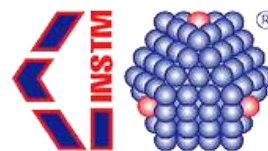




“Circular bio-based Europe (CBE), Bio-based Industry (BBI) program: INSTM and UNIPi participation”

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University of Pisa



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Horizon 2020
European Union Funding
for Research & Innovation





BIC consortium



<https://biconsortium.eu/>

The Bio-based Industries Consortium (BIC) is a non-profit organisation set up in Brussels in 2013 to represent the private sector in a Public-Private Partnership (PPP) with the European Commission, focused on strengthening the bio-based industries sector in Europe.

BIC's industry members cover the whole value chain, from primary production to market.

Members represent multiple and diverse sectors, such as

- agriculture and agri-food
- aquaculture and marine
- chemicals and materials (including bioplastics)
- forestry, pulp and paper technology providers
- and waste management and treatment.

BIC also has associate members such as research organisations, academia and trade associations.

University of Pisa joined BIC on december 2019.

Reference person: Maria-Beatrice Coltelli, supported by Francesca Ceron (Unity Services for Research)

A network of about 50 teachers has been progressively formed in UNIPI: it includes 10 Departments.



BIC is also a founding member of the European Bioeconomy Alliance (EUBA), a unique cross sector alliance dedicated to mainstreaming and realising the potential of the bioeconomy in Europe. The European Bioeconomy Alliance focuses on advocating for a favourable and coherent policy and investment framework to build a competitive, dynamic and sustainable bioeconomy in Europe.

From 2014-2020, BIC's partnership with the European Commission was known as the Bio-based Industries Joint Undertaking (BBI JU), with a total budget of €3.7 billion. It operated under Horizon 2020, and was set up as one of the pillars of the EU Bioeconomy Strategy (2012).



<https://www.bbi.europa.eu/>

142 european projects were funded by BBI JU

<https://www.bbi.europa.eu/projects>

1055 beneficiaries from 39 countries

40% of beneficiaries are small companies



By eliminating risks from investments and funding projects, BBI JU has created a positive impacts. Through its 142 projects, BBI JU has managed to:

- Contribute to the **transition to a zero-emission circular economy**.
- Protect the **environment, ecosystems and biodiversity** by developing new bio-based products, chemicals and materials with a lower environmental impact than their fossil-based alternatives.
- Deliver **socio-economic** benefits to European citizens by activating investments and creating **new jobs** mainly in rural and coastal areas, while contributing to diversification and income growth of farmers
- Structuring the bioindustry by stimulating **collaboration** between bioeconomy actors from different sectors and regions
- Improving the **competitiveness** of EU bio-based industries on a global scale
- Establish EU as a key player in research and innovation related to bio-based industries and as an attractive place for

BBIJU has played an essential role in creating a competitive, sustainable, circular and thriving bioeconomy in Europe and thus *a society where economic prosperity goes hand in hand with environmental protection*. At the same time, BBI JU contributes to the implementation of the EU bioeconomy strategy and contributes to the objectives of the EU Green Deal.



Even the most recent report published in 2021 (VII Report on Bioeconomy) shows that in 2020 the Bioeconomy in Italy generated an output of approximately 317 billion euros.

In all European countries the value of the Bioeconomy, which includes many essential activities, has recorded a less significant decline than the total economy, highlighting a greater resilience to pandemic shock.



In the 2014-2019 period UNIPI researchers participated to numerous projects, especially in the materials science and technology field, thanks and through INSTM consortium

INSTM, a consortium for material science and technology

INSTM

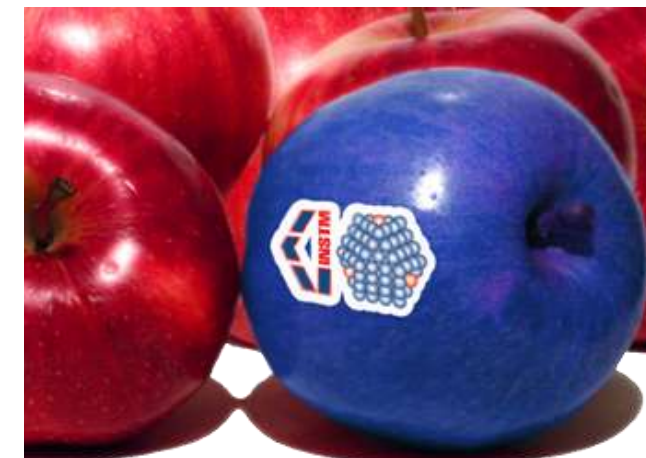
C o n s o r z i o
Interuniversitario
N a z i o n a l e
per la Scienza e
T e c n o l o g i a
dei Materiali

