

# Clearing the confusion – plastics and bioplastics

## Plastics can be categorised by feedstock and degradation properties:

Plastics and bioplastics can be categorised based on their origin/feedstock (biobased vs. fossil fuel based) and their degradation properties (biodegradable vs. non-biodegradable).

## Feedstocks

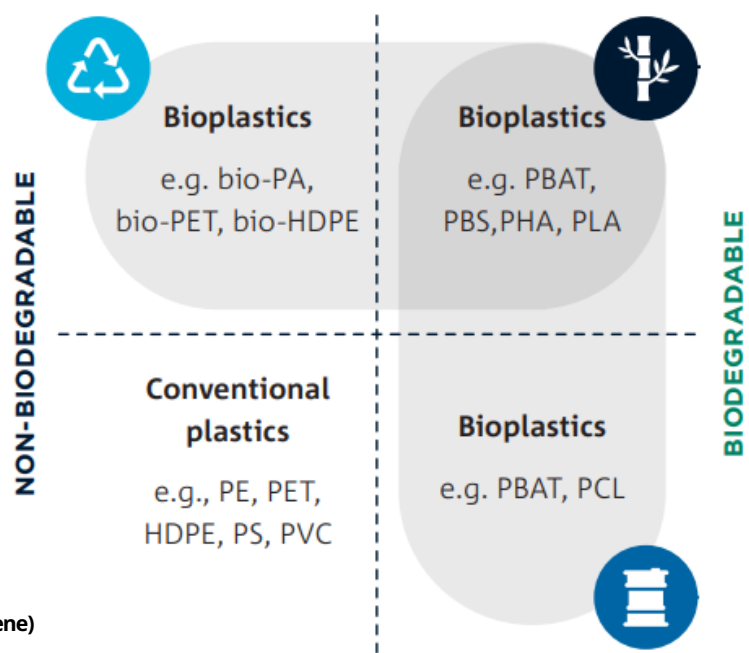
### Plastics can be produced from different feedstocks:

Fossil-based feedstocks: Derived from petroleum, natural gas, or coal.

Biobased feedstocks: Derived from plants, algae, or agricultural waste products.

## Differences in degradation

### Biobased Feedstock



PHA-common source sugar cane, plant oils, food waste

PLA-common source sugar cane



mulch film made from a mix of fossil fuel feedstock and plant based feedstock.



mulch film made from PE (Polyethylene)

The types of bioplastics (shaded). Adapted from Bioplastics Europe.<sup>1,2</sup>

## Compostable or biodegradable? What is the difference?

Biodegradable materials are those that can be fully broken down into natural substances, such as water and carbon dioxide, by naturally occurring microorganisms. In waste management, the term “biodegradable” is broadly used to describe materials that degrade either under composting conditions or in the natural environment. The key distinction is that compostable materials are designed to break down within a specific timeframe under controlled composting conditions, where factors like temperature, moisture, and microbial activity are optimized to accelerate decomposition and biomass formation. <sup>2</sup>

## Certified compostable

Compostable refers to a product’s ability to biodegrade into non-toxic, natural elements within a defined timeframe under specific composting conditions. Both fossil-based and bio-based bioplastics can be certified as compostable. However, compostability claims should only be made if the product has been certified to a recognized standard, such as Australian Standards AS 4736-2006 or AS 5810-2010. <sup>2</sup>

## Biobased bioplastic biodegradable

### Smart Sprays are here

Bioplastics made from bio-based feedstocks that fully break down into natural substances, either under composting conditions or in the natural environment. PHA bioplastics, in particular, are known to degrade effectively in both soil and marine environments. <sup>2</sup>



## Fossil-based bioplastic biodegradable

Fossil-based biodegradable plastics make up a relatively small category, which includes materials like PBAT and PCL. While PBAT is both biodegradable and compostable, improper disposal can still have environmental consequences, as its degradation requires specific conditions to occur efficiently. <sup>2</sup>



## Biobased bioplastic non- biodegradable

Bioplastics can be derived from bio-based feedstocks while remaining non-biodegradable. These materials are chemically identical to traditional fossil-based plastics. <sup>2</sup>



## Conventional plastics non- biodegradable

These materials do not biodegrade. In Australia, 2.9 million tonnes of plastic waste are discarded each year, with only 13% recycled, while the remaining 87% ends up in landfill. <sup>2</sup>

### References

1. Bioplastics Europe. About Bioplastics Europe. 2022
2. State of Bioplastics in Australia, CSIRO. 2024 with permission.

## Collaborators and industry partners



Australian Government  
Department of Agriculture,  
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