NOVAMONT
A Versalis Company

Agricultural solutions to eliminate persistent microplastics in soil and compost

Case Study

Mater-Bi® for biodegradable and compostable twines & clips

"Mater-Bi® is the result of more than 30 years of Novamont research and innovation. It was not only the first biodegradable and compostable bioplastic on the market, but also a product that is constantly evolving towards greater sustainability and circularity, for an ever more efficient use of renewable resources thanks to an increasingly integrated European value chain.

We are proud that our solutions were successful in the Bayer CropScience trials and can help farmers around the world to improve the sustainability of their production while ensuring soil quality."

Marco Pecchiari
Head of Ecology of Product and Environmental Communication - Novamont SpA

"In Bayer CropScience, a company committed to innovation in agriculture, we have been looking for alternatives to conventional plastics that will support a sustainable end-of-life for crop waste products.

Over 1 year, we successfully trialed biodegradable and compostable Mater-Bi® based twines and clips for the trellising of crops in over 80 hectares at our experimental fields in Spain. The twines and clips met the requirements for tenacity, resistance and flexibility for the duration of the entire crop cycle. They are also easy to use, even with gloves, making the task of trellising more comfortable.

Critically, these innovative solutions enable the composting facility to process the vegetable waste together with the Mater-Bi® twines and clips, without contaminating the final compost."

Alejandro Caravaca
Head EMEA Veg R&D Sustainability and Outreach - Bayer CropScience, SLU

BAYER

Excellent performance of compostable twines, including the challenging horizontal support of pepper crops

Type of crops tested	Tomato & Cucumber	Tomato & Melon	Cucumber & Pepper
Growing season	Spring - Summer	Autumn - Winter	Autumn - Winter
Period	April - June/July	July - February	July - February
Cultivated area	8,000 & 4,000 m^2	40,500 & 5,000 m^2	14,500 & 21,000 m^2
Kg max supported load	~ 15 kg & ~ 20 kg	~ 15 kg & ~ 10 kg	~ 5-7 kg
Climatic conditions in the greenhouse (max. & min.)	35 - 40 °C HR 90% & 30%	20 - 40 °C HR 80% & 25%	20 - 35 / 40 °C HR 90% & 50% / 25%

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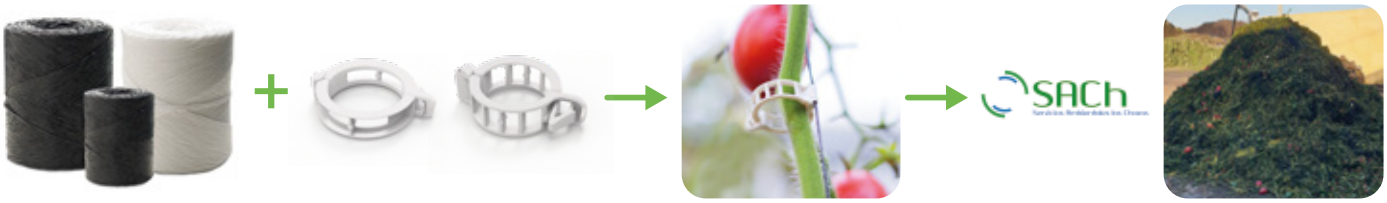
Process Description

- The Experimental Fields, located in El Ejido (Almería, Spain), are a cornerstone of a major Bayer CropScience hub focused on horticultural crops for breeding development in greenhouses.
- Mater-Bi® based twines, black and natural color, and clips were used in tomato, cucumber, pepper and melon, during the two main growing seasons: Spring-Summer and Autumn-Winter.
- The compostable support devices for trellising coupled with vegetal waste, at the end of each growing season, have been sent to be treated in SACh's composting plant in El Ejido.



The Challenge

The big challenge for Novamont was to replace the highly performing polypropylene (PP) based twines and clips, with biodegradable and compostable ones, to better manage the vegetable waste at the end of each crop cycle. In addition, these new support devices had to maintain the required performance in the field during all crop cycles, while facing the extreme climate conditions of the greenhouses (T °C, HR %, UV radiation).

The Solution

Agricultural twines and clips made with Mater-Bi®, produced on conventional thermoplastic processing equipment, were found to meet or exceed requirements for performance, flexibility and ease of use compared to the conventional plastic products. The clips adhered to the rigors of twine movements due to the strong design of the clips grippers.

The Mater-Bi® products exceeded the technical requirements for the applications but are also fully compostable along with agricultural waste at the end of the crop cycle. The Mater-Bi® products will make the composting of vegetable waste more efficient and eliminate the risk of persistent microplastics in compost or soils. These compostable Mater-Bi® products have a bio-based content greater than 50% and are certified to ISO 14067:2018 (carbon footprint).

The Outcome

This Bayer CropScience trial pushed materials to extreme weight bearing limits. Within these extreme conditions, quality, strength, durability and excellent performance were found. Mater-Bi® based twines and clips matched expected performance of the ones made of PP, but exhibited improvements on its application. Furthermore, these materials have been very easy to process into high quality compost, at SACh's composting plant.

Scope of Supply

- 1,300,000 lineal metres of twines (400 m/kg) in Mater-Bi® produced by SICOR SOCIEDADE INDUSTRIAL DE CORDOARIA, S.A.
- 180,000 units of clips (26 mm diameter) in Mater-Bi® produced by ARaymond

NOVAMONT Supports You With:
Know-How and experience sharing with biopolymers.
Close collaboration and partnership, supplying from short distance.
Biodegradable and compostable solutions certified according to the European EN 13432 and other international standards.

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