INSTM:

≡ groups all the Italian Universities (45)
where research on Materials is carried out

≡ about 2.700 scientists

≡ integrates a “critical mass” of knowledge





What INSTM aims t o a c h i e v e

INSTM:

- ≡ promotes and supports the research on Materials Science and Technology
- ≡ develops and improves exchanges between Universities and Industries
- ≡ supports technological transfer, spin-off activities and training for enterprises
- ≡ promotes the public understanding of Materials Science and Technology

**In EU projects
academic groups of
different Italian
universities can join
together to participate
to a project as a
unique partner**

POLYBIOSKIN (M.B. Coltelli INSTM; A. Lazzeri- UNIPL;)

High performance functional bio-based polymers for skin-contact products in biomedical, cosmetic and sanitary industry



SANITARY

DIAPER

Flat die extrusion of topsheet

SAP production by polysaccharide modification

Topsheet surface texturing and antimicrobial modification

Advanced in vitro testing



COSMETICS

BEAUTY MASK

Bacterial fermentation (PHA)

Film extrusion / casting

Non woven production via electrospinning

Impregnation with natural anti oxidant nanoparticles

Advanced in vitro testing



WOUND CARE

WOUND DRESSING

Bacterial fermentation (PHA)

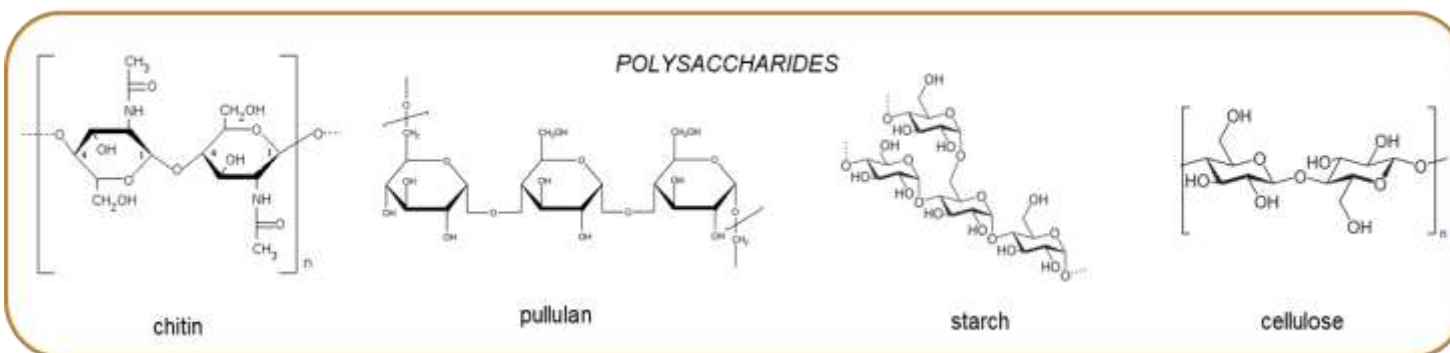
Non woven production via electrospinning

Fibre modification

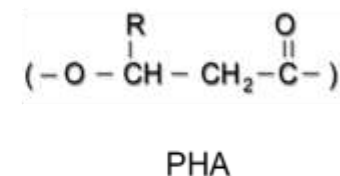
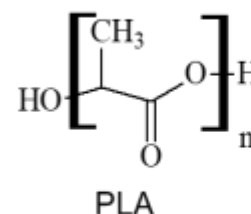
Impregnation with natural anti oxidant nanoparticles

Advanced in vitro testing

BIOPOLYMERS



BIODEGRADABLE POLYESTERS



PLA and PHA, fully renewable, can be processed by extrusion to obtain films or tissues.

They are biodegradable

Coltelli, M.-B.; Danti, S.; De Clerck, K.; Lazzeri, A.; Morganti, P. Pullulan for Advanced Sustainable Body- and Skin-Contact Applications. *J. Funct. Biomater.* **2020**, *11*, 20.

