

Bio-Mi

From R&D to Market

Filip Miketa, CEO
Power4Bio webinar, 22nd of January

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AGENDA

01

THE COMPANY

About Bio-Mi



bio-mi
SUSTAINABLE SOLUTIONS

INTRODUCTION OF BIO-MI COMPANY AND ITS TEAM

Bio-mi is a small and medium size manufacturer and research and development enterprise from Croatia

Bio-mi is a synergy of 20 years industrial manufacturing experience in the field of plastics and young R&D team with strong experience in EU funds and programmes – more than 20 projects

Participation in projects was strong base for development and further production of bioplastics

We are dedicated to the development and production of **biobased, biodegradable and compostable thermoplastics materials** and **film products** used for the production of primary and secondary packaging applications, agro applications etc.

Our team has different profiles:

- Chemical Engineers
- Technical Engineers
- Technicians
- Project managers
- Public relations and social media manager



The background of the slide is a photograph of an industrial setting. On the right side, there is a large, complex machine with various components, including a blue control panel with buttons and a digital display. The machine appears to be part of a manufacturing or research process. On the left side, there is a blurred view of a control panel with several green and yellow indicator lights. The overall scene is dimly lit, with the machine and control panels being the primary sources of light.

02

R&D ACTIVITIES

Company's R&D investments and activities


BIO-MI R&D ACTIVITIES ARE FOCUSED ON :

1. PRIVATE R&D PROJECTS WITH COMPANIES AND RTO'S
2. INTERNAL PROJECTS:
DEVELOPMENT OF
MI FAMILY OF MATERIALS
3. R&D PROJECTS UNDER H2020

Activities and processes which we are implementing are at different TRL 4-9

- Twin screw extrusion: reactive extrusion, compounding, blending, functionalization, compatibilization, grafting
- Cast extrusion
- Blow-extrusion & Co-extrusion
- Re-granulation and mechanical recycling
- Welding/sealing/trimming and rewinding
- Printing/coating
- Characterization of obtained materials rheology, physical properties, temperature properties
- Characterization of obtained films Mechanical characterization of films and conditioning of products

From monomers/oligomers and bio-polymers to final materials,
products and solutions



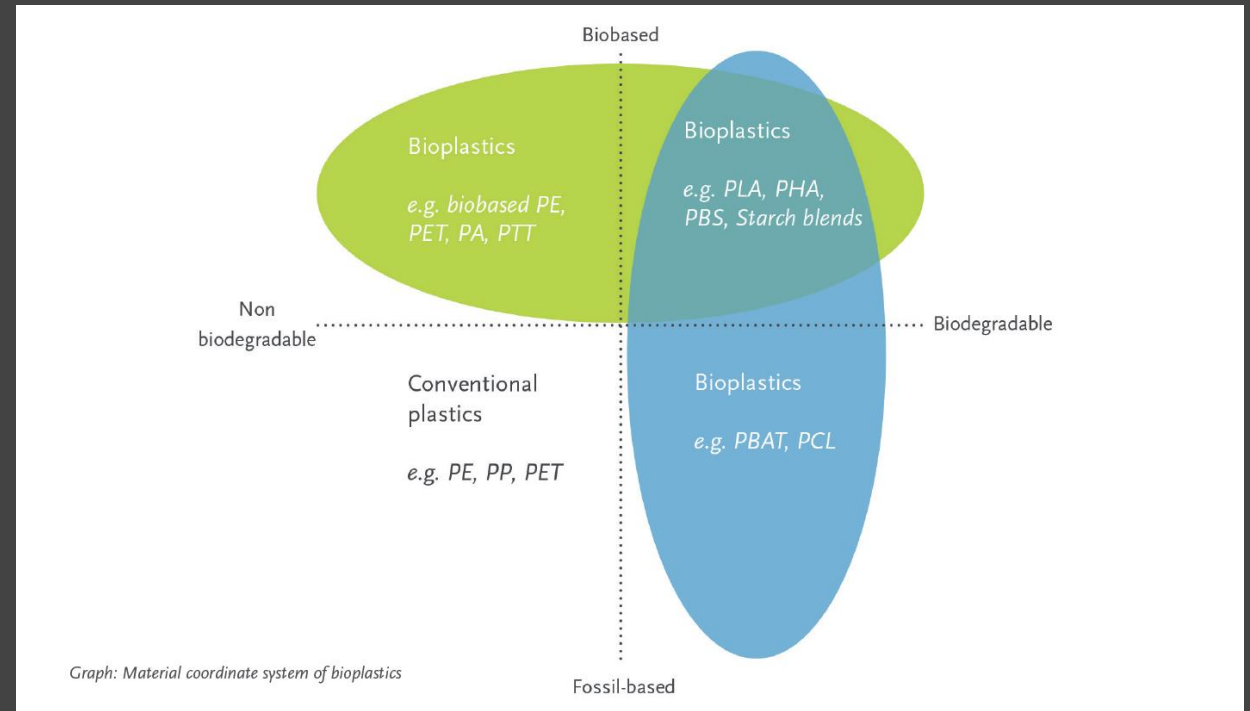
Bioplastics are not just one single substance,
they comprise of a whole family of materials
with differing properties and applications.
Currently, bioplastics accounts for less than
1 %
of the overall plastics market.

