

FACTSHEET BIO-BASED PLANT FOIL

Procurement of Innovative Products: Bio-Based Products in Procurement

Why bio-based plant foil?

What is (bio-based) plant foil?

Plant foil can be used to cover agricultural crops, horticultural plants or newly established gardens. By covering the plants or crops with a foil, the soil temperature is increased which will improve growth and germination. In addition the covering of crops and plants eliminates or reduces the use of herbicides and pesticides, reduces water consumption and keeps fertilizer closer to the plant. Plant foil can be used on a small scale by private users or in large applications in the agricultural or horticultural sector. Plant foil is conventionally made from polyethylene. Bio-based plant foil is also available. Bio-based plant foil can be made from various bio-based materials derived from various agricultural products and waste streams. These resources are used to make bio-based plastic (e.g. PLA) which is then used to make plant foil. This factsheet provides information on bio-based plant foil and how to take this into account in procurement.

Why should organisations consider bio-based plant-foil in procurement?

Organisations could consider bio-based plant foil in procurement if they would benefit from one or more of the capabilities attributed to the bio-based plant foil. Bio-based plant foil potentially has different capabilities. Aspects to keep in mind are environmental impact over the life cycle of the product (this could be determined through Life Cycle Assessment in accordance with ISO 14040) and the sustainable sourcing of the input material (this could be assessed in accordance with the sustainability criteria for biobased products from EN 16751 in combination with CEN/TR 16957 - Bio-based products - Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase). With this kept in mind, several potential benefits can also be attributed to bio-based plant foil¹.

- *Reduced Greenhouse Gas (GHG) Emissions:* The greenhouse gasses emitted during the production of bio-based products have the potential to be lower than their petrochemical equivalent².

This is amongst others influenced by the biomass location and cultivation methods applied. Reduced greenhouse gas emissions will in turn contribute to combating climate change.

- *Avoidance of GHG Emissions:* By using bio-based products which replace petrochemical products, GHG emissions can also be avoided. Fossil feedstock need to remain in the ground to achieve the limit of a temperature increase less than 2°C³ as is included in the COP 21 agreement and ratified by UN-countries including the EU.

Reduced GHG Emissions

Biobased PLA has the potential to reduce GHG emissions approximately 30% compared to its petrochemical counterpart. This comparison takes into account CO₂ uptake from the atmosphere, polymer production and incineration but excludes GHG avoidance. Future PLA production could amount to 80% savings. Source: 'Bio-based economy and climate change', Nova Institute, 2017-01.

- *Biodegradability and compostability:* Some bio-based products have the capability of being biodegradable and/or compostable including biodegradable in the soil⁴. Assuming a baseline in which used polyethylene plant foil is either landfilled or burned, switching to plant foil which is biodegradable or compostable, could result in waste reduction and improved resource efficiency. Products which are biodegradable in the soil could have the additional benefit that removal is not needed. The foil no longer needs to be removed but can be left in the field.

- *Lower total cost of ownership:* Because the foil no longer needs to be removed and disposed of, the total cost of ownership of the product could be reduced.

¹ These benefits can differ between products and should always be confirmed by the supplier.

² Bio-based economy and climate change', Nova Institute, 2017-01

³ McGlade C. and Ekins, P. (2015) 'The geographical distribution of fossil fuels unused when limiting global warming to 2 °C', Nature 157.

⁴ Biodegradation is a natural chemical process in which materials are being transformed into natural substances such as water, carbon and biomass with the help of microorganisms. Compostability is a characteristic of a product that enables biodegradation under specific conditions (i.e. a certain temperature, timeframe, etc.). (Source: ISO 472:2013 Plastics - Vocabulary)

How to take into account specific capabilities of plant foil in procurement?

Procedures and purchasing strategies

Procurement within the gardening and landscaping sector often implies procurement of services or works. Plant foil is likely to be procured as part of a service or works contract or form part of a supply contract for other products, such as establishment of a garden. If the procurer wishes to ensure reduced GHG emissions or procure biodegradable or compostable plant foil, the following examples of procurement criteria could be used.

Example 1. GHG Emissions

The potential capability of reducing GHG emissions would be an important benefit and could therefore be confirmed as part of the procurement criteria.

Minimum Requirement: The carbon footprint of the raw material used for fabrication of the plant foil should be less than the carbon footprint of an appropriate reference raw material.