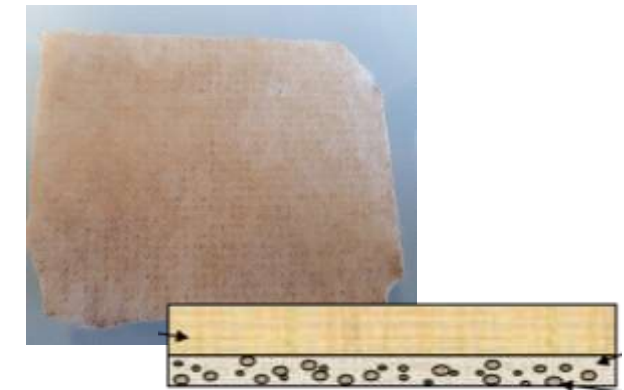
Morganti, P.; Yudin, V.E.; Morganti, G.; Coltelli, M.-B. Trends in Surgical and Beauty Masks for a Cleaner Environment. *Cosmetics* **2020**, *7*, 68.



- Almost 100% biobased
- Increased compatibility with skin and body
- Anti-inflammatory
- Indirectly anti-microbial
- Compostable in industrial plant



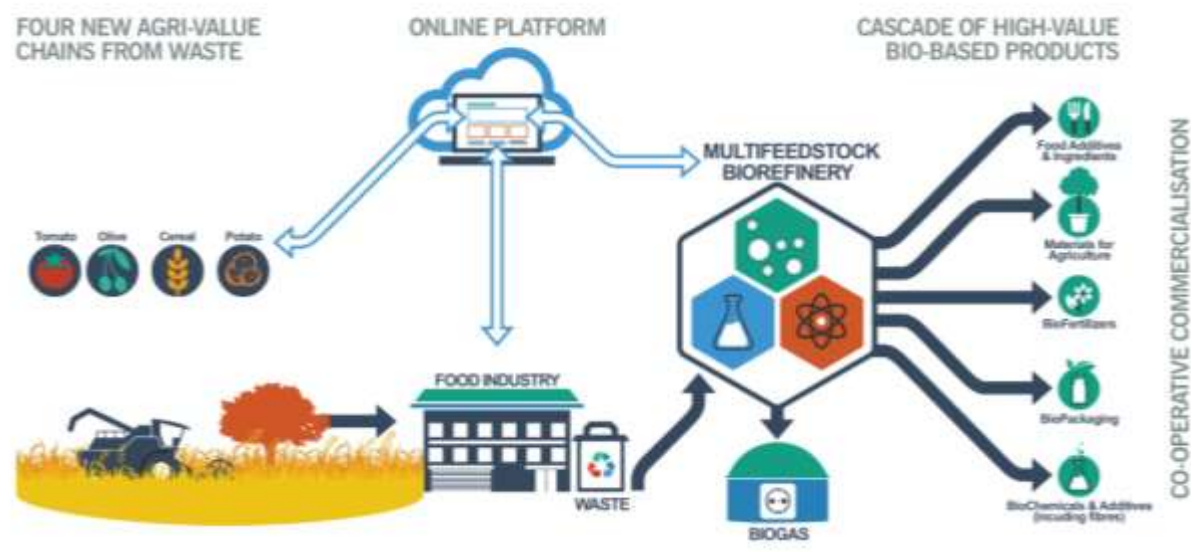
- 100% biobased
- Commercialized dry without preservatives
- Compatibility with skin and body
- Anti-inflammatory, anti-oxidant
- Indirectly anti-microbial
- Water soluble
- Compostable in industrial plant



- 100% biobased
- Compatibility with skin and body
- Anti-inflammatory, anti-oxidant
- anti-microbial
- Compostable in industrial plant

AGRIMAX (Agri and food waste valorisation co-ops based on flexible multi-feedstocks biorefinery processing technologies for new high added value applications)

INSTM reference: Prof. Patrizia Cinelli



Four new agri-value chains from waste

Agrimax will demonstrate the potential of residues and by-products from the processing of tomatoes, olives, cereals and potatoes. The project will maximise the EU's sustainability, while providing new bio-based compounds for the chemicals, food-packaging and farming sectors.



