



#InvestEUresearch



# Horizon 2020 Work Programme for Research & Innovation 2018-2020

**NMBP Programme  
Biotechnology - Topics 2020**

Research and  
Innovation

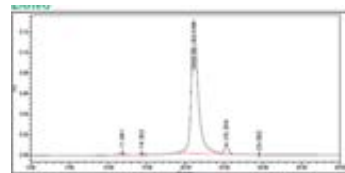
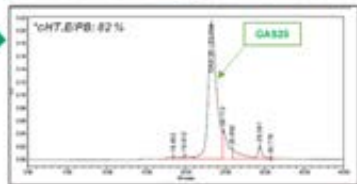
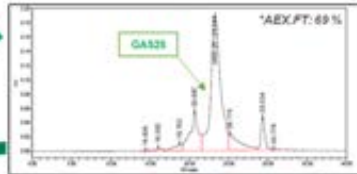
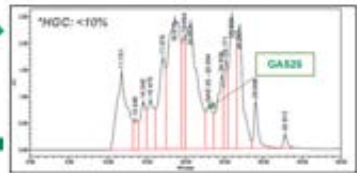
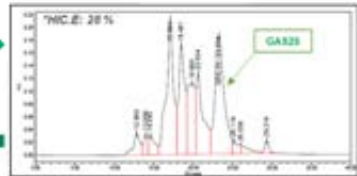
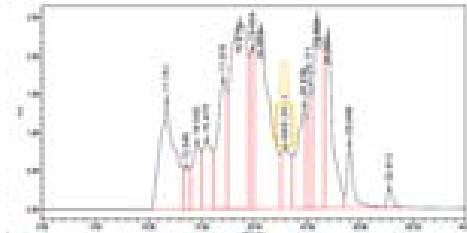


# Titles of the 2020 Industrial Biotechnology topics

- BIOTEC-06-2020:  
Reprogrammed microorganisms for **biological sensors** (IA)
- BIOTEC-07-2020:  
Multi-omics for **genotype-phenotype** associations (RIA)
- CE-BIOTEC-08-2020:  
New biotechnologies to **remediate** harmful contaminants (RIA)  
Note: **cooperation with China**; *single* stage; deadline **15 April 2020**
- CE-BIOTEC-09-2020:  
**Upcycling Bio Plastics** of food and drinks packaging (RIA)
- Two-stage topics:
  - 1<sup>st</sup> stage deadline: **12 December 2019**
  - 2<sup>nd</sup> stage deadline: 14 May 2020

## 1 Nanofitin affinity column

### From Crude Cell Lysate to Purified Product



**DiViNe**  
Vaccines purification

**H2020 programme, 2015-2020**

1st product :

Yield : 38% -> 60%

Purity : 80% -> 94%

Platform proof of principle :

3 custom, pilot scale columns

1 L functional columns

**-> Partnered Discovery Programmes  
Short-term revenues**



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 635770



**Nanofitins reduce intestinal inflammation  
by 75% after oral administration**



**FP7 programme, 2012-2016**

1st Compound Status :  
Late preclinical  
Ongoing development

Platform proof of principle :  
New custom, orally stable,  
target-specific Nanofitins

**-> Partnered Discovery Programmes  
Long-term revenues**



This project has received funding from the European Union's FP7 research and innovation programme under grant agreement **No 278042**



Working with Nature to protect crops



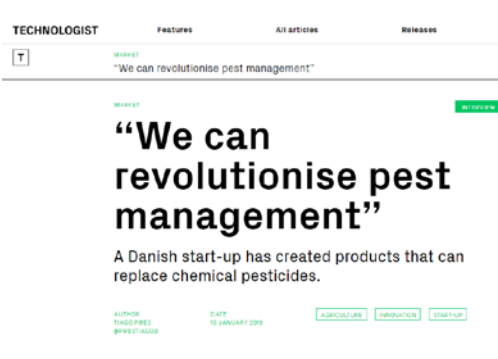
## Thanks to OLEFINE,

- **BioPhero** can collaborate with academic laboratories on R&D and with other companies on product and business development



