

Bioplastics in agriculture

Bioplastics play an important role in modern sustainable agriculture. Different types of bioplastics offer unique solutions to improve the sustainability of the variety of agricultural plastic items in terms of their environmental impacts and their circularity.

Depending on the application, substituting conventional plastic materials with appropriate types of bioplastics can offer different solutions to improve the sustainability of the plastic items in terms of their environmental impacts and their circularity.

Bioplastics comprise a whole family of different materials. A plastic material is defined as bioplastic if it is either biobased, biodegradable or features both properties. For almost every conventional plastic material and application there is a bioplastic alternative available that offers the same or, in some cases, even better properties and functionalities.



Biobased applications

In the context of agricultural applications, all plastic items that can be collected and recycled can be substituted with biobased, non-degradable materials. They have the environmental advantage of reducing the dependency on fossil resources and reducing greenhouse gas (GHG) emissions or even be carbon neutral. Moreover, biobased plastics can make a considerable contribution to increased resource efficiency through a closed resource cycle and use cascades. Biobased drop-ins can be recycled in existing recycling infrastructures.

Industrially compostable applications

For agricultural plastic items (such as threads, clips, nets, shelters...) that are meant to end up in green waste streams, the substitution with certified industrially compostable plastic alternatives makes sense. Substituting conventional plastics with industrially compostable alternatives will help to avoid persistent microplastics in compost and contribute to soil health.¹ It is necessary to always clarify the environment in which biodegradation is to take place and support these claims with certifications and labels based on the according standards (e.g., EN 13432 for industrial composting).



Image 1-3: Industrially compostable labels

Soil-biodegradable applications

For other conventional plastic applications known to be at high risk of releasing persistent microplastics in the soil (such as conventional non-biodegradable polymers for slow-release fertilisers, seed coating, tree guards, and mulch films), certified soil-biodegradable alternatives should be implemented.

Certified soil-biodegradable mulch films provide significant benefits where full retrieval and recycling of mulch films based on conventional plastics is not always feasible and lead to potential loss of topsoil, or the accumulation of persistent microplastics. They are specifically designed to biodegrade effectively in situ and can therefore be incorporated into the soil post-harvest, which eliminates the need for retrieval and recycling or disposal infrastructures.

¹ Find out more in our Position Paper on Compostable Plastics and their contribution to Soil Health: https://docs.european-bioplastics.org/publications/pp/EUBP_PP_Soil_health.pdf

Soil-biodegradable mulch films should be certified according to the international standards EN 17033 or ISO 23157, specifically dedicated to this application. These standards ensure complete biodegradation in the soil environment in addition to passing comprehensive ecotoxicity testing and strict thresholds concerning other harmful substances. The required testing includes plant growth test, acute or chronic earthworm test, and nitrification inhibition testing. Additionally, there are strict rules when it comes to the usage of regulated metals, Substances of Very High Concern (SVHCs) and Per- and Polyfluoroalkyl Substances (PFASs). Furthermore, EN 17033 gives clear indications on the mechanical and optical characteristics that a biodegradable mulch film should meet in order to be able to agronomically perform well in the field.²



Image 4-5: Soil-biodegradable labels

In 2024, the European Union included certain soil-biodegradable products in the Fertilising Products Regulation (FPR) 1009/2019. Soil biodegradable mulch films, coating agents, and water retention polymers are included in the Component Material Category (CMC) 9 “Other polymers”. With that, biodegradable mulch films have gained the status of Soil Improver (being included in the Product Function Category – PFC 3). From 20 November 2024 for soil-biodegradable mulch films and from 17 October 2028 for coating agents and water retention polymers, these products may carry the CE mark, which means that they have been additionally assessed to meet the high safety, health, and environmental protection requirements³ of the European Union and can be traded on the extended Single Market in the European Economic Area (EEA) without restrictions.



Image 6: CE mark

² Find out more about certified soil-biodegradable mulch films in our Q&A: https://docs.european-bioplastics.org/publications/EUBP_Q_A_Certified_soil_biodegradable_mulch_films.pdf

³ The specific biodegradability criteria for soil biodegradable mulch films, as well as for coating agents and water retention polymers can be found in the respective Delegated Regulations and Annexes:
COMMISSION DELEGATED REGULATION (EU) 2024/2770 of 15 July 2024 amending Regulation (EU) 2019/1009 of the European Parliament and of the Council as regards biodegradability criteria for coating agents and water retention polymers
COMMISSION DELEGATED REGULATION (EU) 2024/2787 of 23 July 2024 amending Regulation (EU) 2019/1009 of the European Parliament and of the Council as regards the inclusion of mulch films in Component Material Category 9

Summary

Different types of bioplastics offer unique solutions to improve the sustainability of the variety of agricultural plastic items in terms of their environmental impacts and their circularity.

- All agricultural plastic applications that can be **easily collected and recycled** can be substituted with **biobased**, non-degradable materials. They have the environmental advantage of reducing the dependency on fossil resources and reducing greenhouse gas (GHG) emissions or even be carbon neutral.
- For agricultural plastics items that are **likely to end up in green waste streams** (such as threads, clips, nets, shelters...), the substitution with certified **compostable plastics** alternatives makes sense. They can help to reduce persistent microplastics in compost and contribute to soil health.
- For other conventional plastic applications **known to be at high risk of releasing persistent microplastics in the soil** (such as conventional non-biodegradable polymers for slow-release fertilisers, seed coating, tree guards, and mulch films), certified **soil-biodegradable alternatives** should be implemented. They help to reduce the accumulation of such microplastics in soil and eliminate the need for retrieval and recycling or disposal infrastructures.
- Certain certified soil-biodegradable applications may be traded as **fertilisers** if they carry the **CE mark**. This includes **soil-biodegradable mulch films** (from 20 November 2024), **coating agents and water retention polymers** (from 17 October 2028). They have been assessed to meet the high safety, health, and environmental protection requirements of the European Union and may be traded on the extended Single Market in the European Economic Area (EEA) without restrictions.

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About European Bioplastics

European Bioplastics (EUBP) is the European association representing the interests of the bioplastics industry along the entire value chain. Its members produce, refine, and distribute bioplastics i.e. plastics that are biobased, biodegradable, or both. More information is available at www.european-bioplastics.org