Cascade of high-value, bio-based products

By applying multiple processes to these waste streams, a cascade of new, bio-based compounds will be produced with applications in:

- packaging (bio-polymers, bio-composites, bio-based coatings, active packaging, stabilising agents)
- food (additives, ingredients, natural flavourings, edible coatings, microbial growth media)
- agricultural materials (biodegradable pots, mulching films, bio-fertilisers)

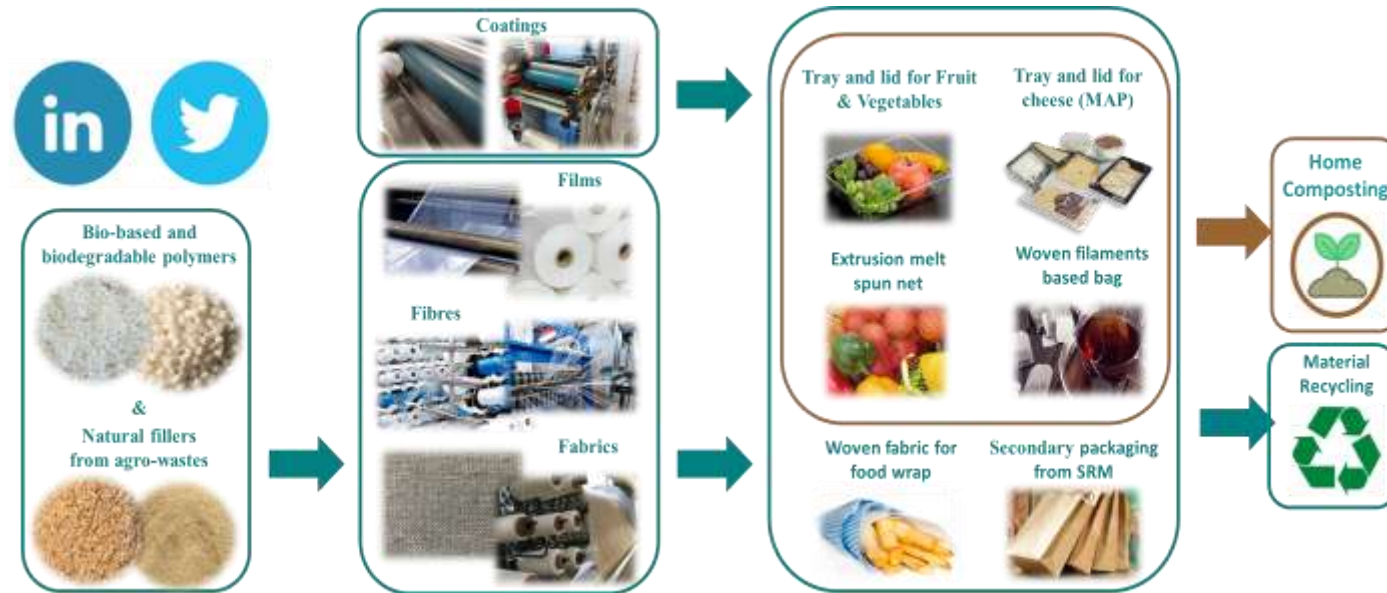
BIOMOTIVE (A. Pucci)

Advanced BIObased polvurethanes and fibres for the autoMOTIVE industry with increased environmental sustainability



BIONtop (M.B. Coltelli INSTM; P. Cinelli UNIPI)

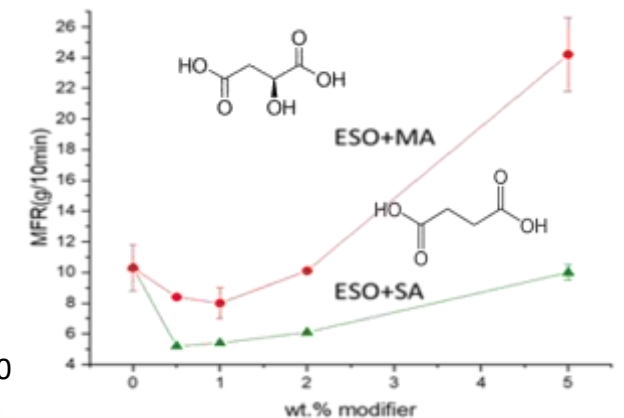
Novel packaging films and textiles with tailored end of life and performance based on bio-based copolymers and coatings



