

Key recommendations for bio-based and biodegradable materials

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BIO
PLASTICS
EUROPE

The logo features the text 'BIOPLASTICS EUROPE' in a stylized font. The 'O' in 'BIO' is a green circle containing a white shopping bag icon. The 'O' in 'EUROPE' is a blue circle containing a white map of Europe. A green vine with leaves is positioned behind the text.

Scope

- Design thinking approach to support the development of bio-based & biodegradable plastic materials
- Understanding of the fate of biodegradable plastics in the environment
- Efficient feedback into policymaking in research, innovation and technology, in particular in the EU Plastic Strategy



**AGRICULTURAL
MULCH FILM**



**MARINE
GEOMATERIAL**



REUSABLE CUTLERY



RIGID PACKAGING



SOFT PACKAGING



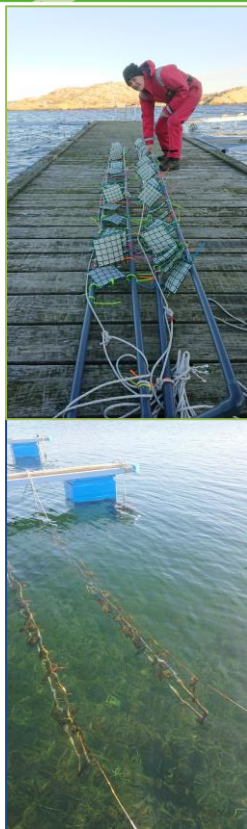
TOYS



FISHING BAIT



FISH CRATES



TYPE OF TESTS CARRIED OUT IN WP5

COMPOSTING and ANAEROBIC DIGESTION

- home-composting (HAW, TUAS)
- lab-scale composting (TALTECH, TUHH)
- lab-scale anaerobic digestion (TUAS)
- industrial composting (TUHH)

RECYCLABILITY

- mechanical recyclability (TUHH)

DEGRADATION

under CONTROLLED CONDITIONS

- accelerated wathering in climate chamber (CNR-IPCB)
- food and cosmetic mimicking tests (TICASS)

in NATURAL ENVIRONMENT

- in soil (CNR-IPCB, TUL)
- in freshwater (HAW)
- in seawater (CNR-SCITEC, IVL)

TOXICITY

on BIOTA

- on marine invertebrates (AWI, IVL)
- on limnic invertebrates (HAW)
- on soil-living organisms and plants (TUL)

under CONTROLLED CONDITIONS

- migration tests (TICASS)

Key critical issues

Feedstocks

- Economical
- Technological
- Social

High price

- Economical

Environmental impacts of production and disposal

- Technological
- Environmental

Recyclability vs. biodegradability according to European policy framework

- Political & Legal

Technical & political aspects: Bio-based plastic content

- Political & Legal

Biodegradation vs. durability

- Technological
- Social

Lack of harmonised waste management system

- Political & Legal
- Economical
- Technological

Unclear labelling

- Political & Legal
- Environmental
- Social

Insufficient implementation of recycling systems

- Economical
- Technological

Findings

- **Great importance of following a circular process** and a continuous **exchange of information** between producers and researchers in test design.
- **Finding a good balance** between material performance and the environmental impact is fundamental.
- **Material biodegradation depends on several factors** such as nature of the material, characteristics of the environment, additives used, and the final product use.
- **Some challenges** still remain especially regarding **degradation under natural conditions** and **ecotoxicity in certain cases**.

Findings

- **Preventing** even **biodegradable plastics from becoming marine litter** and a source of pollution is **essential**.
- The **engagement of stakeholders** with **different backgrounds** and experiences is **crucial** for a strategy development process.
- Biodegradable material is **strongly suitable for some applications**, while it **does not have a clear added value for other ones**.

Recommendations

- **Clear regulations and standards** for bio-based materials at European and national level are a priority for harmonizing the bio-based and biodegradable materials system.
- **Relevant and sensitive toxicity and ecotoxicity tests should be included** for bio-based and biodegradable materials; particularly, for any additives and combinations of additives.
- **Further research on the whole bio-based system** (from production to disposal) should be **encouraged** to overcome technical and economic issues still in place.
- Investing in waste management technologies to **overcome the lack of infrastructures** for bio-based waste management and create efficient disposal systems.
- **Clear and user-friendly communication** is needed to enhance consumer confidence and facilitate the proper use and disposal of bio-based materials.

THANK YOU FOR YOUR ATTENTION!

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