What is bioplastics?

Bioplastics – designed to help society

Did you know?

Every compostable plastics
is biodegradable but every
biodegradable plastics is not
compostable



The latest research shows that soil microbes can use **compostable mulch films** made from PBAT (polybutylene adipate terephthalate) as food, they use carbon from the polymer both to generate energy and form biomass. That means that compostable plastics biologically degrades in the soil and does not remain there as microplastics.

Industrial compost

Biodegradable in soil

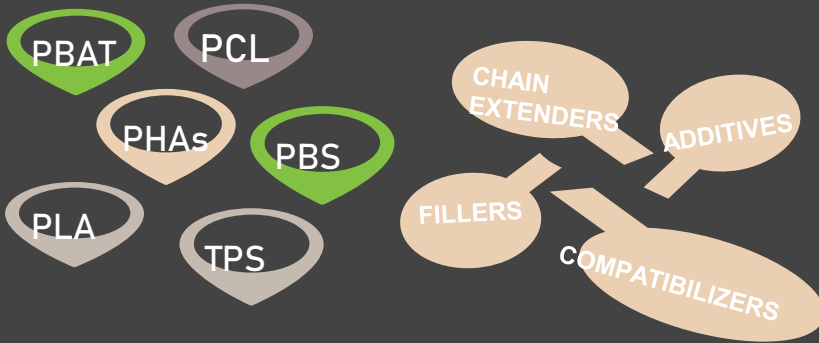
Biodegradable in marine

Home compost

Biodegradable in inland water

Processes: 1) COMPOUNDING

BIOPOLYMERS + OTHERS = COMPOSTABLE BIOPLASTICS



COMPOUNDING, BLENDING, GRAFTING, REACTIVE EXTRUSION, COMPATIBILIZATION

TECHNOLOGIES: Twin-screw extruders, Dryers, Mixers, Feeders



OUTPUT: MI FAMILY of MATERIALS
MI3 MI6 MI9

Bio-Mi already developed first blend/compound/bioplastics MI3 which is starch based compound – first bioplastics made at South East Europe. Currently, Bio-Mi is developing the second bio-degradable and compostable thermoplastic compound- MI6 which is PLA based compound.

Aim is to optimise and further upscale the production of **3 different bioplastic blends/compounds with 9 different certified variations** based on a wide range of bio-polymers, degradable polyesters and co-polyesters such as PLA, PBAT, PHAs, PCL, TPS, PBS, monomers/oligomers, additives, chain extenders, compatibilizers, nucleating agents, fillers etc.