Additional information: The carbon footprint of the raw material

should be conducted in accordance with ISO 14067 or equivalent. An example of a reference raw material could be polyethylene.

Verification: The tenderer shall provide information on the raw materials used and the carbon footprint results, which shall be reported according to ISO 14067 or equivalent. The comparison with the reference raw material shall be included in the report as well as a motivation for the choice of reference material.

Example 2. Compostability

This criterion can be used if the procurer wishes to compost plant foil. Compostability should be determined for either industrial or home composting conditions.

Minimum Requirement: The plant foil used should be compostable under home OR industrial composting conditions (to be selected by the procurer).

Additional information: All materials used in the plant foil must be compostable in accordance with EN 13432:2000 or an equivalent standard. In the case of home composting, the French Standard 'NF T51-800:2015-11: Plastics – Specifications for plastics suitable for home composting' could be used. This standard is based on EN 13432 but has adapted the timing for biodegradability and the temperature at which biodegradability

should take place to match home composting conditions. The manufacturer could also prove compliance with EN 13432 and include an explanation of the testing procedure used to determine biodegradability under home composting conditions.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. A technical dossier of the manufacturer or a test report demonstrating that these requirements have been met is also accepted. The following labels comply with the EN 13432:2000 standard (made applicable for home composting) (or equivalent) and can be used for verification:

- Vincotte: OK compostable
- Din Certo: DIN Geprüft compostable
- Blauer Angel: weil compostierbar

Example 3. Biodegradability in soil

If the procurer wishes to leave the plant foil to biodegrade in the soil, this criterion must be used as an alternative to the criterion on compostability.

Minimum Requirement: The plant foil used should biodegrade in the soil.

Additional information: All materials used in the plant foil must be biodegradable in the soil. To prove this, in practice often use is made of standard EN 13432:2000. When using this standard, the medium in which the biodegradation should take place changes, as well as the timing of biodegradation. Following this information, biodegradability could be proven in accordance with EN 13432:2000 or an equivalent standard such as the French Standard 'NF T51-800:2015-11: Plastics – Specifications for plastics suitable for home composting'. Other standards that can be used are 'ISO 17556:2012 Plastic – Determination of the ultimate aerobic biodegradability of plastic materials in soil', or 'ASTM D5988-12 Standard test method for determining

aerobic biodegradation of Plastic Materials in Soil'. Moreover, French standard 'NF U52-001 Biodegradable materials for use in agriculture and horticulture- Mulching products' and the Italian standard 'UNI 11462 Plastic materials biodegradable in Soil', include specifications defining the test methods and criteria (minimum pass levels) to designate a material as biodegradable in soil

An explanation of the testing procedure used to determine biodegradability under soil conditions should be included by the manufacturer.

Verification: Products holding a relevant label fulfilling the listed requirements will be deemed to comply. A technical dossier of the manufacturer or a test report demonstrating that these requirements have been met is accepted. The following labels comply with the EN 13432 (or equivalent) and can be used for verification:

- Vincotte: OK biodegradable soil,
- Din Certo: DIN-Geprüft biodegradable soil

What bio-based plant foils are available?

The following databases contain information on the availability of bio-based plant foil:

- The 'Datenbank FNR' database (Germany) provides an overview of bio-based plant foil. Information on the product, supplier and whether the product is certified is available within the database.
- The 'CoE BBE' database (the Netherlands) contains one bio-based plant foil product. Information about the producer, product characteristics and whether the product is certified is specified.
- Vincotte provides an overview of the bio-based plant foils that are certified and carry the 'OK Bio-based' label. The product name and a link to the producer website as well as a contact person are supplied.

Points of attention

The following potential barriers and bottle necks have been identified by procurers, policy makers and professionals that work with bio-based products in procurement. The relevance of each of these potential barriers is discussed for the product group 'plant foil':

- **Level of development:** Products from at least 10 producers are commercially available. The level of development is therefore considered reasonably mature.
- **Availability:** Suppliers of bio-based plant foil were found in Germany, Denmark, the United Kingdom and the Netherlands. These suppliers could be contacted for supply to other European countries.
- **Quality of the products:** The quality of bio-based plant can differ, for example the time it takes to biodegrade as well as the medium in which it should biodegrade. Different standards can be applied depending on the medium in which the foil should biodegrade.

