                  | Australasian Bioplastics Association | Industrial             | AS 4736-2006  | Compostable products and packaging                                   |

**Key**

- Lab/simulated conditions
- Indicates standards have equivalent requirements
- Field Conditions

\*The primary geographic market is listed on the left, however, certifications can be used in other markets

Source: *Sustainable Packaging Coalition*

\*Consult the Berlin Packaging Sustainability team for additional information or assistance regarding compostability certifications.



## 4. Issues with use of “degradable additives”

Contributes to greenwashing, consumer confusion, and health & safety concerns



**Plastic Packaging**

+



**Additives**

=



**Plastic Fragments**

### **Leads to fragmentation, not biodegradation**

- Oxidation breaks down material into small particles that remain in the environment
- May include heavy metals or substances that are harmful if leaked into soil or water
- May not fully degrade, contributing to increased microplastics and environmental contaminants

### **May have food safety and health concerns in food packaging**

### **Cannot make packaging compostable**

- Non-compostable plastics cannot turn into compostable material
- Cannot make petroleum-based plastics decompose in a way that is non-toxic and safe for both the environment and human health

### **Negatively affects recyclability**

- Weakens a material’s structural integrity and limits the ability to extract maximum future value from existing material





# Is Compostable Packaging The Right Fit?



# What is the Value of Compostable Packaging?

Source: *Sustainable Packaging Coalition*



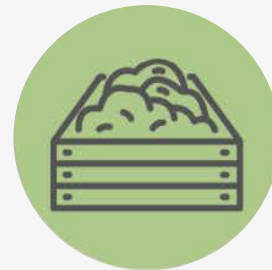
Captures and diverts waste from landfills



Promotes cleaner recycling stream by preventing food contamination



Produces nutrient-rich compost, supporting soil health and carbon sequestration



Supports biological cycles and promotes a circular economy



Serves as possible substitute for non-recyclable or difficult-to-recycle packaging

