



EXPLANATORY GUIDE FOR WASTE MANAGEMENT LABELS

Natalia Sánchez García

Carlos Sanz Lázaro

Explanatory guide for waste management labels

Open Access

Quote as: N. Sánchez-García, C. Sanz-Lázaro (2019).

Explanatory guide for waste management labels.

Dir: *Repositorio Institucional de la Universidad de Alicante*
(*rua.ua.es*).

Cover designed by Freepik



BIOPLASTIC

According to European Bioplastics, a plastic material is defined as a bioplastic if it has a biological base, is biodegradable or has both properties.

First, it should be noted that the terms "biological base" and "biodegradable" are not equivalent, since the property of biodegradation is linked to the chemical structure of a material and not to the raw materials that compose it. So, as shown in Table 1, biobased plastics may or may not be biodegradable, and biodegradable plastics can have three different types of origins: petroleum, partially bio-based or completely bio-based.

Table 1. Types of biodegradable and non-biodegradable plastics according to their origin (<http://library.wur.nl/WebQuery/wurpubs/fulltext/408350>).

	Petroliferous	Partially <i>bio-based</i>	<i>Bio-Based</i>
Not biodegradable	PE, PP, PET, PS, PVC	Bio-PET, PTT	Bio-PE
Biodegradable	PBAT, PBS(A), PCL	Starch blends	PLA, PHA, celofán

Biologically based plastics - biobased - are those composed to a greater or lesser extent (minimum 20%) by renewable plant materials such as corn, sugarcane, starch, cellulose, oils, lignin, proteins and polysaccharides. So, these types of plastics can serve as substitutes for petroleum-based plastics, which are most employees currently.

Based on the percentage of renewable raw materials used in the manufacture of this type of plastics, we can find different labels:



RECYCLABLE

A recyclable product or material is one that can be recycled, that is, that can be subjected to a process of transformation or use after being discarded, in order to be used again. Keep in mind that products that are presented as recyclable are not always recycled.

The following symbols help us identify the material with which the product is made, and which can be recycled:



Möbius Loop: indicates that the materials with which the product has been manufactured can be recycled.



Möbius Loop %: indicates what percentage of the materials that make up the product can be recyclable.



Green point: indicates that the product packaging company has paid to ensure that the packaging waste of that product is managed and recycled through an Integrated Waste Management System (GIS) such as Ecoembes.



Tidyman: this symbol encourages the consumer to deposit the waste in a site enabled for it as containers, bins ...



Glass containers

Glass bottles

Glass jars

** Caps usually go to the yellow container.*

DO NOT DEPOSIT

Light bulbs and tubes

Tableware remains

Crystals or mirrors



Paper and cardboard containers

Cardboard boxes

Cardboard egg cups

Newspapers, magazines, books ...

DO NOT DEPOSIT

Tetrabriks

Dirty or oil-stained
paper napkins and
tissues

Swaddlers



Metal containers: cans, silver paper, metal caps
and bottle lids ...

Tetrabriks

Plastic containers: bottles, bags ...

** Remember to empty the contents of these
containers well*

DO NOT DEPOSIT

CD-ROM, DVD, VHS...

Toys

Swaddlers



Biodegradable waste: food scraps

Organic waste: oil-stained paper and cardboard,
corks and sawdust.

DO NOT DEPOSIT

Sweeping dust, cigarette
butts and ash

Swaddlers, sanitary
napkin and tampons

Wipes, strips, tape,
bandages, gauze, cotton



Waste that does not have a specific collection
system

Swaddlers, toys, pans, glasses, cutlery, dishes ...

CLEAN POINT

Batteries and mobiles

Textiles and footwear

Medicines

Paints and varnishes

Home appliances and

CD's

Furniture and fixtures



Sigre Point (Integrated Packaging Management and Collection System): deposition of expired medicines in the containers of the pharmacies identified with this symbol.



The product is made of **recyclable steel**. This symbol can be found in kitchen utensils, food and beverage containers, appliances and electrical appliances.



Indicates the selective collection of **electrical and electronic equipment (EEE)** once its useful life has ended so that it enters the recycling circuit and does not end up in unauthorized garbage containers. We find it in appliances, batteries, computer equipment, electrical or electronic tools, toys, medical equipment ...



Figure 1. Scheme of end-of-life options for bioplastics. Image obtained from European bioplastics.

As a result of this recycling problem, several projects are being carried out, such as the REBIO project, whose main objective is “to provide a technological and adequate solution to the management of biodegradable plastics through new technologies applied in the mechanical recycling phase”.

REUSABLE

Reusable products or materials are those that can be reused without having undergone prior treatment.

RECYCLED

A recycled product or material is one that has been manufactured using as raw material another material that had been previously used and which is given a second life.

Generally, we will identify these recycled products by means of labels that show a “100% recycled” symbol or the specific percentage of recycled materials that make up that product. These tags will be similar to the following:



In addition, we can find other tags such as:



BIODEGRADABLE

Biodegradable plastics are those that decompose in water and carbon dioxide under natural environmental conditions in a period comparable to that of natural compounds. This biodegradation process depends on environmental conditions such as temperature, humidity, oxygen concentration, quantity and type of microorganisms...

To claim the biodegradability of a product, environmental conditions must be specified and a period of time for biodegradation must be established in order for claims to be measurable and comparable (according to EUBP_BP_En_13432, at least 90% of biodegradation must be reached in less than 6 months).

Based on the appropriate biodegradation environment of the product we can find the following labels:

- Marine biodegradation: the OK biodegradable MARINE label verifies the biodegradability of materials in the marine environment. It should be noted that, this biodegradability is intended only for the water column without taking into account the seabed, where 70% of the plastic waste is concentrated.