Every blend/composition is **not bio-degradable under every condition** and Bio-Mi will be one of the few companies in EU which can offer different end-of-life options for each material/product.

Processes:

2) EXTRUSION

THERMOPLASTICS/MATERIALS



BLOW & CAST
MONO & CO-EXTRUSION



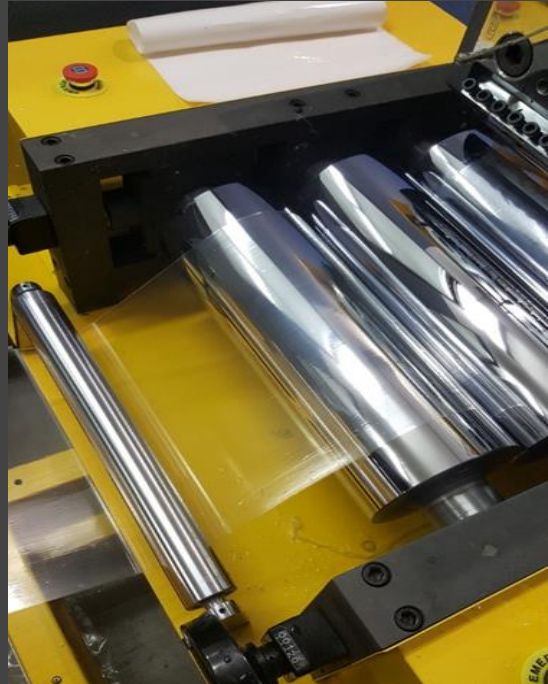
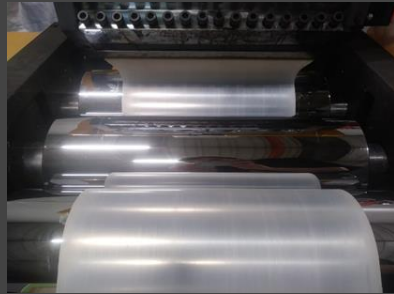
FILMS



FINAL PRODUCTS



AGRO PRODUCTS, GARBAGE BAGS FOR ORGANIC WASTE, etc.



Processes:

3) CHARACTERIZATION

CHARACTERIZATION OF RAW MATERIALS AND OBTAINED MATERIALS/COMPOUNDS

Rheology, physical properties, temperature properties

CHARACTERIZATION OF OBTAINED FILMS

Mechanical characterization of films and conditioning of films in the chamber with controlled temperature and humidity



PROJECT ACTIVITIES

Active projects, BIC membership

03


MANDALA
Sustainable Multilayer Packaging

 **effective**

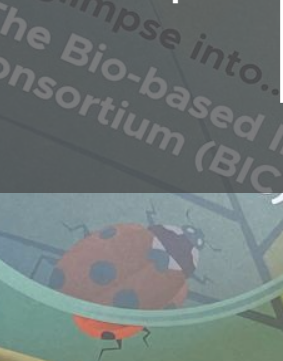


USABLE PACKAGING
Bioplastics for the circular Economy

The development of biodegradable and bio-based plastics is key to implementing circular economy models in the plastics sector.

The **USABLE PACKAGING** project builds an entire value chain for high-performance bioplastic packaging that is both bio-based and biodegradable, derived from food processing by-products and food waste feedstock.

