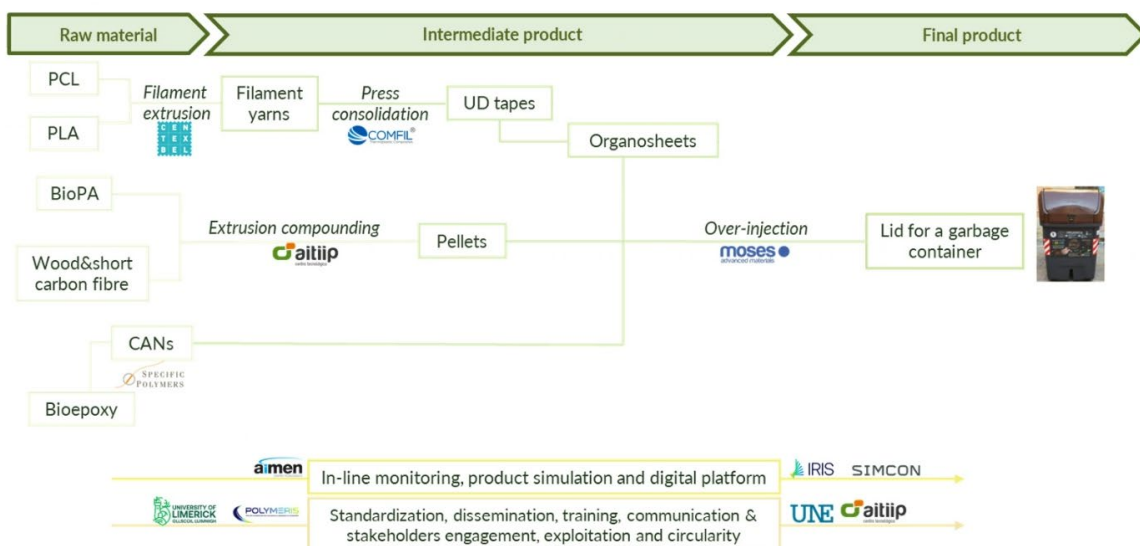


# BIO-UPTAKE

For this second newsletter, after having presented you with a video of our project as a whole, we would like to focus on one of our demo cases: the lid for a garbage container.

**Currently:** Injection moulding of oilbased PE (polyethylene) + EPDM (ethylene propylene diene rubber). Average weight of a lid for a 10.000L container is 22Kg. Requirements for outdoors service life is high-demanding (mechanically, waterproof, UV resistance...)

**What we aim:** Conforming of self-reinforced PLA organosheet & overinjection of reinforced bioPolyamide (short lignin-Carbon and wood fibres). This hybridization will enable to reduce by 35% the final weight of the lid and by 22% the plastic material used. BioPA will ensure the lid to withstand outdoors environment & the application of a reversible adhesive on the organosheet's surface will ensure materials' separation for remanufacture and recycling.



If you have any questions, don't hesitate to ask us!

[www.bio-uptake-project.eu](http://www.bio-uptake-project.eu)

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## OUR PREVIOUS EVENT

After a few months ahead in the project, we already attempted several events where we could present/talk about BIO-UPTAKE:

### AMI2030

Elena Jubete of CIDETEC participated in the AMI2030 Workshop on Sustainable Materials and gave a presentation on "Greener pathways for surface treatments and composite materials" (21st Nov 2023, San Sebastian)

[Read more](#)



### JEC WORLD:

In March, we were at the JEC in Paris. It was a great opportunity to discuss the next steps in the project with members of the consortium, to present the project to an international audience of composites professionals and to receive expressions of interest for future collaboration.

[Read more](#)



## NEWS

**We have made progress in our second work package about Optimization and manufacturing of intermediate bio-composite formats. Please see below the news that can be shared with you:**

### Multifilament production

Centexbel produced high tenacity multifilament yarns of high-melting and low-melting PLA. In addition, multifilament yarns of PCL were produced. Both yarns have been sent to Comfil to produce UD-plates by commingling the yarns. Regarding the PLA and PCL yarns, Centexbel is optimizing the process for lower shrinkage and higher mechanical properties. Work on monofilament extrusion of PCL, PLA/PCL blends and bicomponent core/sheath extrusion of PLA/PLA is also ongoing.