Wheat bran

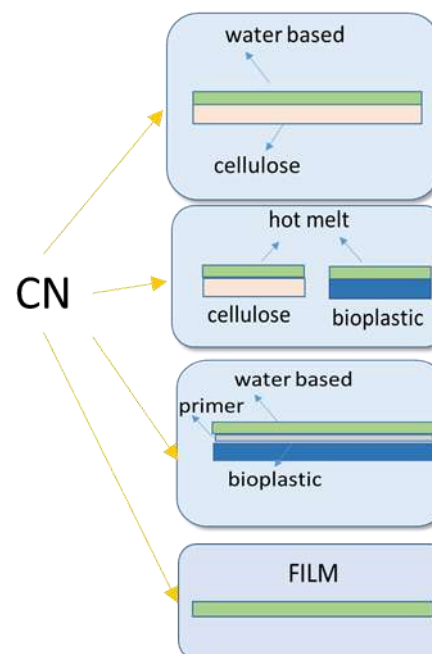
Recycling of blends and composites

Coltelli et al., <https://www.mdpi.com/2073-4360/13/18/3050>

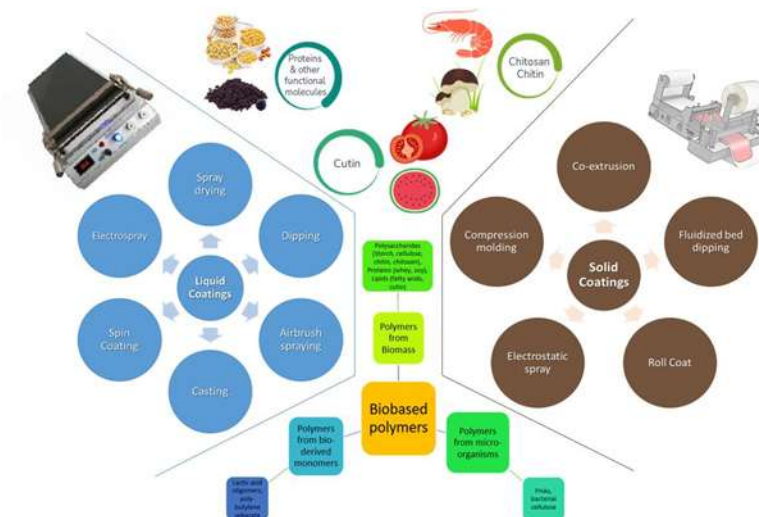


ECOFUNCO (P. Cinelli INSTM; M.B. Coltelli UNIFI) *ecofunco*

Eco sustainable multifunctional biobased coatings with enhanced performance and end of life options



Liquid and Solid Functional Bio-Based Coatings



Gigante, Panariello et al., <https://www.mdpi.com/2073-4360/13/21/3640>

PROLIFIC (A. Lazzeri)



Integrated cascades of PROcesses for the extraction and valorisation of proteins and bioactive molecules from Legumes, Fungi and Coffee agro-industrial side streams

RECOVER (P. Cinelli)

Development of innovative biotic symbiosis for plastic biodegradation and synthesis to solve their end of life challenges in the agriculture and food industries

