BIOSPHERE

Your biotech partner

Company presentation

THINK GREEN
GO BIOTECH

OUR MAIN MARKET SECTORS

Industrial biotechnology solutions for a wide range of applications

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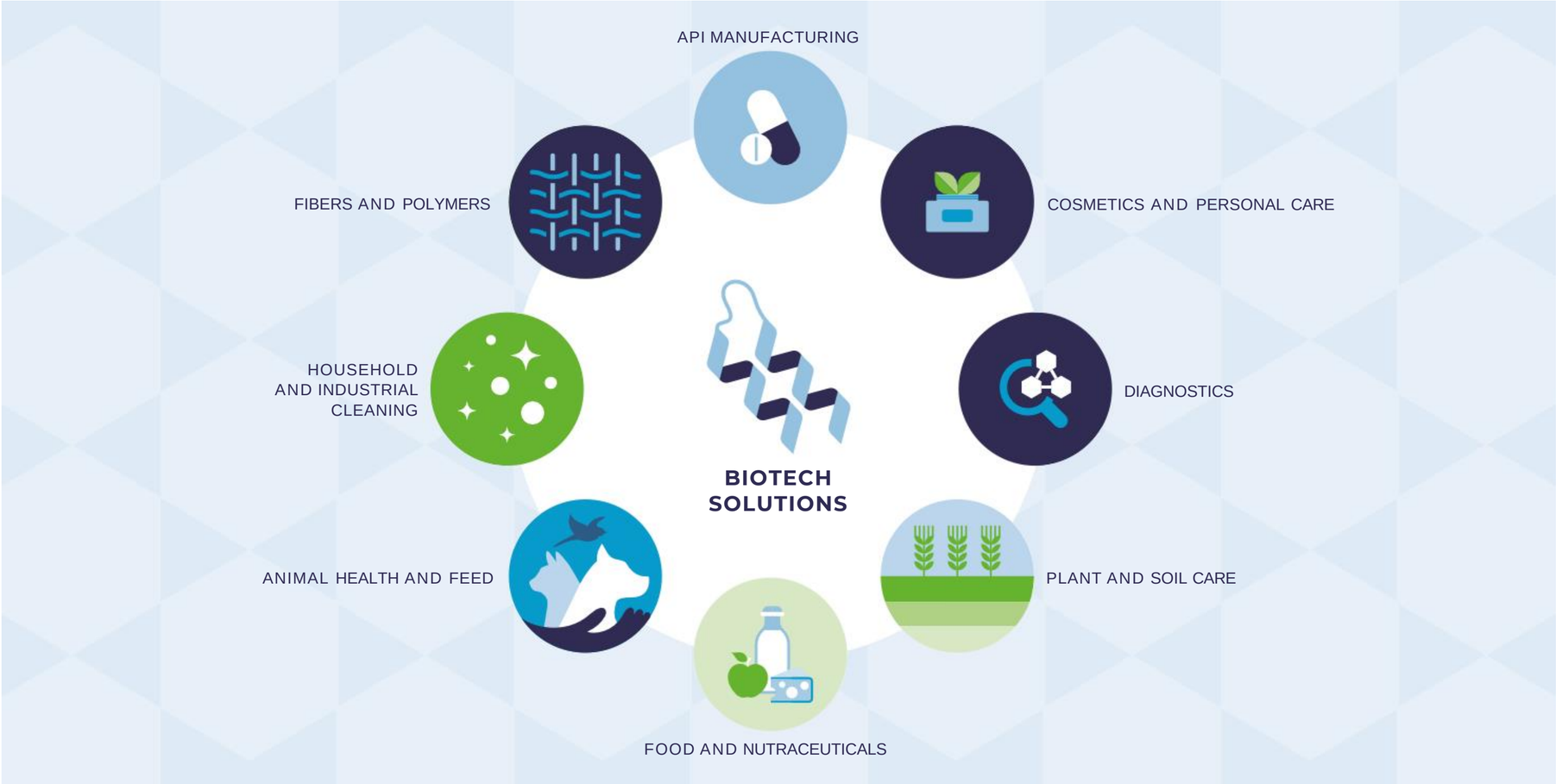


OUR FACILITY

From Lab-scale to Pilot-scale production

OUR TEAM

A unique crew, many key areas of expertise

PROJECT MANAGEMENT

Our project managers ensure that:

- the project **stays on track**;
- **deadlines** are respected;
- **results** are communicated and delivered during regular meetings.

