

Position of European Bioplastics

WHY CERTIFIED SOIL-BIODEGRADABLE MULCH FILMS BELONG IN THE EU FERTILISING PRODUCTS REGULATION

The pathway for including soil-biodegradable mulch films in the Fertilising Products Regulation (FPR) is set. “By 16 July 2024, the Commission shall carry out a review in order to assess the possibility of determining biodegradability criteria of mulch films, and the possibility of incorporating them into component material category 9 in Part II of Annex II” of the Regulation.¹ A first draft assessment report on these biodegradability criteria leads into the right direction.²

European Bioplastics (EUBP) welcomes this report, its scientific approach and the key role given to existing standards, such as the European standard EN 17033³ and the International standard ISO 23517:2021⁴ concerning biodegradable mulch films. While supporting the further investigation of reliable methodologies to evaluate biodegradability in aquatic environments, EUBP underlines that the characterization of biodegradability for a material should be related to the environment where the material is used in and will end its life, which in the case of mulch films is soil.

Benefits of certified soil-biodegradable mulch films

Soil-biodegradable and compostable materials are increasingly used in agriculture.⁵ Certified soil-biodegradable mulch films have been applied on agricultural soils for more than 20 years and their agronomical behaviour and end-of-life have been extensively assessed. They are proven to have a similar agronomical efficiency compared to conventional, non-biodegradable plastics, specifically in terms of increase of yield and quality of crops, control of weeds and increase of soil temperature and moisture. At the same time, they allow the reduction of inputs for cultivation (e.g. herbicides) and add a carbon source into the soil, which can be used, for example, as an energy source by soil microorganisms.^{6, 7}

Certified soil-biodegradable mulch films do not cause loss of agricultural topsoil, whereas non-biodegradable mulch films drag away soil from the fields in a quantity estimated at around 166 kton/yr for Europe when recovered at the end of the crop cycle.⁸

Due to their biodegradability properties, certified soil-biodegradable mulch films help to stop leakage and the accumulation of microplastics in agricultural soils, unlike conventional plastics when these are not completely removed nor properly disposed of. Furthermore, they reduce at source the production of a plastic waste difficult to recycle. This is confirmed in the EU Commission’s “Policy framework on biobased, biodegradable and compostable plastics”.⁹

As such, incorporating this innovative product into the Fertilizing Product Regulation (FPR) would tackle several environmental and agronomic challenges at once, including the need to produce more food from less land and farm more sustainably using less resources.

Biodegradation criteria for certified soil-biodegradable mulch films

Certified soil-biodegradable mulch films are designed specifically for their application on soil and biodegradation in soil. Soil-biodegradable mulch films certified according to EN 17033 are tested for biodegradability in soil and must pass extensive ecotoxicity testing, including plant growth tests, acute or chronic toxicity earthworm tests and soil nitrification inhibition tests. Additionally, there are strict thresholds regarding the residual content of regulated metals, SVHCs and volatile solids.

¹ Art. 50 of (EU) 2019/1009

² AIMPLAS, Plastic Technology Center, presented to the Commission Expert Group on Fertilizing Products its draft final report concerning the study and proposal of biodegradability criteria for polymers to be included in FPR as biodegradable mulch film on 19 April 2023.

³ EN 17033:2018 Plastics - Biodegradable mulch films for use in agriculture and horticulture - Requirements and test methods.

⁴ ISO 23517:2021 Plastics — Soil biodegradable materials for mulch films for use in agriculture and horticulture — Requirements and test methods regarding biodegradation, ecotoxicity and control of constituents.

⁵ Nova-Institut: BioSinn - Products for which biodegradation makes sense. <https://nova-institute.eu/biosinn>. (2021).

⁶ Progetto PA.BI.OR.FR.U., Regione Campania: <http://www.pabiorfru.it/> - 2007-2013.

⁷ Abbate et. Al, 2023, Agriculture, <https://agris.fao.org/agris-search/search.do?recordID=DJ2023010018>.

⁸ EUNOMIA: “Conventional and Biodegradable Plastics in Agriculture” <https://www.eunomia.co.uk/reports-tools/conventional-and-biodegradable-plastics-in-agriculture/>, 2021.

⁹ European Commission: EU policy framework on biobased, biodegradable and compostable plastics. November 2022, p.10. COM(2022) 682.