BREAK-THROUGH IN PLASTIC


The Bio-based Industries Consortium (BIC)

PROJECT WORK

- Bio-Mi is currently participating in **seven active** H2020 projects
- **Two** H2020 are **under GAP**, starting in 2021 due to covid 19
- Every year between 20-30 proposals (last 7 years)
- Without participation in national funding due to many reasons
- Currently H2020 as a only option

BIC, BIOBASED INDUSTRIES CONSORTIUM

- **Full** membership since 2017
- Opportunity to **co-create policies** and **funding priorities** within Bio-based Industries Joint Undertaking (**BBIJU**)
- Participation at **Programmning Working Group** meetings since 2014
- Collaboration with well known RTOs and companies

Effective (H2020, BBI)

Ecofunco (H2020, BBI) ex ECOAT

Usable Packaging (H2020, BBI)

BionTop (H2020, BBI)

Mandala (H2020, BBI)

NENU2PHAR (H2020, BBI)

upPE-T (Horizon H2020 -NMBP-TR-IND-2020)

Bio-Mi in H2020 PROJECTS- timeline

Setting up a company with a focus on new projects and research activities

2017.

Bio-Mi became a full member of BIC (Bio-based Industries Consortium)



Project:
Effective H2020

2018.

Projects:
Ecofunco (ex Ecoat) H2020
Mandala H2020
BioOnTop H2020
Usable H2020



2019.

2020.

Projects:
NENU2PHAR H2020
(started: September 2020)



upPE-T H2020
(started: November 2020)

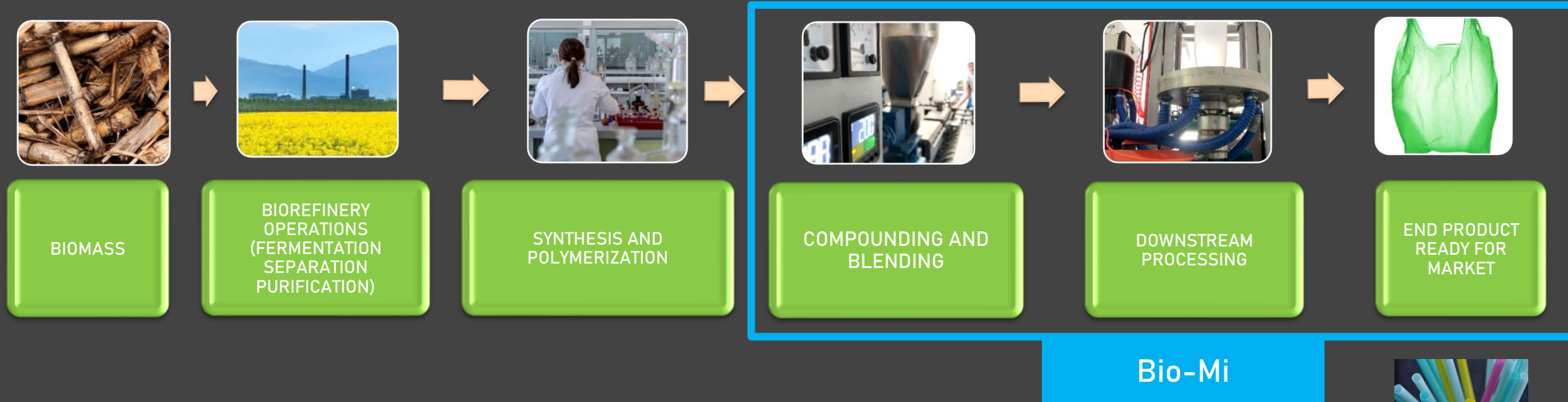


2021.

UPLIFT H2020
(Under GAP)



BIO-MI'S POSSIBLE ROLES IN VALUE CHAIN



Bio-Mi can cover several different roles in the value chain:

- compounding with different types of biopolymers and additives
- blending
- blow extrusion
- cast extrusion
- co extrusion
- re-granulation and mechanical recycling
- welding/sealing/trimming and rewinding
- printing/coating
- characterization of blends and films

TRL 4-9

ACTION:
RIA, DEMO and FLAGSHIP





04

MARKET ACTIVITIES

Bio-Mi equipment investments, TUV certificates
and market opportunities

MARKET ACTIVITIES

Bio-Mi is the first company in East and Southeast Europe which started production and manufacture of bio-based, biodegradable and compostable thermoplastics with certificates based on internal know-how

