BIOPLASTICS WITHIN A CIRCULAR BIOECONOMY PERSPECTIVE

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NOVAMONT

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Certified B Corporation™

OUR DNA

NOVAMONT: A GROUP WITH A TRIPLE VOCATION

Novamont is a Benefit Company, B Corp certified, international leader in the bioplastics sector and in the development of bioproducts and biochemicals obtained through the integration of chemistry, environment and agriculture.

INDUSTRIAL STRUCTURE

- Turnover: **287 mln/€***
- **> 600** people*
- **9 Mater-Bi** production lines
- **5 Origo-Bi** production lines
- **1** plant for the production of **Matrol-Bi**
- **1** plant for the production of **Bio-Bdo** from fermentation
- **1** plant for the production of **Thf**
- **1 plant for the production of biodegradable applications**
- **1** JV with Eni Versalis, Matrìca

RESEARCH & DEVELOPMENT

- **3** research centres
- **3** technological hubs with demo and pilot plants
- **~ 5%** of investments compared to turnover*
- **> 20%** of people dedicated to research, development and innovation activities*
- **5** world-first technologies
- **~1.400** patents / patent applications*

TRAINING CENTER

- **> 400** training activities since 1996 for young researchers and experts
- multidisciplinary training paths activated on complex projects
- collaborations with national and international universities and research centers

*2020 data

BIOECONOMY AS TERRITORIAL REGENERATION

THE THREE PILLARS OF OUR CIRCULAR BIOECONOMY MODEL

REINDUSTRIALIZATION OF NO MORE COMPETITIVE SITE

Biorefineries built starting from the reindustrialization of no longer competitive production sites. Development of innovative and sustainable processes that contribute to the decarbonization of the economy. Research and innovation for the transformation of waste and by-products from the value chain into new bioproducts.

INTEGRATED AGRICULTURAL VALUE CHAIN

Research and innovation for the development of agricultural value chains with low environmental impact, through the enhancement of marginal lands that are not in competition with food. Promotion of sustainable agricultural practices aimed at bringing organic matter back to the soil to regenerate its fertility.

PRODUCTS AS SOLUTIONS

Products designed to close the carbon cycle and to ensure that no persistent substances accumulate in compost, in purified water, in sludge, and in soil, overcoming the problem of pollution.

THREE DIFFERENT FEATURES

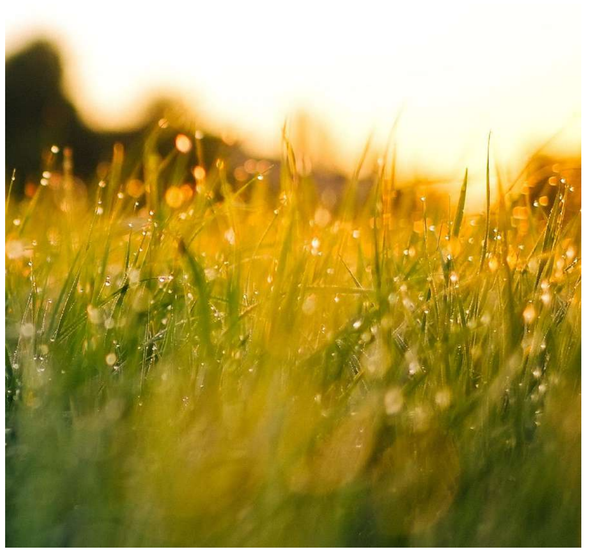
ABOUT WHICH OFTEN THERE IS STILL CONFUSION

BIODEGRADABILITY

The ability of an organic substance to turn into simpler substances through the activity of micro-organisms (biodegradation). If the biodegradation process is complete, the organic substance is converted entirely into simple molecules: water, carbon dioxide, methane and new biomass.

COMPOSTABILITY

The property of biodegradable organic materials (food and grass cuttings, manure, some types of bioplastic, etc.) of being converted into compost in composting plants according to the harmonized standard EN 13423.