PROCESS DESIGN

Our process scientists guarantee:

- development of efficient and **scalable** processes;
- **optimization** of resources;
- **minimization of waste**.

MICROBIOLOGY AND FERMENTATION

Our biotechnologists **mastering the art of:**

- **enzyme engineering**;
- **genetic modification** and **evolution** of microorganisms;
- **fine-tuning** of culture conditions.

DOWNSTREAM PROCESSING

Our chemists have in-depth experience in:

- the **separation** and **purification** of enzymes and desired compounds from **complex mixtures**;
- **immobilization** and **formulation** of your end products.

BIOCATALYSIS

Our biochemists are at the forefront of biocatalytic innovation:

- identifying **solutions for specific bioconversion reactions**;
- developing **tailor-made enzymatic processes.**

SCALE-UP

Our process scientists and engineers:

- drive fast and effective processes scale-up, **from laboratory- scale experiments to industrial production**;
- ensure fully implementation of biotech innovations into the client's processes.

FULL SCALE INDUSTRIAL MANUFACTURING

Our process engineers and quality experts warrant:

- **timely execution** of the production campaigns;
- **adherence** to local, regulatory and the client's regulations and requirements;
- execution of **high quality** operations, registration and documentation.

OUR FACILITY

New building, state-of-the-art equipment

500sqm of cutting-edge research and development **laboratories**, 1,500sqm of advanced **production facilities**, and 500sqm of **modern offices**: our new facility features whatever it takes to create sustainable and impactful biotech solutions for our partners and customers.

> EQUIPMENT

FERMENTATION UNITS

- > Lab-scale fermentation units
- > 150-liter pilot-scale fermentation unit
- > 1,500-liter fermentation unit

DOWNSTREAM TECHNOLOGIES

- > Disc-stack centrifugation
- > High-pressure homogenization
- > Tangential flow micro-filtration
- > Tangential flow ultra-filtration
- > Enzyme immobilization
- > Formulation & drying

ANALYTICS

- > Ultra-High Performance Liquid Chromatography
- > UV-VIS Spectrophotometry
- > SDS-PAGE Protein quantification
- > YSI biochemistry analyzer

OUR FACILITY

Equipment - Fermentation units

Our fermentation equipment is flexible and designed for research and development purposes, pilot-scale applications and industrial-scale production.

4 LAB-SCALE FERMENTATION UNITS
6.5 LITERS

The perfect environment for researchers to conduct controlled experiments, test hypotheses, and fine-tune bioprocesses on a small scale, exploring a wide range of biotechnological possibilities with ease, flexibility and precision.

1 PILOT-SCALE FERMENTATION UNIT
150-LITERS

The bridge between laboratory-scale research and full-scale industrial production: fermentation at this size is a key factor for optimizing processes, reducing the gap between proof-of-concept lab scale experiments and full scale industrial applications.

1 INDUSTRIAL-SCALE FERMENTATION UNIT
1,500-LITERS

The final goal of our research and development effort, or the end application after tech transfer of our customer's protocols: it is here that we bring innovation to industrial scale, producing fully implemented biotechnological solutions.

OUR FACILITY

Equipment - Downstream technologies

The production of finished biotechnological products requires precise and sophisticated downstream processing and we provide all key technologies in this field, at laboratory, pilot and industrial scale.

DISC-STACK CENTRIFUGATION

To efficiently separate solids and liquids from fermentation broths or other complex mixtures.

HIGH-PRESSURE HOMOGENIZATION

To break down cell walls and extract valuable intracellular compounds.