- Biodegradation in soils: OK biodegradable SOIL and DIN CERTCO biodegradable in soil labels verify the biodegradability of agricultural and horticultural products, since they can be left to decompose in situ after use. These labels guarantee that the product is completely biodegradable in the soil without adverse effects on the environment.



- Freshwater biodegradation: the OK biodegradable WATER label guarantees the biodegradation of freshwater products, and therefore substantially contributes to the reduction of the persistence of residues in rivers, lakes or any natural freshwater environment. Like the marine biodegradation label, this label only certifies degradation in the water column and not in the bottom.



OXOFRAGMENTABLE PLASTICS

Degradable oxo-fragmentable plastics (erroneously called oxo-biodegradable or oxo-degradable) are conventional non-biodegradable plastics supplemented with chemical additives that mimic biodegradation, since, in the presence of oxygen, under the effect of heat and UV rays, they lose mechanical resistance, they fragment and disappear visually, creating a false biodegradation of plastics. All this generates an additional problem that is the contribution, of this type of plastics, to the contamination by microplastics. Some of the labels that show oxo-fragmentable products are the following:



COMPOSTABLE

Unlike biodegradable plastics, which as mentioned above, are capable of degrading under natural conditions, in compostable plastics the modification of some environmental condition is necessary to favor its degradability and its subsequent use as composting material. In addition, it should be noted that these plastics should be mixed with other biological products, such as food scraps, in order to carry out compost processing.

There are two types of compostability:

- Industrial:** this type of compostability is carried out in composting industries, where plastics are subjected to controlled conditions of temperature (generally 57°C), humidity and selection of quantity and type of microorganisms.

-**Domestic:** unlike industrial compostability, this type of composting is done domestically and in gardens for personal use and is carried out at room temperature and at a slower pace.

The main labels that show that a product is compostable are:

- Compostability label: Seedling label indicates that the material is compostable. This certification is carried out by TÜV Austria-Belgium and DIN CERTCO.



- Industrial composting: OK compost INDUSTRIAL and DIN Industrial Compostable labels verify that the containers or products (together with their components, inks and additives) that possess them are guaranteed as biodegradable in an industrial compostability plant, so that these products cannot be thrown in the garden.



- Domestic composting: OK compost HOME and DIN Home Compostable labels certify that products made from compostable materials are compatible with household and garden composting. Unlike industrial composting, the temperature in garden compost is lower and less constant, so it is a slower process.



In North America, the Institute of Biodegradable Products (IPB or BPI) is the main certifier of packaging and compostable products.

However, not for not being part of the European Union, this certification is different, but both European and American certifications are harmonized, so that the standards used are mutually recognized.

With all this, the BPI Compostable label verifies that the containers or products that possess it will be degraded in an industrial compostability plant.



As shown above, the main European certifications of biodegradable and compostable materials are DIN Certco and TÜV Austria which are based on a series of standards.

Standards are a series of rules, based on scientific studies, used to evaluate biologically based products and bioplastics with the aim that they can obtain certified labels. Being this adherence to the voluntary standards, each company is responsible for seeking compliance with the standards or not.

The main standards bodies that create standards are ISO (International Organization for Standardization), CEN (European Committee for Standardization) and ASTM (American Society for Testing and Materials).



However, in some cases, such as marine biodegradation, these standards are only guidelines and there really is no standard that meets the requirements to be considered biodegradable. In addition, these standards need to be more realistic when simulating natural environmental conditions. That is why research and development is necessary to generate harmonized standards that reflect the general natural conditions and diversity of existing habitats, both in the marine and on the land. Specifically, the study of this issue is being carried out at the University of Alicante through the Bioplastic Lab research group.

In conclusion, bioplastics are a new alternative that seems to be more environmentally friendly compared to conventional plastics. However, the fact that many of them can be biodegradable or compostable does not solve the current problem we face, in which every corner of the planet is contaminated by these materials. So to combat the problem at the root we should reduce its mass consumption, mainly of single-use plastics, encourage the reuse of these materials and make a correct recycling of these.

REFERENCES

- Beltrán-Sanahuja, A., Casado-Coy, N., Simó-Cabrera, L., & Sanz-Lázaro, C. (2020). Monitoring polymer degradation under different conditions in the marine environment. *Environmental pollution*, 259, 113836.
- Textile Exchange Global Recycled Standard (2014). “Global Recycled Standard 4.0”
- Forest Stewardship Council Global Development (25 Mayo, 2018). “Etiquetas FSC”. Available from: <https://ic.fsc.org/es/choosing-fsc/fsc-labels>
- Twenergy (2013). “Guía de los símbolos de reciclaje”.
- Ecoembes. “Guía para reciclar más y mejor”. Available from: <https://www.ecoembes.com/sites/default/files/guia-con-contenedor-residuos-organicos.pdf>
- Martien van den Oever, Karin Molenveld, Maarten van der Zee, Harriëtte Bos (2017). Bio-based and biodegradable plastics - Facts and Figures.
- European bioplastics (31 Mayo, 2018). “Waste management and recovery options for bioplastics”. Available from: <https://www.european-bioplastics.org/bioplastics/waste-management/>
- Biodegradable products institute (2019). Available from: <https://bpiworld.org/>
- Petra Horvat, Andrej Kržan (2012). “Certification of bioplastics”.



Universitat d'Alacant
Universidad de Alicante

UA

UNIVERSIDAD DE ALICANTE

Vicerectorat de Responsabilitat Social, Inclusió i Igualtat
Vicerrectorado de Responsabilidad Social, Inclusión e Igualdad