RENEWABILITY

A material can be defined as truly renewable if this material is restored, through natural or man-controlled processes at a rate comparable to that of its exploitation. It follows that a material is renewable if its raw materials derive from plant or animal sources.

PRODUCTS AS SOLUTIONS

SECTORS WHERE BIODEGRADABILITY AND COMPOSTABILITY REPRESENT AN ADDED VALUE

SEPARATE COLLECTION

Bioplastics help to **improve the management of organic waste,** reducing the **possibility of pollution** and consequently promoting the production of **high-quality compost**

LARGE RETAIL

Carrier bags and **fruit & vegetables bags** adopted by the large-scale distribution can be re-used for the organic waste separate collection

FOODSERVICE

Compostable foodservice ware **simplify waste management** when it is not possible or practical to use washable and reusable ones, such as in major events or in catering services

FOOD PACKAGING

Biodegradable and compostable packaging for products, if disposed of in the **organic waste collection** and recycled, could be transformed into **compost**

COFFEE CAPSULES, LABEL, CLING FILM

In some specific applications, **compostability** avoids organic waste going to disposal and it avoids the **contamination of other waste streams** with food residues

AGRICULTURE

Biodegradable in soil products simplify plastic waste management operations, significantly **reducing the possibility of pollution** in those applications where there are high rates of dispersion in the environment, as in agriculture.

A POWERFUL LINE OF CIRCULAR THINKING

LINKING MUNICIPAL ORGANIC WASTE WITH COMPOST AND AGRICULTURE INVOLVING CITIZENS

Mater-Bi F&V Bags with best LCA and high renewable content (>60%)

- Create awareness
- Suggest the right tools

Re-use of Mater-Bi® F&V bags as replacement of waste bags

Additional amount of organic waste (1 kg / F&V bag) collected thanks to the re-use of the F&V bags in Mater-Bi®

Composting

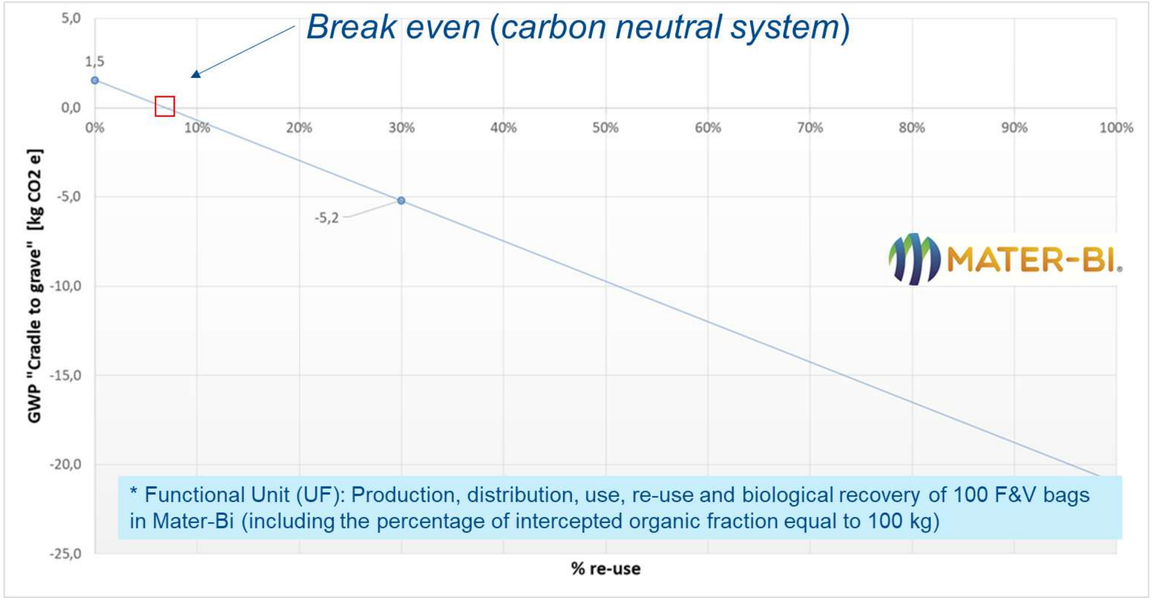
High quality Compost

Use of compost in agriculture (C-sink)