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **No 760798**

- Raised €3 mio VC investment
- Selected as a top 20 Industrial Biotech company in Europe
- Achieved a wide public outreach



This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement **No 760798**

# Further details on Horizon 2020 NMBP Programme Industrial Biotechnology Topics 2020

*(Reference slides not for discussion at the  
Panel)*

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# BIOTEC-06-2020: Reprogrammed microorganisms for biological sensors (IA)

## Specific Challenge:

The complexity of the biological mechanisms involved in the production of a new biosensor, and the resources, time needed to develop and market new biological sensors limit their use on a widespread scale.

Modern biotechnology offers tools for developing much more advanced biological sensors.

The challenge is to realistically engineer microorganisms that:

- use synthetic networks to expand the portfolio of molecules that are currently known to be detected by natural systems;
- perfect the networks for improved performance in given industrial settings.

# BIOTEC-06-2020: Reprogrammed microorganisms for biological sensors (IA)

## Scope:

Proposals should:

- Address sensitivity, specificity and the possibility of detecting multiple analytes;
- Include demonstration activities at medium scale in order to confirm the performance and robustness of the reprogrammed microorganisms as biosensors in the selected application;
- Address Social Sciences and Humanities (SSH) elements regarding acceptability of the technologies used by stakeholders and regulatory aspects;
- Activities should start at TRL 3 and achieve TRL 6 at the end of the project.

# BIOTEC-06-2020: Reprogrammed microorganisms for biological sensors (IA)

## Expected impact:

- The development of three or more reprogrammed microorganisms or the development of reprogrammed microorganisms for three or more different biosensors to be used either as biological sensors or for the production of novel molecules used as biological sensors;
- The applicability of the novel biological sensors in at least two different industrial sectors;
- Quantifiable demonstration at medium scale of the increased performance and benefits arising from the innovations compared to the state of the art.

# BIOTEC-07-2020: Multi-omics for genotype-phenotype associations (RIA)

## Specific Challenge:

The exploitation of existing biological data types for an increased number of useful applications requires new computational and statistical approaches that integrate data and perform complementary analyses with the different –omics datasets.

This is needed to draw meaningful information about genotype-phenotype associations that complete the picture of how biological models function and how phenotypes are established.

An improved understanding of phenotypes will make possible the development of new predictive models for living beings applicable in different industrial sectors.



# BIOTEC-07-2020: Multi-omics for genotype-phenotype associations (RIA)

## Scope:

Integration of different 'omics datasets and different data types towards the goal of fully understanding the causal relations between the genome of an organism and its phenotype.

Proposals should:

- Focus on systems biology solutions and develop methods that integrate 'omics datasets and use data collected in several experiments.
- Take into consideration the study of interactions between different data types; the combination of data from multiple time points and different individual entities;
- Tackle the challenges posed by data quality. The outcomes should allow for replication and validation, expanding the capacity to generate biological knowledge.
- Involve at least two case studies for the application in one or two industrial sectors where biotechnology can provide added value, excluding healthcare.
- Activities should start at TRL 4 and achieve TRL 6 at the end of the project.

# BIOTEC-07-2020: Multi-omics for genotype-phenotype associations (RIA)

## Expected impact:

- A comprehensive analysis and interpretation of the complexity of genotype-environment interactions in biological systems ensuring its applicability to different industrial sectors;
- The development of models that leverage 'omics information to realistically predict phenotypic effects, including performance, and to answer specific biological questions about phenotypic variation;
- A significant improvement to the exploitation of existing databases for new biotechnological applications in industry, excluding health.

# CE-BIOTEC-08-2020: New biotechnologies to remediate harmful contaminants (RIA)

## Specific challenge:

Standard remediation strategies have different levels of efficiency. Advanced bioremediation approaches, which use naturally occurring microorganisms, in the form of emerging technologies for the treatment of contamination in various ecosystems foresee more sustainable and gentle alternatives to physicochemical options.

