BIOnTop - Introduction and overview on project activities and expected results

Christian Schulz, EU Project Manager

Biobased materials research: Advances from ECOFUNCO & BIONTOP EU-Projects
16.06.2021 | ECOFUNCO Workshop | Online@WebinarMasters

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European Bioplastics: 25 years of bioplastics experience

- European Bioplastics represents the interest of the bioplastics industry along the entire value chain in Europe.
- Our foremost goal and commitment is to build and strengthen a supporting policy framework in the EU for bioplastics to thrive in through a strong network and engagement in dialogue with all relevant stakeholder.

- **Foundation of IBAW**
- Biodegradable polymers
- Germany

- Name change to **European Bioplastics w**ith focus on Bioplastics biobased & biodegradable
- Europe

- Networking on **EU & Member State** level

European Bioplastics at a glance

Members of European Bioplastics – The value chain

Renewable raw materials / Green chemistry

Cargill, Corbion, NESTE, ROQUETTE

Certification

TÜV AUSTRIA, TÜVRheinland, DIN CERTCO, Precisely Right.

Bioplastics manufacturers and auxiliaries

BASF, BIOTEC, NatureWorks LLC, NOVAMONT, TOTAL, Corbion

Converters

Huhtamaki, IMMER, POLIFILM, SIG, SPHERE, wentus

Brand owners

DANONE, FERRERO, LAVAZZA

Research

AIMPLAS, Fraunhofer ISC

*selection of EUBP members in 2020

Networks and Networking hub

- European Bioeconomy Alliance (EUBA)
- Bioplastics Organisations Network (BON) Europe
- Annual EUBP Conference (30/11 – 01/12/2021)

Largest bioplastics industry forum in Europe (more than 350 participants)

www.european-bioplastics.org/events/

Activities & services

- EUBP is a knowledge partner and business network for companies, experts, and all relevant stakeholder groups of the bioplastics industry
- **Our activities and services at a glance:**

> Gathering insights and knowledge about the industry

> Formulating & communicating industry's key positions

> Representing members' policy interests in Europe

> Connecting members with potential business partners

> Facilitating a dynamic stakeholder dialogue

> Supporting standardisation, certification & labelling: EUBP owns the Seedling mark for (industrial) compostability awarded by certifiers DIN CERTCO and Vinçotte

Current research projects – Horizon 2020 & BBI-JU

- **BIOnTop** – Novel packaging films and textiles with tailored end of life and performance based on bio-based copolymers & coatings
  - BBI-JU: 21 partners; 8 countries; 5.4 million €; Lead: AIMPLAS
  - Duration: June 2019 to May 2023
  - **https://biontop.eu/**

- **BIOMAC** – European Sustainable Bio-based nanoMAterials Community
  - H2020: 33 partners; 12 countries; 16.7 million €; Lead: University of Thessaloniki
  - Duration: January 2021 to December 2024
  - **https://www.biomac-oitb.eu/**

- **PRESERVE** – High performance sustainable bio-based packaging with tailored end of life and upcycled secondary use
  - H2020: 26 partners; 10 countries; ~8 million €; Lead: IRIS
  - Duration: January 2021 to December 2024
  - **https://www.preserve-h2020.eu/**

- **BioSupPack** – Demonstrative process for production & enzymatic recycling of environmentally safe, superior & versatile PHA-based rigid packaging solutions
  - BBI-JU: 17 partners; 8 countries; 8.8 million €; Lead: AIMPLAS
  - Duration: June 2021 to November 2024
  - **https://www.biosuppack.eu/**

The Context… currently available packaging materials

Conventional plastic packaging are low cost, light weight, versatile, have good protective properties…

But they:

- Contribute to the **depletion** of our finite non-renewable resources.
- Often use multilayer structures to meet required performances which are difficult to recycle. Same goes for coated textile packaging.
- In addition, in many cases left over products at EoL make material **recycling challenging**.

PLA is currently the most **affordable bio-based and biodegradable plastic** but its biodegradability, and that of many other biodegradable biopolymers, is **not granted in every environment**.