ENVIRONMENTAL BENEFIT | **ENVIRONMENTAL IMPACT** | **USEFUL PRODUCT** | **ENVIRONMENTAL BENEFIT**

Greenhouse gas emissions *as a function of the% re-use of the Mater-Bi® F&V bags:

The LCA analysis shows that already at 7% of re-use of the F&V bag in Mater-Bi® the system becomes carbon neutral



A GREAT COLLABORATION PLATFORM

THE NETWORK OF THE ITALIAN BIOPLASTICS VALUE CHAIN

Converters and brand owners

Public administrations

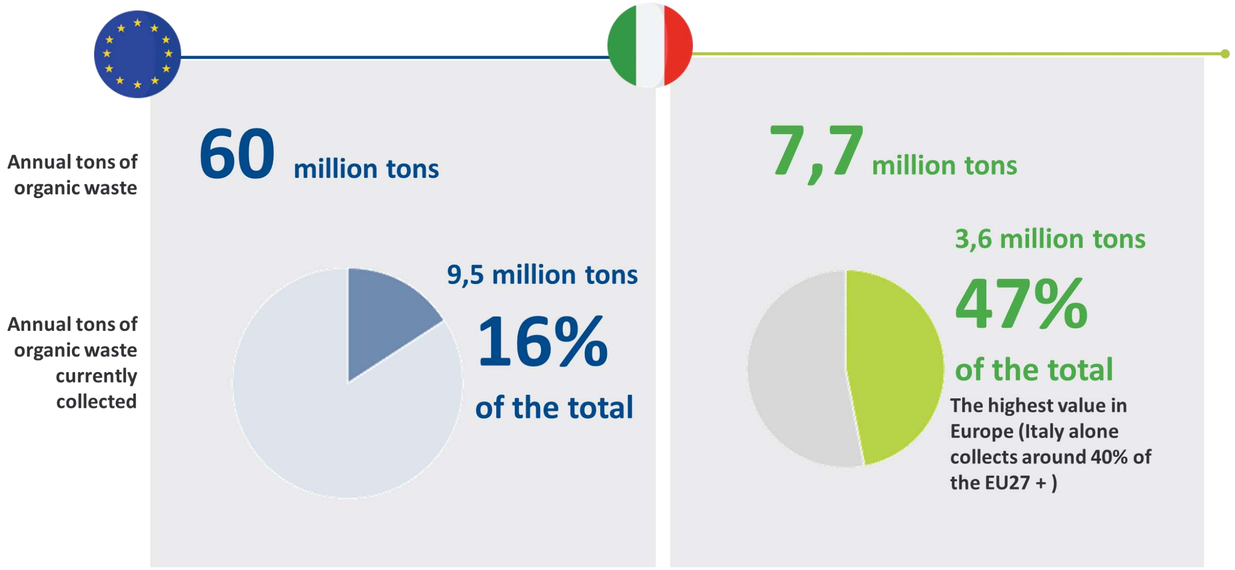
R&I with universities and research centers

