INN PRESSME

Increasing the production of bio-based nano composites

cea

APPLICATIONS: CONSUMER GOODS | PACKAGINGS | ENERGY & TRANSPORT

DEVELOPMENT: FORMULATION

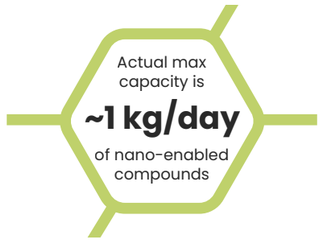
CURRENT-STATUS

The POUDr'innov pilot line developed by CEA is specialised in the development of thermoplastics compounds from bio-resources or from end-of-life polymers.

The bio-based polymers activities include:

- Comparison of bio-based and oil-sourced polymers in terms of mechanical properties and sustainability.

- Formulation of bio-based polymers with bio-based fillers (vegetal fibres) and nano-fillers for properties improvement.



CHALLENGE

Primary development of thermoplastics composites containing nano-fillers, usually involve the preparation of a master-batch by solvent casting under laboratory hood.

This process induces limitations in terms of production rate.

The handling of nanomaterials for the elaboration of nano-enabled polymer composites requires a specific know-how in terms of nanosafety (personal protective equipment, filtrated air conditioning).

FURTHER DEVELOPMENT

The use of a direct and continuous melt mixing process, using twin-screw extruders for example, is more suitable for manufacturing nanocomposites and can be easily upscaled for a high production rate and a lower cost.

After upgrading the pilot line with specific nano safety equipment, the Pilot Line would be able to produce up to 10 kg/h of nano-enabled bioplastics by extrusion, in the form of pellets for injection-moulding, or extruded films for packaging or printed electronics applications.

BENEFITS FOR COMPANIES AND SME'S

The Pilot line is supporting SMEs and companies interested in the development of nanocomposites with no experience in nanomaterials handling at the industrial scale, from the materials fine-tuning (few kg) up to pilot scale (50 kg) for materials qualification.

The companies will get feedback on the global process of materials production, the safety requirements to manage the risks with nano handling and access to the OPEX and CAPEX values for such manufacturing line.

Industries interested in printed electronics from nano-enabled materials will find a unique environment which will allow them to better manage nano-safety issues up to the development of 2D substrates for preliminary printing test.

APPLICATION EXAMPLES

TRANSPORT

CEA POUDR'INNOV Pilot Line will select raw materials and formulate nano-enabled bio-thermoplastics with specific aesthetical (e.g. high gloss effect) and structural properties for car components.

SPORT

In the frame of the development of bio-based antibacterial sport goods like fascia rolls, CEA POUDR'INNOV Pilot Line will improve the mechanical properties of biopolymers by integrating flax/hemp microfibers in their formulation.

PRINTED ELECTRONICS,

Using the new cast film extruder, CEA POUDR'INNOV Pilot Line will develop new biobased and/or biodegradable films for printed electronics applications.