EN 17033 foresees a complete material biodegradation after two years.^{10,11} Good practice guidance is incorporated within EN 17033 and is part of the producers' communication to the farmers. Adherence to these guidelines ensures controlled biodegradation of the films in soil, avoids any adverse effects on the soil environment and prevents the films from leaking into other environments.¹² As farmers have a direct interest in maintaining soil health, they can be expected to check and follow the labelling and instructions on how to use and dispose these products correctly.¹³

Biodegradation criteria for environments other than soil

To date, there are no indications regarding the risk of substantial migration of biodegradable mulch films from agricultural fields to water bodies and ultimately to the sea. This ecological hazard appears to be unsubstantial given that the mulch films are intrinsically biodegradable and therefore subject to biodegradation not only in soil but whenever active microorganisms are present.¹⁴

Suitable test methods for determining the aquatic biodegradability of mulch films should consider the higher density of these films which would make them sink in the sediments. Therefore, the ISO methods based on the coexistence of seawater and sediments should be used, as such methods have been specifically developed for polymers.¹⁵ In line with EN 17033, a period of 24 months should be given, with 90% biodegradation, absolute or relative to reference material.

To fulfil its primary purpose, i.e., providing a barrier to weed growth for a defined period of time - up to nine months depending on the crop's requirements - soil-biodegradable mulch films need to show a certain stability. Too stringent criteria for biodegradability in aquatic environments would impair this stability in any case and thus negatively affect the primary functionality of the films. ***When developing biodegradability criteria and corresponding test methods for***

aquatic environments, the risk and amount of certified soil-biodegradable mulch films migrating to water must therefore be thoroughly assessed to justify this additional effort and not to pose too high a burden on these innovative materials.

Certified soil-biodegradable mulch films should be covered by the EU Fertilising Product Regulation

European Bioplastics highly recommends assessing the inclusion of certified soil-biodegradable mulch films into the FPR, as stated in the Regulation's recital.¹⁶ Indeed, the FPR appears to be the most adequate legislation to cover these innovative materials, given that it already covers a broad range of products applied to soil and sets high requirements in terms of environmental safety. The inclusion of certified soil-biodegradable mulch films in the FPR will open a single market for producers and users (i.e., growers), guaranteeing at the same time a high level of soil protection and stimulating further investments, innovation, and research in this field which strongly relates to a circular bioeconomy. The environmentally beneficial use of biodegradable plastics is as well anchored in the EU Commission's Circular Economy Action Plan.¹⁷ ***To enable a functioning bioeconomy also in the agricultural sector and to limit the amount of microplastics in agricultural soils, incorporating certified soil-biodegradable mulch films into the FPR is crucial.***

About European Bioplastics

European Bioplastics (EUBP) represents the interests of more than 80 member companies throughout the European Union. With members from the entire value chain, European Bioplastics serves as both a contact platform and catalyst for advancing the objectives of the growing bioplastics industry. For further information, please visit <http://european-bioplastics.org>.

¹⁰ The same applies to ISO 23517:2021, Plastics - Soil biodegradable materials for mulch films for use in agriculture and horticulture - Requirements and test methods regarding biodegradation, ecotoxicity and control of constituents.

¹¹ The conversion into biomass has been proven for PBAT at ambient temperatures in: Zumstein et al., Sci. Adv. 2018; 4; Biodegradation of synthetic polymers in soils: Tracking carbon into CO₂ and microbial biomass.

¹² Yu et al., 2021, Journal of Hazardous Materials Advances, (4), <https://doi.org/10.1016/j.hazadv.2021.100024>

¹³ This assumption is also supported in the EU Commission's policy framework: European Commission: Policy framework on biobased, biodegradable and compostable plastics. November 2022, p. 10.

¹⁴ In fact, data shows that the main microplastic contaminations in oceans are stemming from synthetic textiles, tire dust, road making, marine coating, personal care products and plastic pellets and not from biodegradable materials. See: Joint Research Center of the European Commission: MICROPLASTICS. Focus on Food and Health. Factsheet – December 2017.

¹⁵ Such as ISO 19679:2020 Plastics — Determination of aerobic biodegradation of non-floating plastic materials in a sea-water/sediment interface- Method by analysis of evolved carbon dioxide.

¹⁶ Recital (2) of (EU) 2019/1009. Thanks to the effects of certified soil-biodegradable mulch films on soil physical properties and biological activity, it can be counted as an inorganic soil improver within the Product Function Category (PFC) 3 (b) of the FPR.

¹⁷ See COM/2020/98 p. 13.