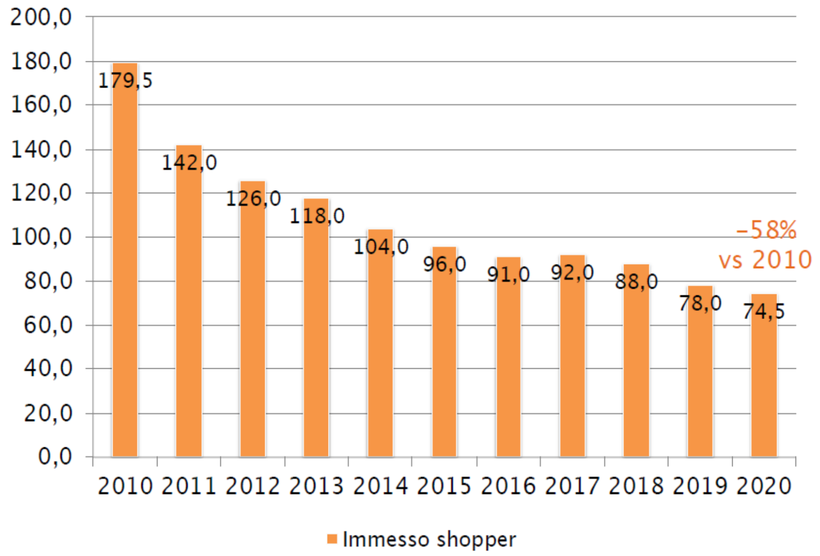
Retailers

Composters and farmers

Citizens

Thanks to this collaboration platform, to the Italian law for the reduction of disposable bags, and to the participation of citizens in using compostable bags for organic waste collection, **Italy is first in Europe for the recycling of food waste** (47% vs 16% of the European average). The consumption of disposable bags in general has decreased, from almost **180,000 t in 2010 to 74,500 t in 2020**.





Source: Zero Waste Europe and BioBased Industries Consortium, Bio-waste generation in the EU: Current capture levels and future potential, 2020.

Source: Plastic Consult 2021

THE BIGGEST CONCERN OF MULCH FILM PRACTICE

END OF LIFE ASPECTS CHARACTERIZING TRADITIONAL MULCH FILMS

Plastic contamination by soil

For every 100 kg of mulch film about 280 kg of waste are produced. Soil represents the main contaminant.

how to stop this:

Soil contaminated by plastic

The use of traditional film < 25 µm is responsible for about 15,000 t/y of microplastics which remain in the soil and about 30,000 t/y of agricultural plastic waste which are dumped or burned in the soil

Source: Revision of the Fertilisers Regulation – benefits of biodegradable mulch films Kristy-Barbara Lange, European Bioplastics, 12 October 2016
http://www.europarl.europa.eu/cmsdata/108931/Kristy%20Barbara%20Lange%20EUBP%20PPT2.pdf

BIODEGRADABLE IN SOIL MULCH FILMS

At the end of the crop cycle biodegradable in soil mulch film must not be removed, but should be worked into the soil, in order to properly biodegrade (through the mineralizing action of soil microorganisms) into CO2, water and organic matter.

- **Cost reduction** in terms of manpower (removal, dispose of, transport)
- **Net reduction of plastic waste**
- **Reduction of potentially negative impacts on the environment** when the plastic films are not properly removed and disposed of

BIODEGRADABILITY IN SOIL: main European and American standard: EN 17033, UNI EN 13432: 2002, and ASTM 6400:2012

NEW BIOPRODUCTS

CUSTOMIZED SOLUTIONS IN SENSITIVE SECTORS: THE ENVIRONMENT AND HEALTHCARE

COSMETIC INGREDIENTS CELUS-BI

Celus-Bi is a line of **biodegradable cosmetic ingredients** allowing to avoid the contamination of the sewage sludge and the dispersion of microplastics into the sea. Celus-Bi is developed by Novamont in close collaboration with ROELMI HPC.

BIOLUBRICANTS MATROL-BI

Matrol-Bi is a line of biolubricants and dielectric fluids from **renewable resources, rapidly biodegradable**. Optimal solutions for environmentally-sensitive areas such as agricultural, forest, marine or urban areas.

BIOHERBICIDES

Ager-Bi is a family of solutions for the management of weed control that combine productivity, safety and respect for the environment. Based on **pelargonic acid** from vegetable origin. Suitable for the non-selective control of vegetation.

"The challenge of our millennium is in the balance between the technical means that humanity possesses and the wisdom in how we will make use of them".

UMBERTO COLOMBO

MARCO VERSARI

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THANK YOU FOR YOUR ATTENTION

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