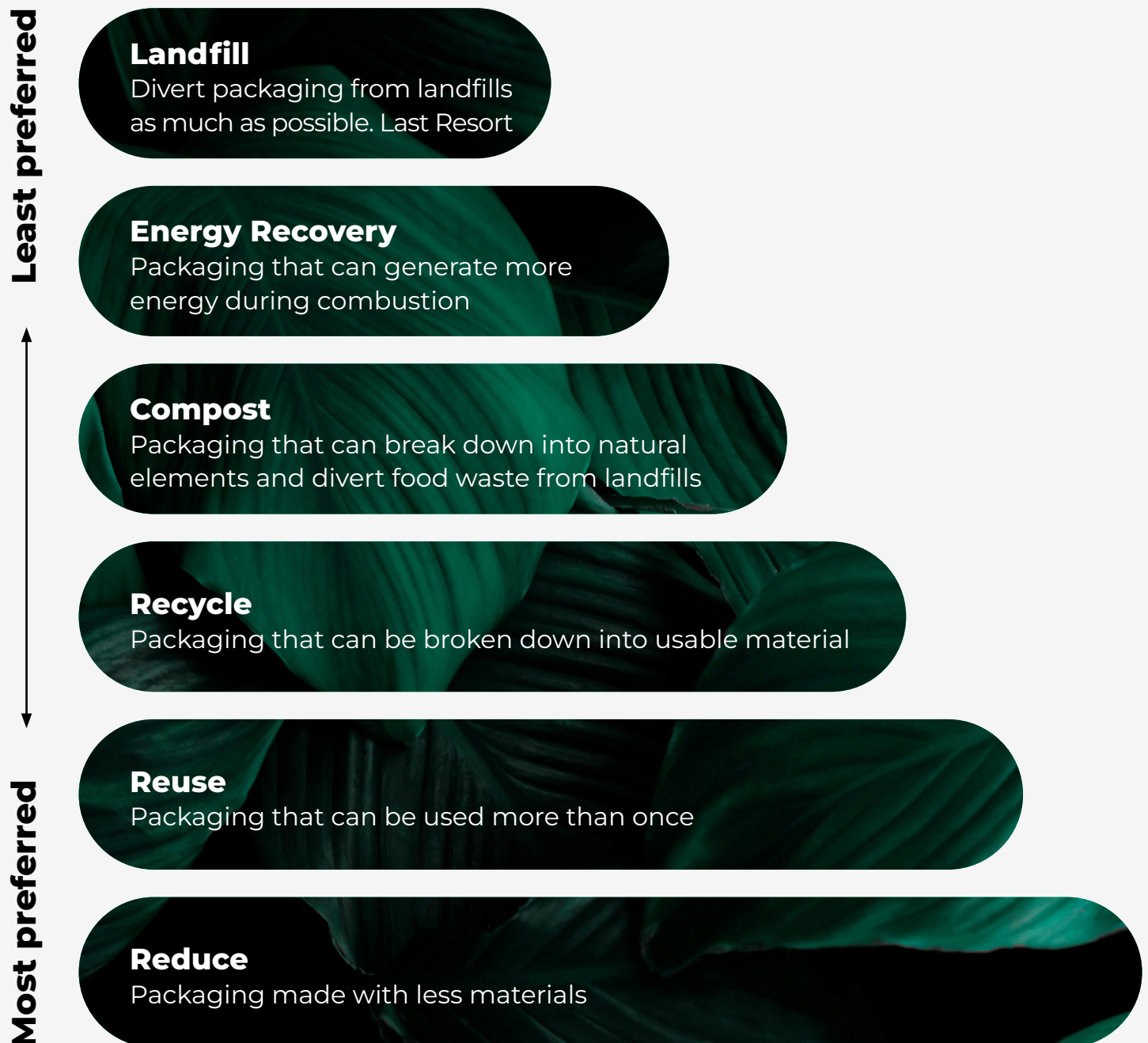


Supplements seasonal feedbacks (such as leaves) in the composting process



# Where Compostable Packaging Fits In

When determining whether compostable packaging is the right fit for your packaging application, first consider other methods that may serve as a more sustainable approach.



\*Unacceptable: Open burning, dumping, littering



Note: These criteria are not universal and serve as a general guide. Please consult the Sustainability Team to advise on specific cases.

Source: [Sustainable Packaging Coalition](#)

## A Note About Chemicals of Concern

Regardless of the context, all compostable packaging needs to be free of chemicals of concern. Much attention has been given to per- and polyfluoroalkyl substances (PFAS), which are used to impart grease and water resistance to certain categories of compostable packaging. These chemicals are no longer permitted in BPI-certified compostable packaging as of January 2020. Substitutions to these chemicals need to be carefully considered, and all additives used in compostable packaging need to be screened for potential health concerns. This is why BPI's certification screens for carcinogens, reproductive toxins, and mutagens.

## Best Uses for Compostable Packaging:

### ✓ Food waste

Prevents food waste from being landfilled and reduces methane, a greenhouse gas

More food waste diverted in packaging + food waste programs than in food-only composting programs

## What Shouldn't Be Compostable:

### ✗ Rigid, readily-recyclable plastics

Most conventionally-designed rigid plastics can be recycled, and making such products compostable can lead to consumer confusion

### ✗ Personal care and cosmetics packaging

Leftover product inside packaging may not be safe as compost feedstock

### ✗ Non-food packaging

Does not help achieve the primary goal of sending more food waste to composters



A close-up photograph of a vibrant red flower petal, likely a gerbera, with several clear water droplets resting on its surface. The lighting is soft and warm, highlighting the texture and color of the petal. The background is blurred, showing more of the flower's structure.

# Compostable Packaging: Labeling Best Practices



## Pursue

For certified compostable packaging that meet well-recognized compostability standards like ASTM, the term “compostable” (and not “biodegradable”) should always be used when describing end-of-life attributes

Use logos from verified third-party certification programs

Use prominent labels, stripes, and green or brown coloring to distinguish truly compostable packaging

Refer to BPI’s [Guidelines](#) for the Labeling and Identification of Compostable Products and Packaging.

Use [How2Compost label](#) to communicate proper sorting instructions

## Avoid

Avoid recyclability symbols or language on packaging designed to be compostable

Avoid labeling compostable packaging with similar words that may be misleading (i.e., “biodegradable,” “degradable,” “decomposable,” “oxo-degradable”)





# External References





## **Understanding the Role of Compostable Packaging in North America**

[View Article](#)

## **Ensuring the Success of Compostable Packaging**

[View Article](#)

## **Position on Biodegradability Additives**

[View Article](#)

## **New Thinking About Compostable Packaging**

[View Article](#)

## **FAQ on Degradable Plastics**

[View Article](#)

## **Forum for Bio-Based Innovation in Public Procurement**

[View Article](#)

## **Biodegradable vs Compostable Explainer**

[View Article](#)

## **Overview of Relevant EU Legislation for Bioplastics**

[View Article](#)

## **Guidelines for the Labeling and Identification of Compostable Products and Packaging**

[View Article](#)