Main accent is on MI family of materials

MI3 – STARCH BASED COMPOUNDS, INDUSTRIAL AND HOME COMPOST

MI6 – PLA BASED COMPOUNDS, INDUSTRIAL COMPOST

MI9 – PHAs BASED COMPOUNDS, BIODEGRADATION IN SOIL, BIODEGRADATION IN MARINE

All mentioned compounds are tailored for flexible/semi-rigid films and packaging, for agro sector (agro films, mulch films)

Except certified compounds, Bio-Mi is providing tailor made solutions

professional.co.uk/html5/header/production/default.aspx?pubname=86edid=1f0d958f-85a8-453f-a44f-a055861878cc

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Compostable plastics: Bio-Mi shares its R&D know-how

Bio-Mi from Croatia shares its expert knowledge when it comes to the compostable plastics industry in South East Europe, including insights into their existing R&D activities.

Bio-Mi is a real and vibrant company that has been a pioneer in the first manufacture in the compostable plastic industry in South East Europe that has developed a strong reputation for its sustainable and compostable products and has been able to share some of its know-how with those interested from the region. At Bio-Mi, the idea is to create a new and exciting world of compostable products, but as a responsible company that aims to contribute to a more sustainable future, it is the right way to go. The company believes that knowledge should be shared in order to achieve a global impact and ultimately change the current state of affairs. By sharing resources, we can change the world, therefore, we have to move forward like this, we are the future," says Filip Mikić, the founder of Bio-Mi.

Research and development (R&D) activities

For Filip and his team, Bio-Mi has been working on creating and developing all of its products in research and development (R&D) in order to develop the most cost-effective and commercially viable products. Bio-Mi has been working on creating and developing all of its products in research and development (R&D) in order to develop the most cost-effective and commercially viable products. Bio-Mi has been working on creating and developing all of its products in research and development (R&D) in order to develop the most cost-effective and commercially viable products.

Research and innovation projects

Bio-Mi is currently working on several research and innovation projects. These projects are aimed at developing new products and improving existing ones. Bio-Mi is currently working on several research and innovation projects. These projects are aimed at developing new products and improving existing ones. Bio-Mi is currently working on several research and innovation projects. These projects are aimed at developing new products and improving existing ones.

Sustainable development

Bio-Mi is committed to sustainable development. The company believes that sustainable development is the only way to ensure a better future for all. Bio-Mi is committed to sustainable development. The company believes that sustainable development is the only way to ensure a better future for all. Bio-Mi is committed to sustainable development. The company believes that sustainable development is the only way to ensure a better future for all.

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<https://www.openaccessgovernment.org/compostable-plastics-bio-mi-shares-its-rd-know-how/93635/>

CERTIFICATION PROCESS



Bio-Mi finished TUV certification process

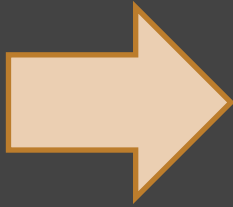


Figure 12. Sieved substrate of the sample Blank compost at the end of the disintegration test

START-FILM

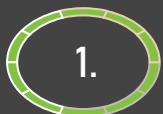


Figure 13. Sieved substrate of the final compost with test material at the end of the disintegration test

END-COMPOST

CERTIFICATION PLAN

Industrial compost and Home
compost blends



Biodegradable in soil



Biodegradable in marine



BIO-MI is boosting its capacities

NEW INDUSTRIAL MACHINERY WITH HIGH PRODUCTION CAPACITIES

Future PLAN

Further
Certification of
MI family blends

Deployment
to new
markets

Further
investments in
high capacity
equipment and
other technologies

Continue research
activities on more
innovative solutions

Further
investment in
new laboratory
equipment



Bioeconomy
today for
sustainable future tomorrow !

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THANK
YOU!

Pictures of blend, film, equipment, etc. used in this presentation were taken at our facility