While the merits of using microorganisms to depollute their environment and to transform harmful contaminants into harmless end-products are well known, a number of challenges remain:

- *their effectiveness to treat compounds that are not biodegradable;*
- *time efficiency;*
- *specificity of the environment;*
- *level of concentration of the contaminants;*
- *the combined biological activity of the microbial community over time and space;*
- *the consumption of energy.*

# CE-BIOTEC-08-2020: New biotechnologies to remediate harmful contaminants (RIA)

## Scope:

- R&I for efficient and low cost remediation strategies using microorganisms by means of emerging biotechnologies that require minimum or zero external energy or chemicals and that reduce the remediation time compared to physicochemical processes;
- Work to ensure remediation in soil, sediments, mines, surface water, groundwater or industrial water;
- Develop a system to remove different contaminants, including complex mixtures, covering hydrocarbons and their derivatives, recalcitrant compounds, metals, nanomaterials, paints and coatings, nutrients, pharmaceuticals or micropollutants and toxic contaminants;
- Include field trials to prove an acceptable performance for field applications will be a plus.
- Activities should start at TRL 3 and achieve TRL 6 at the end of the project.



# CE-BIOTEC-08-2020: New biotechnologies to remediate harmful contaminants (RIA)

## Expected impact:

- Remediation of at least two toxic contaminants of different nature;
- Proof of the feasibility to scale up the technology for field testing, including an assessment of the related environmental benefits and risks;
- A quantified demonstration of the benefits compared to standard physicochemical remediation approaches, in particular regarding time and energy efficiency.



# CE-BIOTEC-09-2020: Upcycling Bio Plastics of food and drinks packaging (RIA)

## Specific Challenge:

Plastics' use fails to capture the economic and environmental benefits of a more 'circular' approach. Most plastic is produced from non-renewable sources, cannot be recycled and contains toxic additives. Some plastics are bio-based; however not all are recyclable, reusable or biodegradable.

Packaging that cannot be recycled ends up in landfills or is burnt in, a process that releases large amounts of CO<sub>2</sub> and toxic chemicals into the atmosphere.

The challenge is to develop technologies to deal with the upcycling of plastics for food and drinks packaging - transforming them into new materials, products of better quality or for better environmental value.

This will allow the sustainable recycling or biological degradation in accordance with existing and novel technologies, standards and certification schemes.



# CE-BIOTEC-09-2020: Upcycling Bio Plastics of food and drinks packaging (RIA)

## Scope:

- Expand the potential of current technologies and materials for the manufacturing and design of bio-plastics that are recyclable and/or biodegradable;
- Exploit known or develop new biotechnologies, based on enzymes or enzyme combinations and microorganisms, for improved recycling or biodegradation of plastics;
- Develop novel standards and certification schemes applicable to packaging materials made from recyclable and biodegradable bio-plastics;
- Include Social Sciences and Humanities (SSH) elements and gender aspects to improve consumer attitude and behavior with respect to purchasing and recycling food and drink packaging;
- Take a systemic approach and involve cooperation among actors in the supply chain;
- Activities should start at TRL 3 and achieve TRL 6 in the end of the project.

# CE-BIOTEC-09-2020: Upcycling Bio Plastics of food and drinks packaging (RIA)

## Expected impact:

- 60% food and drink packaging is upcycled by 2030;
- A viable roadmap to prove that by 2030 60% of the plastics still to be used for packaging of foods and drinks with short-shelf life will be produced from renewable sources;
- Contribute to the increase in new and upgraded waste recycling facilities designed to facilitate recycling via biotechnological or biochemical methods;
- Increased awareness among European citizens of products and materials upcycling capacity;
- Novel standards and certification schemes to be applied together with market pull measures such as public procurement and tax exemptions.