AllThings.Bio

Food Packaging

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BBI JU

Bio-based Industries Consortium

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Why should we care about food packaging?

Ever bought a bag of sweets, where every sweet was packaged individually, then in a group, and finally in a big bag? If you decided not to buy that brand anymore, you are not alone. In a recent survey, **29% of the respondents said they no longer buy certain brands due to their unsustainable packaging**. The expectation is that the demand for sustainable packaging will continue to grow.

Food packaging comes in different forms, mostly forms of paper (34%) and plastic (37%). Food packaging is not only important to make a product stand out, it also has to keep the food safe during transportation and keep the food fresh by protecting it from factors that speed up spoiling, such as light, dust, or oxygen.

Why should we care about food packaging?

The growing volumes of packaging have an increasingly harmful environmental impact. Global food packaging is responsible for 680 million tonne CO_2 equivalents per year, this is equal to 148 million cars (14% of all passenger cars in the world).
Moreover, inks and dyes from packaging can leach from landfills into the environment, and plastic packaging from litter accumulates in the ocean.

What can be done about this? One option is **recycling**. At the moment, around 2/3 of packaging is recycled in Europe. Another option is to reduce the amount of food packaging. Some food, such as fruit and vegetables, can be sold unpackaged.
However, for other food, such as fresh poultry and milk products, packaging is required to keep the food from spoiling. Therefore, **carefully designed packaging that has reduced environmental impact, while remaining high food quality, is needed**. And replacing the fossil-based feedstock used for food packaging can be an appealing alternative.

Bioeconomy and food packaging

Most of the food we buy is wrapped, bagged or boxed. This is not only true for ready meals, pre-packed sandwiches, salads or to-go beverages, but also for household staples, such as milk, fresh fruit and vegetables. Many food containers utilise composites and plastics derived from petrochemicals. But **these can be replaced by alternatives made from renewable resources**, such as potato starch or wood cellulose.

Renewable biological resources are also called "**biomass**" and are mainly plant material. The products that are made from it are known as **bio-based products**. The production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy, is commonly referred to as "bioeconomy". More information on bio-based products and bioeconomy can be found in our introductory factsheet.

Bioeconomy and food packaging

There are two types of more sustainable materials for packaging: **bio-based** and **biodegradable materials**. These terms may sound similar but they mean different things.

- **Bio-based products** are entirely or partially made of materials of biological origin. They can have many advantages over fossil-based products, such as sustainable production processes, improved functionalities or environmentally friendlier characteristics (e.g. less toxic, biodegradable) to name a few.
- **Biodegradable materials** on the other hand are materials that will decompose under the right conditions and break down into their natural components. Bio-based packaging is not always biodegradable but some packaging is both, bio-based and biodegradable.

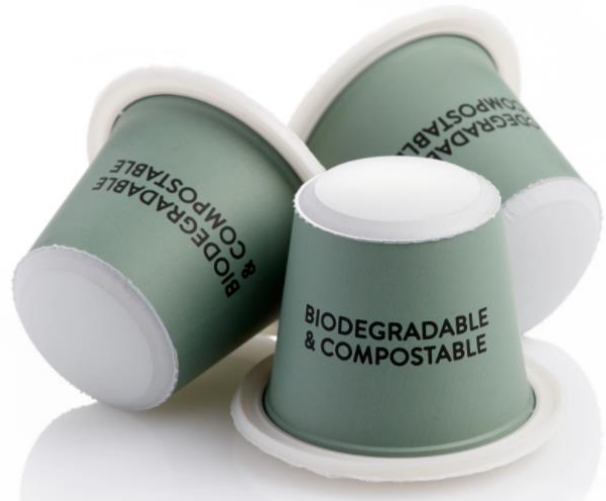


Foto credits: Sourced Coffee

Challenges and opportunities for sustainable food packaging

Anno 2020, only 1% of all plastic packaging is bio-based. The remaining 99% is still fossil-based. A good bio-based option for packaging is the use of paper and board. This bio-based solution has many advantages, such as low CO_2 emissions and a high recycling rate. In many cases, paper and board need a plastic (polyethylene) coating to prevent the paper or board from soaking when packaging liquids or moist food. For a few years now, **the large beverage carton producers have been offering packaging solutions that are 100% bio-based**, e.g. applying polyethylene made from biomass (residues like e.g. sugarcane from Brazil or tall oil from Nordic forests) for re-sealable closures (caps) and coating.

Due to food residues or the use of additional barrier layers in the packaging, not all food packaging is suitable for recycling. Packaging liquids, cooled and frozen food not using any (fossil-based or bio-based) plastic is particularly challenging, due to the highly performant barrier properties of plastics. However, research results in this field are promising, **and the first plastic-free packaging solutions are being launched on the market**.

EU waste legislation, including the Waste Framework Directive and the Packaging and Packaging Waste Directive (last amended July 2018 and enacted into national law by EU Member States since July 2020) is expected to increase the use of bio-based recyclable packaging and bio-based compostable packaging.

What to look out for

If you want to play your part in making the world a bit better, you can of course try to reduce packaging wherever possible and buy food products that come without any packaging.

Sometimes packaging is unavoidable. In such cases, **you could choose renewable or recyclable packaging** - bio-based packaging sometimes is even both. To help you find them, here **are three certified labels you can look for.** They identify materials that contain a certain proportion of bio-based substances referring to the bio-based carbon content.