The Context… defficient/currently still linear end of life

Of plastics reaching waste management systems…

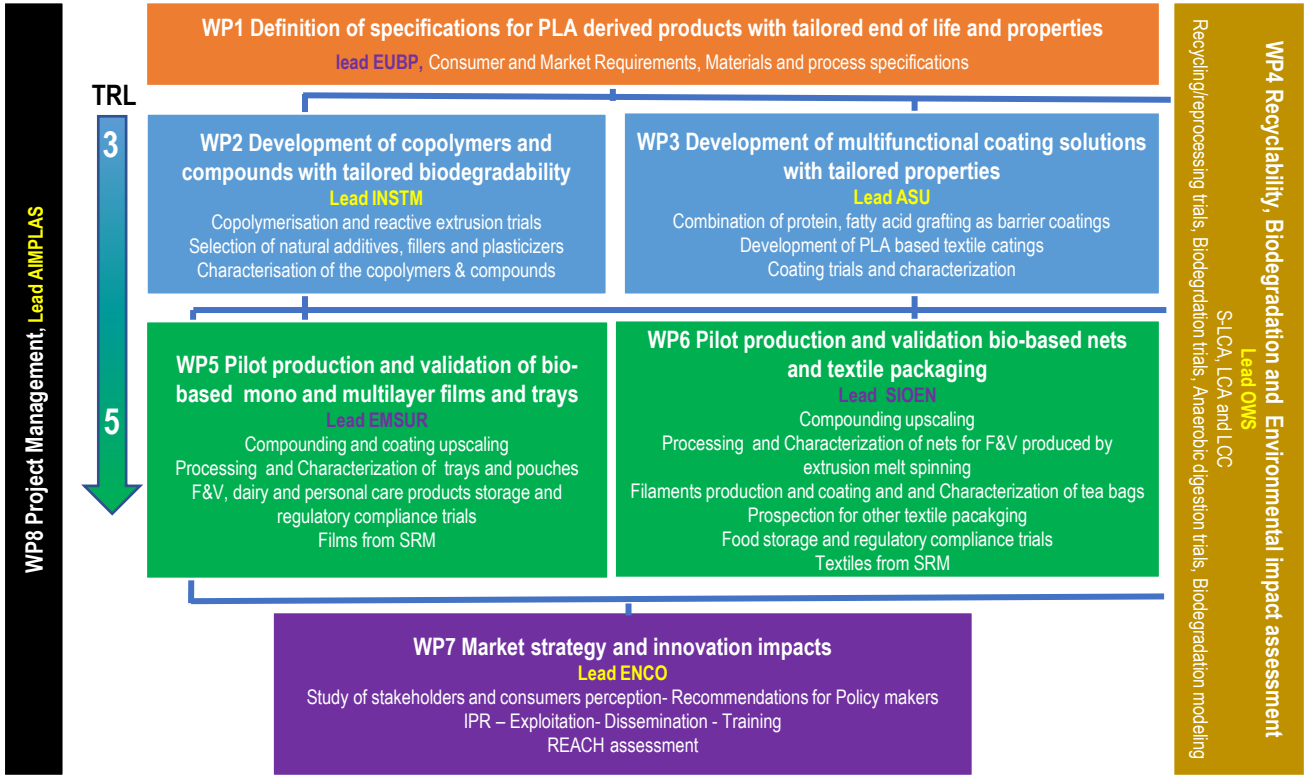
… only < 31 % are recycled,
… 30 – 40 % are landfilled,
… 30 – 40 % are incinerated.

Insufficent collection for organic recycling
… and high environmental leakage

BIOnTop Key figures

- Call topic: BBI.2018.SO3.R10 - *Develop bio-based packaging products that are biodegradable/ compostable and/or recyclable*
- RIA (Start TRL 3-4, Target TRL 5-6)
- 4 years (01/06/2019 – 31/05/2023)
- Budget 5,4M€ (BBI-JU contribution 4,2M€)
- Coordinator: AIMPLAS PLASTICS TECHNOLOGY CENTRE
- 21 partners (4 RTOs, 9 SMEs, 6 Large & a pan EU industry association)
  - **7 BIC members**
  - **+Advisory board**
- 8 countries

Overview on project structure and work packages



Main goals of the project – Novelties & Background

- Tailoring **biodegradation under mild conditions** through:
  - Copolymers from bio-based (malic, succinic) diacids and lactide/ lactid acid or PLA prepolymers
  - PLA reactive extrusion
  - Biocomposites with renewable agricultural filler to speed up disintegration
- Tailoring **barrier and surface properties** through:
  - Fatty acid grafting
  - Whey and alginate coatings
  - PLA coating for textile
- **Upscaling** different **conversion** processes:
  - Melt spinning of Biontop compounds for production of nets, filaments for textiles and non-wovens
  - Blown extrusion of recycled and virgin PLA copolymers
  - Extrusion, lamination, thermoforming
  - Recycling

