Demonstrate superior bio-based packaging solutions with minimal environmental damage

Produce innovative, high-performance bio-based packaging material with sustainable end-of-life properties at demonstration level, the performance of which is superior to fossil-based alternatives and to existing bio-based material such as paper [4].

Proposals should address only one of the following two objectives.

> They must produce superior, **reusable or recyclable**, bio-based plastic solutions for a specific application that demands reusability or recyclability as the best end-of-life option to prevent environmental damage. The targeted bio-based plastic solutions must be integrated in a circular value chain operating at demonstration level.

OR

> They must produce superior bio-based plastic solutions that are **biodegradable** [5]**, industry compostable, home-compostable or degradable in specific environments**. These solutions must be superior for a specific application that demands degradability/compostability as the best end-of-life option to prevent environmental damage. The targeted bio-based plastic solutions must be integrated in a circular value chain operating at demonstration level.

Proposals in either of the above options must therefore demonstrate and prove both:

- superior performance compared with fossil-based alternatives in comparable applications;
- a sustainable end-of-life causing no damage to the environment.

Achieving both these objectives will pave the way to improved consumer perception and greater consumer acceptance of bio-based solutions.

The demanded proof should meet accepted standards for performance, recyclability and degradability/compostability.

The scaled-up solutions must comply with all applicable regulations (e.g. for food or cosmetics packaging), and with safety regulations in particular.

Proposals should include waste-management actors as beneficiaries for the design of the value chain, including in the end-of-life phase. This is a necessity if the developed packaging solution does not integrate into existing waste-management infrastructure.

Proposals must address all the requirements for demonstration actions shown in Table 3 of the Introduction of the 2020 Annual Work Plan.

The technology readiness level (TRL) at the end of the project should be 6-7. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

INDICATIVE FUNDING:

It is considered that proposals requesting a maximum contribution of EUR 7 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

[4] Several topics in the past AWPs (e.g. BBI 2016.R5 and BBI 2018.SO3.R10) focused on ‘improved packaging solutions’, but this is the first time that such theme is addressed at a demonstration level.

[5] See remarks on biodegradability in the Introduction of the 2020 Annual Work Plan.

Packaging is key to sustaining the quality and durability of consumer and industrial products through their lifespan. Today, most packaging materials are fossil-based and may cause environmental problems at the end of their life cycle if not properly managed.

For example, oxo-plastics (also called oxo-degradable plastics) are used in agricultural films, rubbish bags, carrier bags, food packaging and landfill covers. However, they break down into very small particles, potentially contributing to environmental (soil, marine, air) contamination by microplastics [1] [2]. And not all biodegradable packaging materials disintegrate quickly enough to avoid becoming marine litter or contaminating the soil [3].

With its 2018 plastics strategy, the European Commission has laid out plans to: (i) make all plastic packaging on the EU market recyclable by 2030; (ii) reduce single-use plastics; and (iii) restrict the intentional use of microplastics. Products made from oxo-degradable plastics will be banned from the EU market from July 2021.

Industry can develop and produce bio-based packaging materials that enable better functional performance than their fossil-based counterparts. This improved performance can be improved gas barrier functionality; longer shelf lives for food-packaging applications; and better consumer safety features. In addition, bio-based packaging materials can be made reusable or recyclable in applications that demand recyclability for a sustainable end-of-life. For other applications, bio-based packaging material that outperforms fossil-based alternatives can be made biodegradable22, industry- or homecompostable, or degradable in specific environments if this feature is demanded. These features may be desirable for applications such as food packaging. If a packaging material contains food remains after use, it cannot always be recycled as part of recyclable plastic streams. Making packaging material for specific food applications compostable will allow it to be collected together with food waste and to be composted, thus diverting it from landfill or incineration.

The **specific challenge** is to upscale the production of sustainable and high-performing bio-based packaging solutions that do not create environmental damage during and after use.

[1] COM(2018) 35 https://ec.europa.eu/environment/circular-economy/pdf/oxo-plastics.pdf

[2] Microplastics are synthetic, water-insoluble polymer items smaller than 5 mm that may pollute the aquatic environment and other environments.

[3] Imogen E. Napper and Richard C. Thompson (2019): Environmental Deterioration of Biodegradable, Oxo-biodegradable, Compostable, and Conventional Plastic Carrier Bags in the Sea, Soil, and Open-Air Over a 3-Year Period. DOI: 10.1021/acs.est.8b06984.

EXPECTED IMPACTS LINKED TO BBI JU KPIS:

- contribute to **KPI 1** — create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** — create at least one new bio-based value chain;
- contribute to **KPI 5** — demonstrate at least two new bio-based materials for packaging;
- contribute to **KPI 6** — demonstrate at least two new consumer products based on bio-based chemicals and materials that meet market requirements.

ENVIRONMENTAL IMPACTS:

- minimise landfill or incineration of the packaging material after use;
- reduce greenhouse gas (including CO2) emissions (expressed in CO2 equivalents) in the overall value chain compared with the state of the art;
- contribute to the EU's 2050 long-term strategy for a climate-neutral Europe by replacing fossilbased material with bio-based, renewable material.

ECONOMIC IMPACTS:

- lay the basis for market-acceptable production costs of the targeted bio-based products;
- increase business opportunities for new, innovative and sustainable packaging solutions that have no negative impact on the environment.

SOCIAL IMPACTS:

- create new job opportunities in the bio-based sector in rural, coastal and/or urban areas;
- increase the competitiveness of European biomass producers and the bio-based industry by supporting new jobs, growth, and investment, while ensuring environmental sustainability and an increase in local biodiversity.

TYPE OF ACTION: Innovation action - demonstration action

Last update: 1 November 2023

Permalink: https://cordis.europa.eu/programme/id/H2020_BBI-2020-SO3-D4