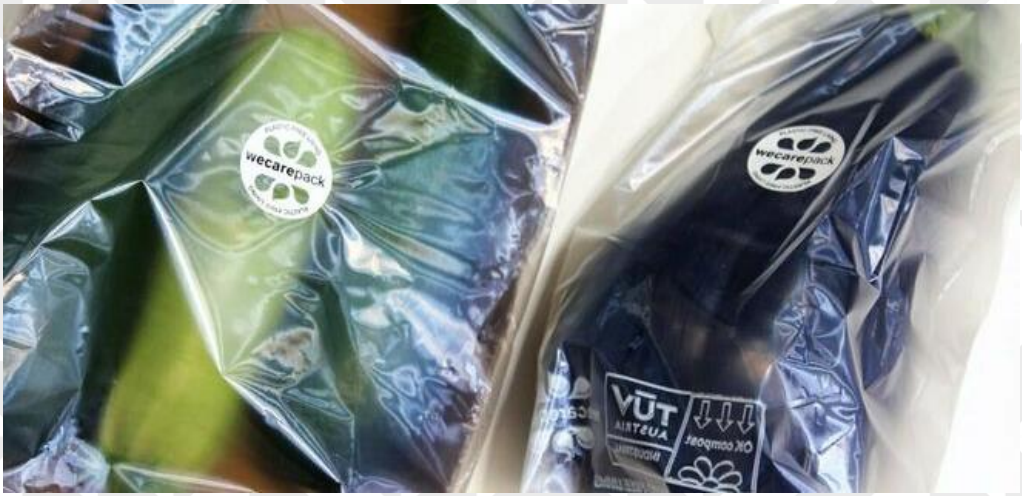


Foto credits: Centro Tecnológico de la Agroindustria Adesva

What to look out for

Note that **bio-based packaging is not always biodegradable**, and biodegradable packaging is not necessarily bio-based. Moreover, it is important to note that there are different types of biodegradable plastics. They sometimes still need industrial conditions to biodegrade, whereas others can be biodegraded at home.

In most cases, **biodegradable plastics still need controlled composting conditions to degrade within a limited time**. It is therefore never a good idea to leave behind biodegradable plastics (or any waste) in the environment.

See below some examples of certified labels indicating that a plastic is biodegradable under home composting conditions.

It is not possible to recognise by eye if a plastic is fossil-based or bio-based and if the material will biodegrade easily. As result of people's ignorance or confusion, **both the bio-based and the fossil-based materials can end up in the household organic waste stream**. Such contamination of source-separated organic waste has generated resistance of waste management companies facing operational problems at composting facilities.

Interact with the bioeconomy

Play our **serious game** to get familiar with the bioeconomy.

Use our **label scanning app** to learn what the bioeconomy labels say about the products they are found on.

Serious Game

Mission BioHero

Scanning App

Label BioHero

Join our **LinkedIn group** to discuss all matters related to the bioeconomy.

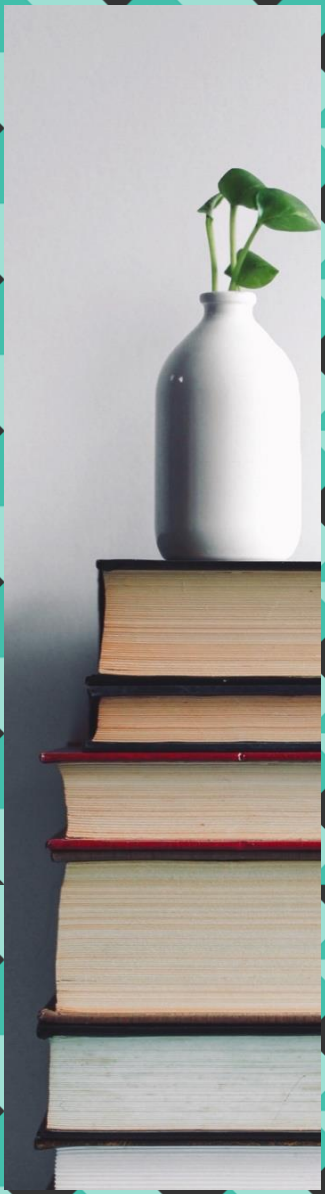
Further reading

Documentation from BioCannDo - Bioeconomy Awareness and Discourse Project (October 2016 – September 2019):

- Quiz on bio-based food packaging
- Page flow on bio-based packaging
- Fact sheet with Key Messages

Additional information:

- Bio-based packaging catalogue developed by Wageningen University.
- Myths and facts on biodegradable plastics, developed in the EU project InnProBio
- Podcast episode on food packaging



AllThings.Bio PRO

Beyond Food Packaging, the Allthings.bioPRO factsheets series covers the project's four missions, tangible themes that are familiar to the wider public, as follows:

- The Bioeconomy
- Jobs and Careers
- Kids and Schools
- Fashion and Textiles

The factsheets are living documents, that are refined and expanded over the duration of the project (September 2020 - August 2023), taking into account feedback collected during engagement with citizens and experts.

The latest editions of the factsheets can be found at the project website, www.allthings.bio.

For more information contact our coordinator Valerie Sartorius, v.sartorius@fnr.de

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