Position of European Bioplastics

RECYCLING AND RECOVERY: END-OF-LIFE OPTIONS FOR BIOPLASTICS

Efficient waste management is key to the European Commission's flagship policy goal of a resource-efficient Europe and its circular economy vision. The EU Waste Framework Directive (2008/98/EC, WFD) defines a five-step waste hierarchy ranking the treatments of waste based on their ability to conserve resources (see Figure 1).

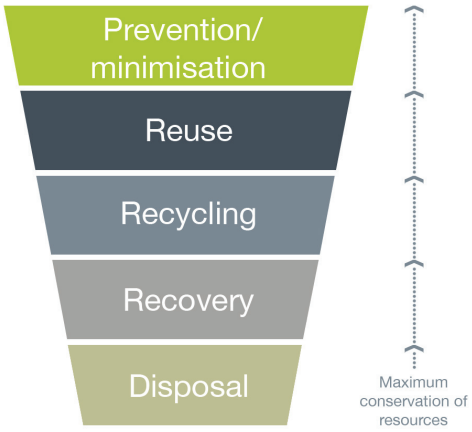

Figure 1: EU waste hierarchy[1]

Bioplastics can be bio-based, like bio-based PE (polyethylene) and bio-based PUR (polyurethanes), biodegradable, for example PBAT (polybutylene adipate terephthalate), or both, such as PLA (polylactic acid) and starch blends. The properties of these various types of bioplastics make them suitable for a wide range of applications for which they increase resource efficiency, ameliorate performance, and support the most efficient waste treatment option – implementing the guiding principle of the waste hierarchy, a circular economy.

Prevention, minimisation, and reuse

This step of the waste hierarchy requires the use of manufacturing processes and materials that minimise resource use and maximise the functional performance of the product. Plastics have consistently proven their suitability, with products becoming increasingly thinner, lighter and stronger. The rules of competition, and the economic and ecological demands of the market lead to bioplastics increasing their performance and resource efficiency. Bioplastics packaging with increased barrier properties can, for example, extend shelf-life of fresh produce and therefore contribute to food waste prevention.

Also, there are already a large number of plastic and bioplastics products, which can be reused multiple times.[2]

Mechanical recycling

The major share of bioplastics produced today is mechanically recyclable. Bio-based plastics that are chemically and physically identical to their fossil-based counterparts, but made from biomass, are called drop-in materials, for example bio-based PE and bio-based PET (polyethylene terephthalate). The only difference to their fossil-based equivalents is that the polymers are wholly or partly derived from biomass and feature a lower carbon footprint than their conventional alternative. They can be recycled in already well-established recycling streams[3].

[1] *Recycling in this graph shall include mechanical, organic and chemical recycling.*
[2] *Carrier bags made from bio-based PE or PLA, or starch can be reused many times before the material wears out.*
[3] *Several other bioplastics can be mechanically recycled, as soon as the needed volumes are available in the market, most notably PLA.*

- EUBP supports reuse and recycling targets for plastic waste that are progressive, incremental and based on separate collection of household and other plastics.
- Correspondingly, EUBP supports the creation of a single market for plastic recyclates; the combination of recycled material and bio-based material represents a truly circular use of resources that is already accepted in the market.

Organic recycling

Industrial composting and anaerobic digestion (AD), also referred to as organic recycling, are the 'circular' end-of-life options for biodegradable, compostable plastics products such as packaging. These are plastics that biodegrade within a specific timeframe in clearly defined conditions (e.g. temperature, humidity, and the presence of microorganisms). The biodegradation process in an industrial composting facility is called composting and converts the plastic into carbon dioxide, water, and biomass. In anaerobic digestion, the biodegradation process is called biomethanisation and additionally produces methane (biogas)[4], which is used for the production of energy and/or fuels. In order to be suitable for industrial composting and AD, products and materials need to meet the requirements laid out in the European norm EN 13432[5]. The Packaging and Packaging Waste Directive (94/62/EC, PPWD) defines organic recycling of packaging and also sets the essential requirements for biodegradable and compostable packaging.

- EUBP calls for the mandatory separate collection of biodegradable waste across Europe and to include waste with biodegradability properties in the biowaste definition of the WFD[6].
- EUBP also recommends the use of biodegradable, compostable plastics products for food packaging and single-service food applications in cases where mechanical recycling poses a challenge, or when packaging that is highly contaminated with food waste, in order to minimize plastic contamination of organic waste streams.

Chemical recycling

Chemical recycling, also known as feedstock recycling, means the recovery of the building blocks and monomers that a polymer or plastic, respectively, is made of. The base materials obtained through chemical recycling can be used in new polymerisation processes and the fabrication of new products. Chemical recycling fits in well with the idea of a circular economy, and numerous successful research projects have been conducted in recent years.

- EUBP calls for the support of more research and development activities in the area of chemical recycling and feedstock recovery to make large scale operations feasible and thus become an additional valuable recovery option in the future.

Energy recovery

If mechanical, chemical, and organic recycling, respectively, are not available, the next best option according to the EU waste hierarchy is for bioplastic waste to be incinerated, generating partly renewable energy through heat recovery. The renewable (i.e. bio-based) share of the bioplastic material releases the same amount of carbon dioxide as originally sequestered by the plants, thus closing the material carbon loop.

- In case no higher ranked end-of-life options are available, EUBP considers incineration with energy recovery a viable end-of-life choice for bio-based plastics, due to its production of renewable energy.

Landfill

Because of its inherent environmental risks, landfilling is, according to the EU waste hierarchy, the least desirable end-of-life option. Despite steady progress in the EU's efforts to reduce landfilling, it is still the most common waste disposal route in many European countries today.

- EUBP supports the gradual phase-out of landfilling for any recyclable waste in Europe and appropriate measures to expand recycling and recovery of all types of plastic waste.

For more information, please see the EUBP Fact Sheet "Bioplastics – furthering efficient waste management".

About European Bioplastics

European Bioplastics is the association representing the interests of the bioplastics industry along the entire value chain in Europe. Its members produce, refine, and distribute bioplastics, i.e. plastics that are either bio-based, biodegradable, or both. More information is available on www.european-bioplastics.org.

[4] *AD plants should ideally be combined with an aerobic composting step.*
[5] *EN 13432 „Requirements for packaging recoverable through composting and biodegradation. Test scheme and evaluation criteria for the final acceptance of packaging".*
[6] *Biodegradable, compostable plastic bags help to optimise the collection of biowaste and its diversion from incineration and landfill to organic recycling.*

Contact: *European Bioplastics e.V., Phone: +49 30 28 48 23 50, Email: press@european-bioplastics.org, www.european-bioplastics.org*