european bioplastics

FACT SHEET

European Bioplastics

Bioplastic carrier bags – a step forward

Great variety. Full performance. Better for the environment.

Plastic shopping bags: highly functional but still controversially discussed

Undoubtedly, lightweight plastic shopping carrier bags are a most convenient and useful product. Just a few grams of plastics are necessary to carry lots of goods safely. Besides transporting and protecting purchased goods, they are used for distributing information, for advertising and, at the end of their product lives, as waste bags.

The size of the European plastic bag-market (all bag types) is approx. 1.7 million tons each year, with carrier bags accounting for around 800,000 tons. These bags are mainly distributed via large food and non-food retail stores. On average, each EU citizen is using 198 plastic bags per year.[1]

However, negligent consumer behaviour, such as wrong disposal (littering) or excessive use, has harmed the image of this useful product and challenged its future in Europe. European Bioplastics recognises the need for a more resource efficient and sustainable economy and society, and reducing the overall consumption of bags can help to achieve this goal.

Bioplastic bags – not an excuse for littering!

Littering is not a product-intrinsic problem of shopping bags. It is caused by careless or thoughtless disposal behaviour on the part of consumers. In order not to encourage this behaviour, bioplastic producers, retailers and brandowners should refrain from advertising biodegradability and compostability of bioplastics bags as a solution to littering. However, all products should inform the consumer about these useful end-of-life options.

This is why European Bioplastics generally endorses measures to reduce the consumption of oil-based plastics shopping bags. Two exceptions, however, should be offered to consumers and retailers as an alternative solution:

- Plastic shopping bags containing at least 50 percent biobased content should be exempted from reduction measures such as taxes or charges.

- Compostable plastic shopping bags that comply to EN 13432 and contain at least 50 percent biobased content[2] should be exempted in countries where organic waste is separately collected and recycled in industrial composting plants.

1 European Commission, 2013: Assessment of impacts of options to reduce the use of single-use plastic carrier bags (Croatia was not yet included in this assessment).
2 From 2017 onwards, France bans all single-use carrier bags except those that are biobased and compostable (Energy Transition and Green Growth Law, August 2015). The biobased content and its progressive increase from 30% in 2017 to 60% in 2025 is defined in a decree.

Bioplastic carrier bags - highly beneficial

Carrier bags made of bioplastics represent a valuable alternative to conventional fossil-based bag types. They are – partly or fully – made from agricultural feedstock through biotechnological and chemical processes. A wide variety of feedstock, e.g. sugarcane, sugar beet, corn, wheat, potatoes, cassava, and also food residues and cellulosic biomass, can be used.

Using renewable resources offers a range of advantages:

- Scarce fossil resources are saved by substituting them with annually regrowing feedstock.
- Using biomass first for materials and afterwards for energy generation (principle of use cascades) immensely increases resource efficiency.

Different types of bioplastic shopping bags available in the European market

Type	**Single-use bag**	**Multiple-use/ re-usable bag**	**"bag-for-life"**
Common name	T-shirt bag	Griphole-bags / loop-handle-bags	Woven or nonwoven bag
Film gauge	Approx. 8-25 µm	40-70 µm	> 100 µm
Size (examples, given in cm)	44x30 Carrefour 33x29 COOP	51x44 (ALDI)	55x37x35 (IKEA) L38x20x35 (dm)
Type of plastics typically used	HDPE	(L)LDPE	PP, PET
Short description:	• Semi-transparent • Very thin • Use for information/ marketing purposes not highest priority • Secondary use as waste bag • Incineration or composting • Prone to littering	• Printable, glossy • Medium / thicker • Widely used for information/marketing • Used several times (4-9 times) • Final use as waste bag • Recycling possible	• Thick woven material • Information/marketing use possible • Longterm re-use for shopping, heavier transports etc. • Hygiene can become an issue • Recycling possible
Bioplastic alternative	AVAILABLE	AVAILABLE	AVAILABLE*
Additional benefits of bioplastic alternative	• Potentially reduced carbon footprint • Recovery of renewable energy • Used as multi-purpose waste-bag. If compostable, suitable also for biowaste	• Potentially reduced carbon footprint • Recycling possible • Recovery of renewable energy	• Potentially reduced carbon footprint • Potential recovery of renewable energy

* Technically feasible, however, no corresponding product available in the market yet. Biobased PP will reach the stage of commercialization by 2014, partly biobased PET already available.

- The biobased content of bioplastic shopping bags also helps to reduce CO2 emissions – these shopping bags have a lower carbon footprint than oil-based bags.[2]

- In countries where organic waste is collected, shopping bags that are biobased and compostable can be used to collect organic waste, in effect making it a dual use bag. Studies[3] have shown that compostable biowaste bags help to increase the amount of biowaste collected and improve the quality of compost. Dual use also reduces the number of bags that are littered or end up in landfills.

- In countries where plastic waste is recovered for recycling, bioplastic shopping bags can be mechanically recycled into new plastic products.

- In countries where waste is incinerated, the biobased con tent contributes to the generation of renewable energy.[4]

The bioplastic alternative – commercially available

Developed in response to environmental challenges and the finite nature of fossil resources, bioplastic shopping bags epitomise the innovation within the chemical and plastics industries to great effect. Because of their omnipresent use and great visibility, carrier bags are a key product of the bioplastics industry, driving its development.[5]

The EU retail market has taken note of bioplastic bags, and the demand is growing rapidly. Being at the verge of a broader market introduction, their share in the European carrier bag market has now reached almost 5 percent (2012, estimation of European Bioplastics). The current bioplastics production capacity could cover a significantly higher share. And, as more and more bioplastics production facilities become operational within the next years, they could potentially cover the complete EU plastic carrier bag consumption within less than a decade.

