Position of European Bioplastics

MARINE LITTER

The European Commission has identified marine litter as one of the main threats for the environment. Consequently, the Marine Strategy Framework Directive[1] was designed and came into force in 2008. This Directive aims to achieve a Good Environ- mental Status (GES) of the EU's marine waters by 2020 and avoid damage caused by marine litter. Accordingly, it protects the resource base on which marine-related economic and many social activities depend.

Plastics account for the largest share of marine litter[2]. The key characteristics that make these materials so valuable in the first place, such as stability and persistence, become the very reason that plastic products pose a significant problem for the environment. It can be avoided by appropriate waste management treatment at the end of their life cycle. When ending up in the seas or washed ashore, plastics turn into a threat to animals and other living organisms, espe- cially due to ingestion or entanglement.

Marine debris originates from a variety of sources[3]. Shipping and fishing activities are the predominant sea-based sources, whereas ineffectively managed landfills, public littering, and the careless disposal of waste in the environment are the main land-based sources of marine litter. If waste is deposited in open landfills, lightweight materials – and this especially accounts for plastics – can be blown away by wind or washed away by rain. This results in plastic waste ending up in rivers, lakes, and oceans. In order to minimise and ultimately prevent further pollution of the marine environment, European Bioplas- tics:

- considers the full implementation of EU waste legislation and an increase in the efficiency of waste management crucial;
- supports the gradual phase-out of landfilling for plastic products in Europe and appropriate measures to expand recycling and recovery of plastic waste;
- demands stricter measures to combat littering, for example through fines, and supports more and better education about littering, which is often linked to a lack of information about the environmental conse- quences;
- calls for more research into biodegradation behaviour of materials and applications within marine environ- ments
- supports the establishment of standards, in order to determine applications that are likely to end up in marine environments, making marine biodegradabil- ity justified and necessary.

Littering should not be accepted as an unfortunate but inevitable fact for any kind of waste, neither on land nor at sea – including all varieties of plastics.

End-of-life options for bioplastics[4]

European Bioplastics considers a sound and well-functioning, source-separated waste collection as one of the essential measures to fight marine litter. All types of waste should find their way to appropriate and controlled forms of waste management and recycling.

Bioplastics offer several benefits in well-functioning waste separation systems. Non-biodegradable materials like bio-based polyethylene (PE) or polyethylene terephthalate (PET) can, after multiple uses, be collected together with their fossil counterparts and delivered to suitable recycling or recovery streams.

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[1] *European Commission: Marine Strategy Framework Directive 2008, http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm.*
[2] *DG Environment News Alert. Science for Environment Policy (Nov 2011): Plastic Waste: Ecological and Human Health Impacts; European Commission (DG Environment) (April 2011): Plastic Waste in the Environment – Final Report.*
[3] *KIMO (2012): "Economic Impacts of Marine Litter". See also: Sheavly, S. B.; Register, K. M. (2007). "Marine Debris & Plastics: Environmental Concerns, Sources, Impacts and Solutions". Journal of Polymers and the Environment 15 (4): 301–305.*
[4] *The term bioplastics includes two main groups: 1. bio-based, non-biodegradable plastics, such as bio-based PE or bio-based PET; 2. compostable / biodegradable plastics. Bioplastics are plastics that are bio-based, biodegradable, or both.*

For compostable plastic products, i.e. materials certified according to EN 13432, industrial composting and anaerobic digestion (AD) are the appropriate ways of (organic) recycling. Compostable biowaste collection bags have the added benefit of easing the pre-sorting in households and thus diverting biowaste from landfill into organic waste recovery systems. This means that they help to keep considerable quantities of waste out of landfills, but inside the recovery and reuse loop. Therefore, mechanical and organic recycling of bioplastics should be sup- ported. Incineration combined with energy recovery is, in the absence of organic recycling facilities, also an acceptable end- of-life option, generating partly renewable energy. In the case of bio-based plastics the material carbon loop is closed. Because the carbon dioxide taken from the atmosphere to produce the raw material is released again at the end of its product life during incineration.

Biodegradable and compostable plastics[5] in marine environments

Currently, there is no international standard that appropriately defines the biodegradation of plastics in marine environments. However, a number of standardisation projects are in progress at ISO and ASTM level[6]. Even though plastics that are biodegradable according to established standards are not and never were intended to be a solution against marine littering, the United Nations Environment Programme (UNEP) recognises that 'biodegradability in seawater' may be part of the solution[7]. European Bioplastics fully supports UNEP's call for more research into the biodegradation behaviour of existing material types and applications. EUBP further supports the determination of classes of applications where marine biodegradability can be considered an end-of-life option.

European Bioplastics also calls for the establishment of standards to measure and affirm – or reject – claims of biodegradation in the respective marine environments as it has already been achieved by the biodegradable industry for the issues land-based use and end-of-life scenarios.

The standards should be in line with all pertinent research findings in the field of plastics linked to the marine environment. They should determine a defined time frame for the complete biodegradation[8] of plastics for each of the different marine environments (eulittoral, sublittoral, and pelagic – from surface to deep sea – zones), which should be aligned with the set of requirements for other natural environments (e.g. soil[9]).

Further Reading:

T. O'Brine, R.C. Thompson; "Degradation of plastic carrier bags in the marine environment", Marine Pollution Bulletin 60, 2279-2283, 2010

M. Tosin, M. Weber, M. Siotto, C. Lott, F. Degli Innocenti; "Laboratory test methods to determine the degradation of plastics in marine environmental conditions"; Frontiers in Microbiology 3; Article 225; 2012

C. Müller, K. Townsend, J. Matschullat; „Experimental degradation of polymer shopping bags (standard and degradable plastic, and biodegradable) in the gastrointestinal fluids of sea turtles"; Science of the Total Environment 416; 464-467; 2012

UNEP, „Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change", 2016

J. Greene; "PLA and PHA Biodegradation in the Marine Environment"; Report by Department of Resources Recycling and Recovery, State of California; 2012

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.

[5] *Certain bioplastic materials are biodegradable/compostable and used in products where this characteristic offers added value. Compostable in this context means certified according to the harmonized European norm EN 13432. Such materials and products are suitable for the organic recycling, i.e. industrial composting and anaerobic digestion. EN 13432 certification gives no indication to what extent and within what timeframe a material will biodegrade in marine environments.*

[6] *There are ASTM standards related to this topic. The ASTM standard D7081-05 (Standard Specification for Non-Floating Biodegradable Plastics in the Marine Environment) was withdrawn without replace- ment; ASTM D6691-09 is a test method for determining biodegradation of plastic materials in the marine environment. For more information:*

[7] *UNEP, Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change, 2016, pp. xi, 26, 133, 143, 176f.*

[8] *Biodegradation according to EN13432 is considered to be complete, if at least 90% of the material have been converted into carbon dioxide (the remainder is due to the fact that besides carbon dioxide, water and biomass are produced during biodegradation, with carbon dioxide being the only part accurately measureable).*

[9] *Standard EN 17033 "Biodegradable mulch films for use in agriculture and horticulture – Requirements and test methods" (published in 2018).*

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