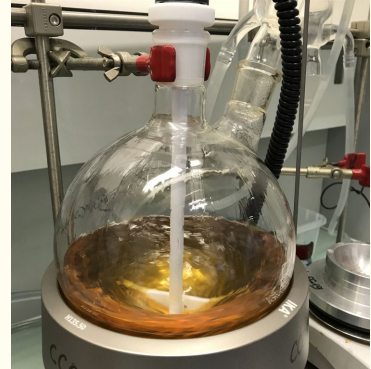
## From the yarn to Unidirectional materials

Comfil® has spun out different matrix materials. Together with the high tenacity (HT) yarn from Centexbel and the matrix fibres, several commingled yarns have been developed. From the yarns, UD materials were developed, manufactured and consolidated on our press facilities. During the testing, a high shrinkage was discovered, and work has been initiated to minimize the shrinkage. Work on consolidation and forming of parts has also begun on the press facility.



## Fabrication of 3R-CAN resins

Specific Polymers has produced 500g-batches of sustainable epoxies based on vanillin (DGEVA) and phloroglucinol (PHTE) and transfer to CIDETEC for the fabrication of 3R-CAN resins. Specific Polymers is also developing bio-based adhesive formulations and their bonding-debonding behavior.



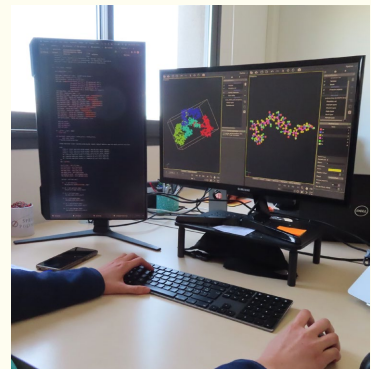
## Pull off testing

Pull-off test equipment has been purchased to compare the adhesion strength of formulations on wood and PLA substrates.



## Simulations

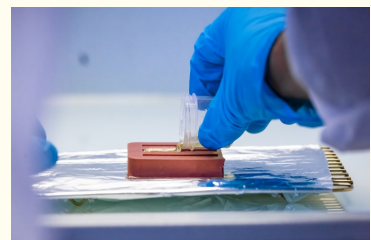
Reference systems based on DGEVA resin combined with various dynamic hardeners were simulated using molecular dynamics, resulting in good correlation with experimental data for routine properties (density, Tg). Initial attempts to simulate thermoplastic substrates were made, focusing on defining the best force-field and modeling parameters.



## Development of formulations for manufacturing bio-based preregs

Cidetec has been working on the development of 3R (recyclable, reprocessible and repairable) formulations to be used in the manufacturing of bio-based preregs that later will be used for bathroom ceiling manufacturing in WP3. Two separate pathways are being followed so far:

1. optimization of the bio-based 3R epoxy resin formulation by combining the bio-based epoxy resin (DGEVA) received from SP with a dynamic hardener in different ratios and with the addition of different flame retardants. Physico-chemical properties of all the prepared formulations, as well as their thermo-mechanical and dynamic properties are being characterized and assessed in parallel to the development of the formulation in order to select the most appropriate one for up-scaling;



2. since the bio-based epoxy resin is not available yet in big quantities, a second route is being followed for the prepreg manufacturing process optimization: a commercially available epoxy resin (with similar viscosity and Tg range of DGEVA combined with the dynamic hardener) is being used to prepare formulations with different flame retardants and different Tg values. These formulations are being thoroughly characterized in parallel too and the most suitable one has been selected for manufacturing the first rolls of prepreg material with two different kinds of flax fibre.

### Manufacturing of fibre reinforced bio-pellets

In Task 2.4, Aitiip's objective is to manufacture pellets of reinforced bioPA to be used as nerves in lids for garbage containers. During these first months, we have extruded and characterised composites reinforced with recycled carbon fibre, using as matrix PA11 as well as PA10-10. Our next steps will be to reinforce both matrixes with recycled wood fibre.



**If you are interested in the solutions we have developed or would like to know more, please don't hesitate to contact us!**

## NEXT EVENTS

You want to meet us in person, so don't hesitate to come to these events and follow our social media to see where we will be located!

- **[Manufacturing Partnership Days 2024](#)**: 08/05/2024, Brussels (Belgium)
- **[EUBCE 2024](#)**: 24-27/06/2024, Marseille (France)
- **[R4 Composites](#)**: 8-9/10/2024, Toulouse (France)

## MORE INFORMATION ON BIO-UPTAKE

If you want to know more about us, visit our linkedin page to see the presentation of the different partners. You will discover the majority of the members involved in the project and their role with videos and images!

[Watch the video](#)

Stay connected with us and we will resume our content with another newsletter around late 2024.

[Register to our newsletter](#)



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the European Union

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