

Growing pots and soil mulch films - BIOMAC Test case #2

BIOMAC, as an open ecosystem, focuses on the creation and validation of new supply and value chains where technologies that are being scaled-up and validated to TRL 7, accelerating their exploitation potential. The BIOMAC OITB has been built to address 5 Test Cases (interTeCs) for the validation selected based on their complexity in order to involve different pilote lines as well as the supporting services and thus provide a holistic feedback for the operation of the OITB as a whole.

The TeC2 "Agricultural applications" is led by Novamont and it aims at validating the use of different intermediates for the preparation of biomaterials with application in agriculture.



1. Biopolyester-based biomaterial for injection molded black grow pots



A biobased and biodegradable thermoplastic material suitable for injection molding applications and designed to provide rheological characteristics and recyclability potential suitable for valorization in black grow pots. The grow pots could be mechanically recycled at the end of their life and industrially composted if contaminated by organic residues.

The biomaterial is obtained starting from Novamont's formulations including its proprietary biopolyesters and biochar from EUDIN.

Biomaterial granules and injection molded grow pots obtained by Novamont and including biochar from Miscanthus straw pellet provided by UEDIN.

Potential benefits

- Alternative to the use of fossil-based carbon black with exploitation opportunity in sustainable horticulture and floriculture nurseries
- No accumulation in open environment during recycling or in case of accidental dispersion
- Possibility to recover pots contaminated by organic residues through industrial composting
- Reduction in cost of the final bioproduct using economically sustainable biochar grades as filler

2. Biopolyester-based biomaterial for injection molded brown grow pots

A biobased and biodegradable thermoplastic material suitable for injection molding applications and designed to provide rheological characteristics and recyclability potential suitable for valorization in brown grow pots. The grow pots could be mechanically recycled at the end of their life and industrially composted if contaminated by organic residues.

The biomaterial is obtained starting from Novamont's formulations including its proprietary biopolyesters using nanolignin from CNANO.



Potential benefits

- Nanolignin shows a thermoplastic behavior within a specific temperature range suitable for obtaining injection molded parts with uniform color distribution
- The natural color of lignin provides a natural coloring to the final product

No accumulation in open environment during recycling or in case of accidental dispersion
Reduction in cost of the final bioproduct using economically sustainable nanolignin grades as filler.

Injection moulded grow pots based on NVMT's biopolyester and including nanolignin

3. Biopolyester-based biomaterial for injection molded grow pots including biobased succinic acid

A biobased and biodegradable thermoplastic material suitable for injection molding applications including a biopolyester derived from biobased succinic acid from the fermentation of Miscanthus' sugars. The grow pots could be mechanically recycled at the end of their life and industrially composted if contaminated by organic residues.

The biomaterial is obtained from Novamont's formulations including its proprietary biopolyesters prepared from succinic acid by ATB.



Potential benefits

- Potentially >95% RRM biomaterial from EU feedstock
- No accumulation in open environment during recycling or in case of accidental dispersion
- Compatible with standard mechanical recycling processes

Injection moulded grow pots based on NVMT's biopolyester derived from biobased succinic acid

4. Starch-based biomaterial for black biodegradable in soil mulch film

A biobased and biodegradable thermoplastic material suitable for film blowing applications and designed to provide mechanical properties suitable for in-field deployment compatible with standard agricultural machinery. The mulch film is tilled in the soil at the end of the crop cycle and it undergoes biodegradation in soil without accumulation.

The biomaterial is obtained from Novamont's proprietary formulations including thermoplastic starch and biochar by EUDIN.



Potential benefits

Alternative to the use of fossil-based carbon black with exploitation opportunity in 100% biobased agrofilm for biological agriculture applications

- Valorisation of biochar from EU biomasses for agricultural applications in a circular bioeconomy case study

Film blowing of biomaterial by NVMT including biochar and final film roll

5. Starch-based biomaterial for brown biodegradable in soil mulch film

A biobased and biodegradable thermoplastic material suitable for film blowing applications and designed to provide mechanical properties suitable for in-field deployment compatible with standard agricultural machinery. The mulch film is tilled in the soil at the end of the crop cycle and it undergoes biodegradation in soil without accumulation in open environment.

The biomaterial is obtained starting from Novamont's proprietary formulations including thermoplastic starch using nanolignin by CNANO.



Film blowing of biomaterial by NVMT including lignin at different concentration

Potential benefits

- Nanolignin shows a thermoplastic behaviour within a specific temperature range suitable for obtaining mulch films with low unmelts and improved mechanical properties due to a more homogeneous distribution.
- The natural colour of lignin offers the opportunity for the valorisation of brownish mulching in those local communities where the use of more visually impacting black mulch films is discouraged.
- Valorisation of lignin from EU biomasses for agricultural applications in a circular bioeconomy case study.

6. Starch based biomaterial including polyols and diols for biodegradable in soil mulch film

A thermoplastic biobased and biodegradable material suitable for film blowing applications and designed to provide improved mechanical properties suitable for in-field deployment compatible with standard agricultural machinery thanks to the use polyols and diols (e.g. sorbitol) as the plasticizer of starch.

The biomaterial is obtained from Novamont's proprietary formulations including thermoplastic starch, using polyols and diols from AUTH (PL3).



Potential benefits

- Valorisation of sugar sidestreams from EU biomasses for agricultural applications in a circular bioeconomy case study.

Film blowing of biomaterial by NVMT including polyols and diols (e.g. sorbitol) from PL3



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