This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union’s Horizon 2020 research and innovation programme under grant agreement No 837761. The JU receives support from the European Union’s Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.
Multilayer packaging are extremely challenging to recycle. PLA’s biodegradability is not granted in every environment.

31% plastic currently recycled

8 million/day plastic items reaching oceans

41% plastic currently incinerated
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 (1/06/2019 – 31/05/2023)

Budget 5.4M€ (BBI-JU contribution 4.2M€)

21 partners (4 RTOs, 9 SMEs, 6 Large & a pan EU industry association)
  - 7 BIC members
  - +Advisory board

8 countries
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Formulation: sustainably sourced comonomers, additives, agricultural fillers to speed up disintegration
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Synthesis: direct polycondensation and batch synthesis followed by reactive extrusion or batch copolymerization
- **Formulation:** sustainably sourced comonomers, additives, agricultural fillers to speed up disintegration

- **Synthesis:** direct polycondensation and batch synthesis followed by *reactive extrusion* or batch copolymerization

- **Conversion:** Extrusion, lamination, thermoforming, melt spinning (nets, textiles and nonwovens), blown extrusion of recycled and virgin copolymers.
Recyclable (material & organically) home-compostable monomaterial trays & films for F&V

Recyclable (mat. & org.) multilayer trays & films compatible with MAP e.g. for dairy & personal care.

Home compostable and org. recyclable nets for F&V.

Home compostable and org. recyclable coated textiles, e.g. monofilament woven fabric tea bags.

Recyclable (mat. & org.) reusable coated woven fabrics e.g. food wraps.

Tailor barrier and surface properties (e.g. for easy emptying): solvent-free grafting of whey protein-based barrier coating on PLA films and textiles.

Coating processes: direct, transfer, hotmelt coatings and direct fatty acid grafting
Material sorting: PLA determination.

Multilayer recycling: effect of proteins

Material reprocessing: mechanical properties, (re)processability of blends, films and trays

PLA degradation in mild conditions: biodegradation under home composting (28°C).

Biodegradation in soil (25°C) and in home composting
Predictive biodegradation modeling as support for eco-design of the new materials applications.

- Setup and data pre-processing, pre-analysis
- Data modeling and calibration.
  - Biodegradation
  - Disintegration
- Case-Based Reasoning model
Tailor barrier and surface properties (e.g. for easy emptying): solvent-free grafting of whey protein-based barrier coating on PLA films and textiles.

Coating processes: direct, transfer, hotmelt coatings and direct fatty acid grafting
Development of multifunctional coating solutions with tailored properties

* Barrier to oxygen & UV (whey)
* Barrier to aroma (e.g., alginates)
* Barrier to water & vapour: hydrophobic grafting
* Barrier to grease & liquids
  (FA for repellence or plastic or PLA coating for textiles).
Development of multifunctional coating solutions with tailored properties

• Development, processing and testing of a new water barrier and repellance coating
Development of multifunctional coating solutions with tailored properties

- Development, processing and testing of a new water barrier and repellance coating
- Processing and testing of the barrier and repellance coatings for films & trays

Thinner films and an alginate and WPI coating for lid film application:

- The films coated with WPI and grafted with fatty acid chloride are thermoformable for small trays
- FA grafting generates a repellent effect to different food simulants (water, oil, ethanol)
- Whey protein coating and FA grafting on small PLA/PBSA trays achieve a BIF (Barrier improvement factor) of ~ 90 (OTR)
Development of multifunctional coating solutions with tailored properties

- Development, processing and testing of a new water barrier and repellance coating
- Processing and testing of the barrier and repellance coatings for films & trays
- Production and characterisation of PLA and FA coatings for textiles

Transfer coating (food wrap):
- Lamination of PLA film on PLA substrate
- Use of low Tg PLA adhesive coating

Direct coating (shopping bag):
- Use of PLA plastisol coating
- Use of crosslinkers to improve durability

Hotmelt coating (textile food wrap):
- PLA in molten state is coated on substrate

Alginate coatings for tea bags
New cross-sector interconnections
New bio-based ‘consumer’ demonstrators
New bio-based value chains
New building blocks, new materials...

* Bio-based value chains.
* Business models
* Market opportunities
* Consumer perception
* Maximise the innovation impacts
* Uptake of the project results for growth and jobs
* Protecting BIOOnTOP knowledge and results (IPR)
* Robust plan for the C&D and exploitation
* Dialogue w/public and policy makers to lobby for the set up of standards and, policy recommendations
This project has received funding from the Bio Based Industries Joint Undertaking (JU) under grant agreement No 837863. The JU receives support from the European Union’s Horizon 2020 research and innovation programme and the Bio Based Industries Consortium.
Thank you for your attention

Rafael Alonso – AIMPLAS coordinator
ralonso@aimplas.es

Marco de la Feld – ENCO (WP leader)
m.delafeld@enco-consulting.it

Sergio J Quesada – ENCO (Project Manager)
quesada@enco-consulting.it