A re-usable bag is the preferred article for carrying goods. Many consumers however still request carrier bags in stores if they are not accustomed to re-usable bags or when they have forgotten their own. A growing number of retailers now wish to offer shopping bags with an improved ecological profile.

Shopping bags made of bioplastics are commercially available in many different styles, sizes and film gauge (thickness).

Today, the following bioplastics are used:

- in biodegradable/compostable shopping bags:
  - starch based materials (starch polyester blends)
  - polylactic acid (PLA) based materials (PLA polyester blends)

- in biobased, non-biodegradable shopping bags:
  - biobased polyethylene (PE) derived from bioethanol (sugar cane)
  - starch alloys (starch polyolefin blends)

Retailers and brand owners planning to switch their stores' bags to bioplastics should carefully consider what performance characteristics are needed and which end-of-life options are feasible in the corresponding country/region.

Communication guidelines for biobased and compostable bags

Biobased plastic bags
A bag is biobased if it contains a significant share of renewable raw materials (biomass). The term biobased describes the part of a material or product that stems from renewable resources.

Note:
When making a biobased-claim, the unit (biobased carbon content, total biobased content), a percentage, and the measuring method should be clearly stated. Certification and labelling schemes are in place to help substantiate claims.[6] Biobased does NOT necessarily mean compostable. Information should be given about the feedstock used and the end-of-life options with regard to the existing waste management infrastructure in the geographical region where the product is commercialised.

Compostable plastic bags
A bag is „compostable" if it biodegrades under (industrial) composting conditions. At the end of this process, only water, carbon dioxide and a small amount of biomass is left over. The European standard EN 13432 defines the criteria for compostability of packaging products in industrial composting plants. Biodegradability is linked to the chemical structure of the polymer chain but not dependent on the origin of the raw materials. A compostable bag can therefore be either bio-based or not.

Note:
In order to make accurate claims about industrial compostability, companies should make a reference to EN 13432. Furthermore, „compostability" certification and labelling is highly recommended. Information about the raw material origin and the end-of-life options should also be given in order to properly inform the consumer about the nature and characteristics of the product.

2 nova-Institute: www.nova-institut.de/.../Meta-LCA%20Publication; Kyoto Club publication „Bioplastics: A case study of the bioeconomy in Italy" – free download: http://freebook.edizioniambiente.it/libro/77/pd_modello-
3 BASF: http://www.basf.com/group/pressemitteilungen/P-12-179
4 European Bioplastics does not support landfill as a viable end-of-life option. However, in case of bioplastic shopping bags ending up in landfill, the biobased content will help to 'sequester' CO_2.
5 Thanks to their specific properties and benefits, bioplastics are often regarded differently in various political discussions and consequently receive specific treatment in some measures. European Bioplastics has prepared a position paper provide information about the views of the bioplastics industry. Measures aimed at bags should encourage the use of bioplastics and not discriminate against any sort of plastic.
6 Go to European Bioplastics Website for further information: http://en.european-bioplastics.org/standards/.

Established examples

Bag type	Properties
Compostable bag Example: UK-based Coop supermarket chain 	• Typically starch or PLA blend with copolyesters • Biomass content of up to 50% • Single use bags offer additional benefit of potential final use as biowaste bag • Also reusable versions available (50-60 microns) • Compompostable according to EN 13432 (industrial composting) • Non-recyclable within current post consumer plastic waste streams • Renewable energy recovery possible (incineration) • Potential reduction of CO_2 footprint, GHG emissions and fossil energy consumption • Potential food waste diversion from landfill • Potential resulting increase in amount of collected biowaste
Biobased polyethylene bag Example: German drugstore chain Rossmann 	• Available as LLDPE or HDPE • Very high biomass content possible (>80%) • Identical properties / functionality to conventional PE bags • Reusable • Non-compostable • Recyclable in existing PE film waste streams (chemically identical) • Compoundable with rPE and conventional (fossil based) PE • Renewable energy recovery possible (incineration) • Possible reduction of CO_2 footprint, GHG emissions and fossil energy consumption
Starch polyolefin alloy bag 	• Starch polyolefin alloys alone or compounds/multilayer structures with conventional or biobased polyethylene • Medium to high biomass content (around 50%) • Mechanical properties comparable to conventional LDPE or HDPE bags • Reusable • Non-compostable • Non-recyclable with the current plastic waste streams • Renewable energy recovery possible (incineration) • Potential reduction of CO_2 footprint, GHG emissions and fossil energy consumption

A remark about LCAs

There are a number of LCA studies available that focus on plastic bags. However, the results vary widely, depending on the functional unit, system boundaries, and the chosen assumptions for the bags' end-of-life. Additional parameters strongly affecting the results of LCAs are the presumed durability of the analysed bags and the particular waste management situation in specific countries or municipalities. Furthermore, comparative studies are frequently affected by the use of data sets coming from different sources and with different levels of accuracy.

However, even though different products' and bag types' LCA results may vary, two general statements can be made across the entire range of bioplastic shopping carrier bags:

By relying on renewable resources, bioplastics can contribute to reducing the use of oil and the reduction of GHG emissions. If compostable, bioplastics can become a relevant tool for waste collection with proven benefits for waste management. This represents a valuable step forward in terms of sustainable production and consumption in Europe and worldwide.

European Bioplastics
Marienstraße 19-20
10117 Berlin

Phone: +49 .30 28 48 23 50
Email: info@european-bioplastics.org
Email: press@european-bioplastics.org

For more information please visit:
www.european-bioplastics.org
twitter.com/EUBioplastics

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