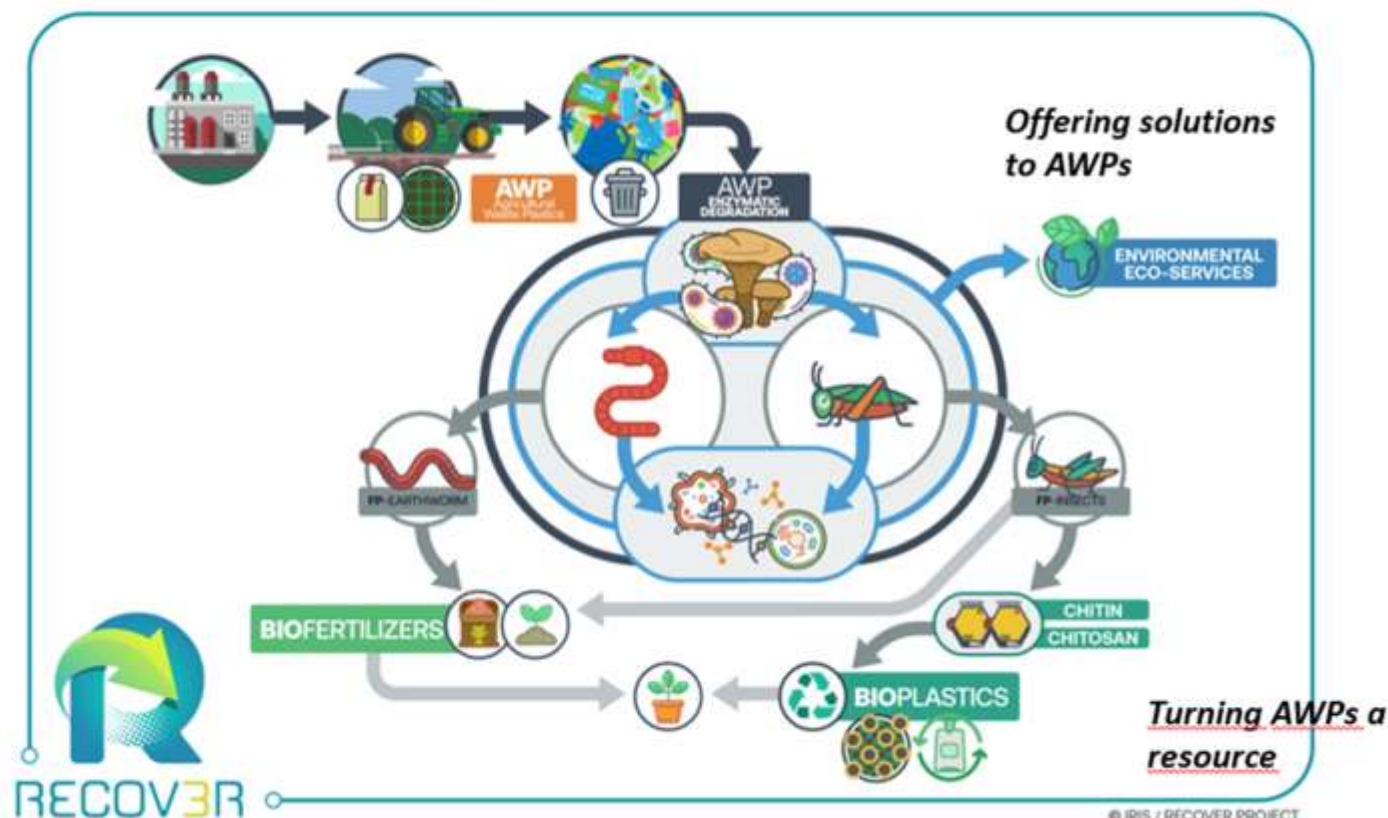
Recover solutions & innovations



Agri-food Waste
Plastics (AWPs)

Combining new
enzymes,
microorganisms,
insects &
earthworms

Products



From 2021-2030, the new partnership is called the [Circular Bio-based Europe Joint Undertaking \(CBE JU\)](#), which has a total budget of €2 billion and aims to build on the success of the BBI JU and address current challenges facing the industry.

In the framework of Horizon Europe

<https://www.cbe.europa.eu/>

The main goals of the European partnership are:

- Accelerate the **innovation process** and development of bio-based innovative solutions
- Accelerate **market deployment** of the existing mature and innovative bio-based solutions
- Ensure a high level of **environmental performance** of bio-based industrial systems

Aims:

- Wider participation of stakeholders (eg "rural, coastal, urban areas and regions with underutilized potential"; "mobilize national and regional authorities"; etc.)
- Focus and monitor environmental performance, including biodiversity, always respecting the principles of circularity, sustainability and planetary limits
- Broader and more explicit communication mandate (e.g. explicit mention of politics, producers, industry, NGOs and consumers in general)
- Financial contribution from private partner



Only 20% of the CBE JU 2022 budget is addressed at Research & Innovation actions (RIA). Mainly Innovation Actions and Flagships will be financed, to support products yet partially developed. Both SMEs and large companies will be funded.

Calls deadline for submission is september 22.

No-food, no-medical and no-fuel applications are considered. Feedstocks highly sustainable on the environmental point of view should be considered.

UNIPi researchers can contribute on several topics, going from chemical processes and catalysis, to selection and treatment of biomass feedstocks to obtain valuable active compounds, to use biobased materials in several industrial applications.



Thank you for your attention

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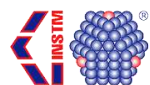


ECOFUNCO PARTNERS

ARCHA



Huhtamaki



LUCENSE