Novel combinations

Main goals of the project – Prototypes

To develop new bio-copolymers, compounds, biocomposites & coatings formulation and process them into:

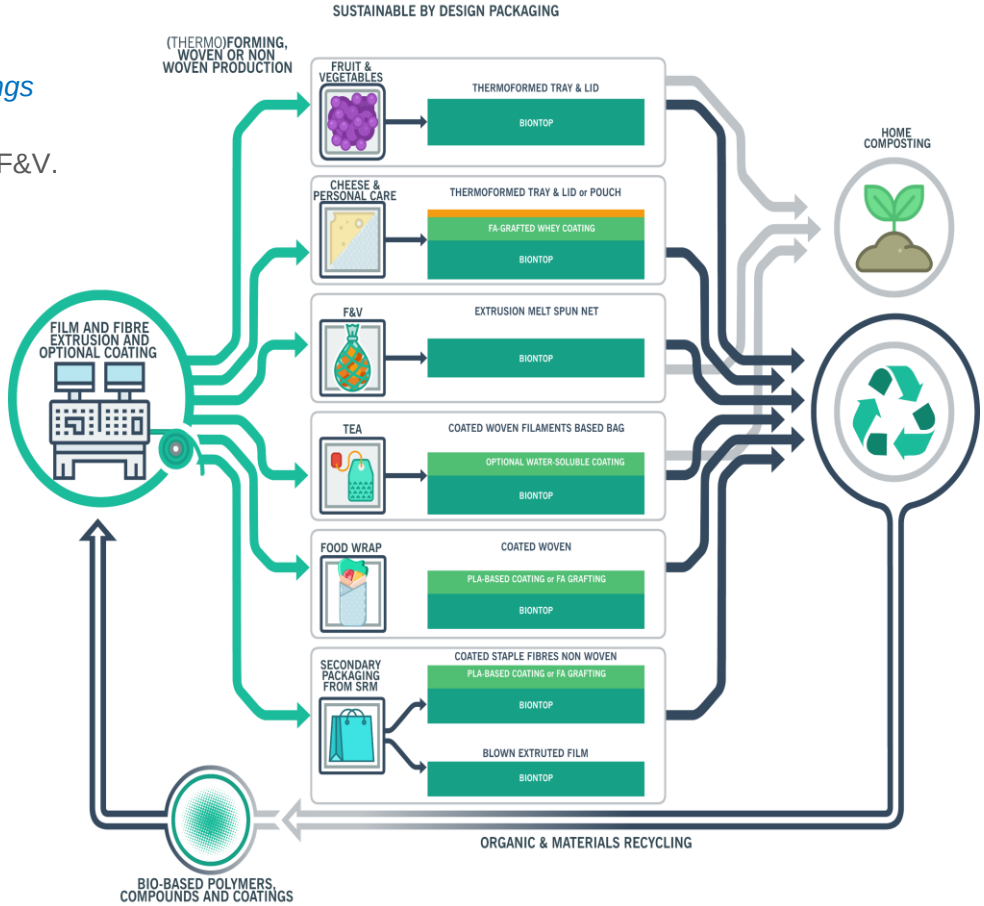
1. Recyclable*, home-compostable monomaterial **trays & films for** F&V.
2. Recyclable*, **multilayer trays & films for MAP** for e.g. dairy and personal care products.
3. Home compostable & organically recyclable **nets for F&V.**
4. Home compostable & organically recyclable **coated textiles** e.g. woven fabric tea bags.
5. Recyclable*, reusable **coated woven fabrics** e.g. food wraps.

Recyclable*, reusable **secondary packaging** from **SRM**:

6. Extruded **blown bags**.
7. **Non-woven bags**.

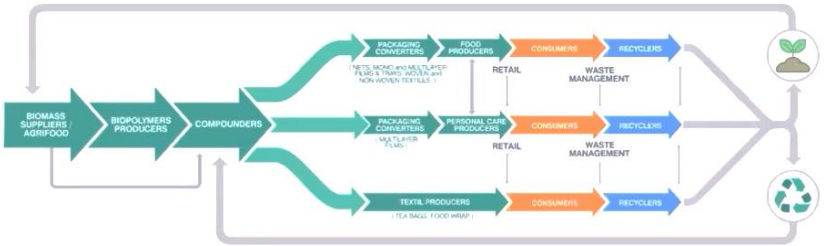
+ Support tools along the life cycle

**industrially recyclable in terms of material & organically*

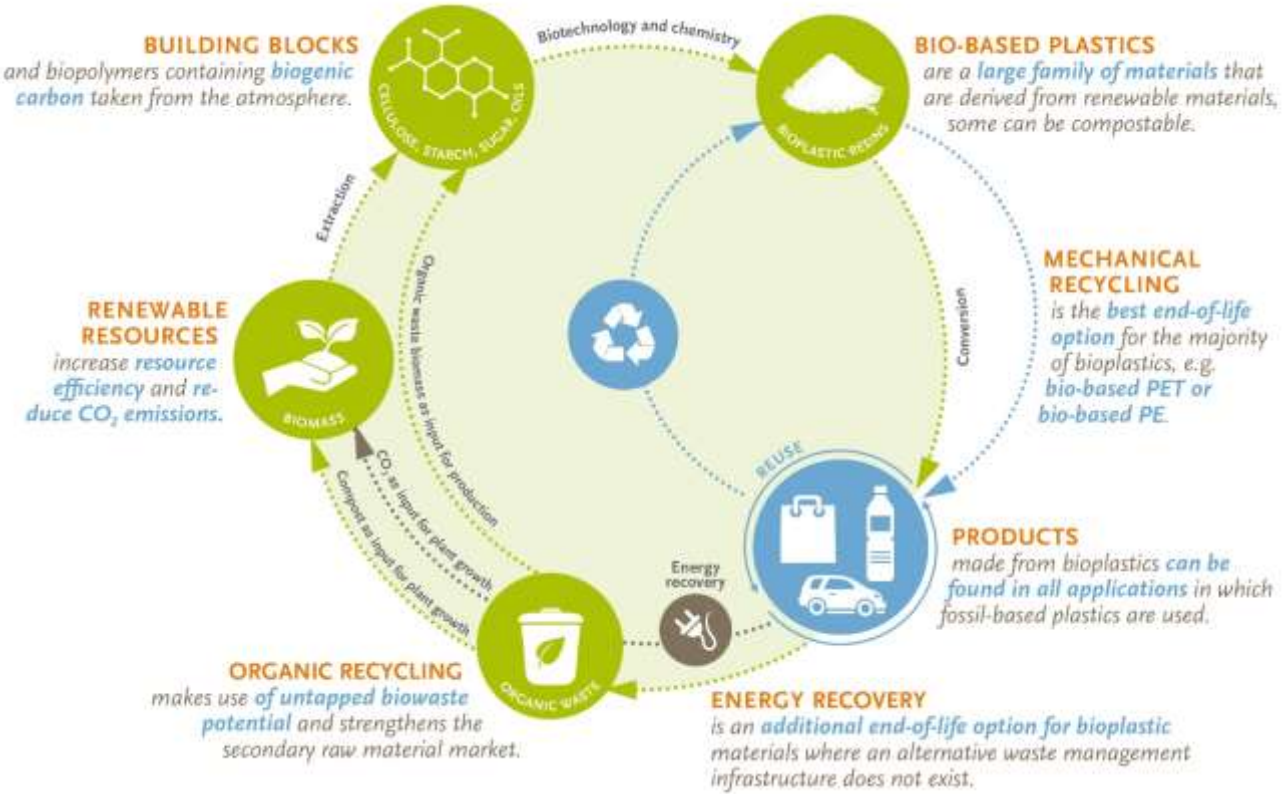


BIOnTop packaging solutions value proposal & impacts

- Close to **100 % bio-sourced** and partly from generation 2/3 feedstocks
- Providing superior **product preservation** in case of barrier packaging and advanced functionalities
- Meeting converters' **processability** (standard techniques used), industry 4.0 optimisation approach
- Versatile to meet the needs of different end users sectors
- Wide range of **products demonstrators** and maximised consumer perception
- **Recyclable-by-design** / End of life options (EoL) adjustable to the respective applications:
    - mechanically **recycled**,
    - **industrially** / domestically **composted**,
    - suitable for **anaerobic digestion**.
- **Eco-design support tool** to select the different materials depending on the target EoL and support circular bio-based value chain approach
- Cost competitive
- Reduction of **EoL handling fees**
- Reduced environmental impact



Bioplastics life cycle model – closing the carbon loop



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