TANGENTIAL FLOW MICRO-FILTRATION

To selectively separate and remove particles, contaminants, and unwanted substances from biotechnological solutions.

OUR FACILITY

Equipment - Downstream technologies

The production of finished biotechnological products requires precise and sophisticated downstream processing and we provide all key technologies in this field, at laboratory, pilot and industrial scale.

TANGENTIAL FLOW ULTRA-FILTRATION

To separate macromolecules such as proteins and enzymes from smaller molecules, resulting in highly purified and concentrated biotechnological products.

ENZYME IMMOBILIZATION

On different support materials, it can be studied and optimized at laboratory scale, and then scaled-up with a capacity of 100 kg/batch.

FORMULATION & DRYING

The customer’s products can be delivered in liquid form or solid formulations using freeze-drying or spray-drying techniques.

OUR FACILITY
Equipment - Analytics

Our chemical and microbiological laboratories are equipped with analytical technologies for process analytics, quality control and release of final products.

UHPLC

UHPLC guarantees efficient separation and high resolution for the characterization and quantification of cellular metabolites, polymers, small molecules, chiral compounds.

UV-VIS

UV-VIS Spectrophotometry measures the intensity of a light beam at different wavelengths. This technique is essential in biotechnology. It is used to quantify cell density and has a wide application in protein characterization. With temperature-controlled UV-VIS Spectrophotometer, investigation of enzyme activity, protein denaturation, and protein melting point are conducted.

SDS PAGE

This method is fundamental in research and industry for protein analysis and has numerous applications in studying biological processes and developing biotechnological products.
SDS-PAGE is based on the molecular weight of proteins and is essential for analyzing protein purity, studying protein-protein interactions, and identifying proteins in complex mixtures when coupled with techniques like Western blotting.

OUR GREEN SOUL

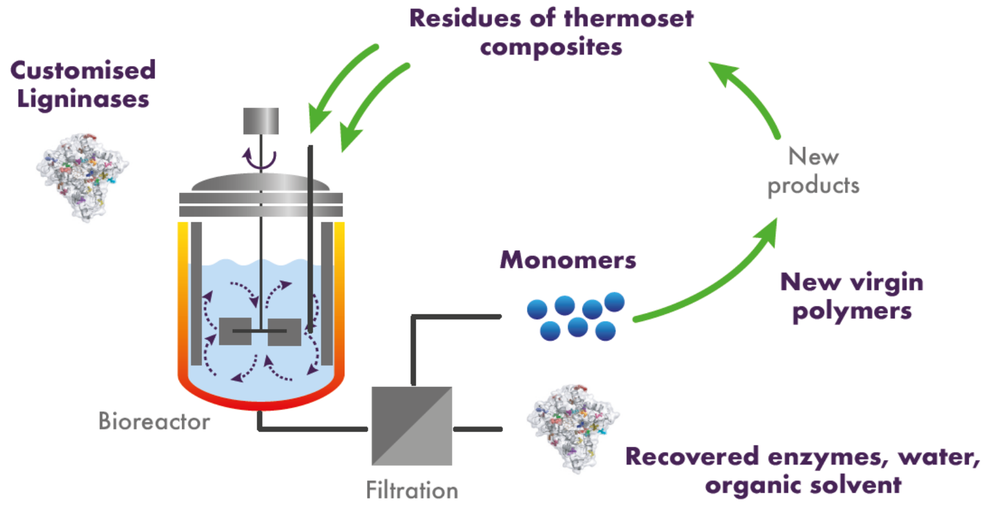
Cultivating the science of nature
for an ever more sustainable growth

FUNDED PROJECTS

BIZENTE

Apply Ligninases To Resolve End - of - life Issues of Thermoset Composite Plastics

Part of the Horizon funding program, **BIZENTE** is a project currently running in the development of a model of enzymatic degradation as a solution for the end-of-life of the thermoset composites.



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BIZENTE is funded by the **Bio Based Industries Joint Undertaking** (JU) under the **European Union's Horizon 2020** research and innovation, Grant agreement n°886567 – Project duration: May 2020 – Apr 2024

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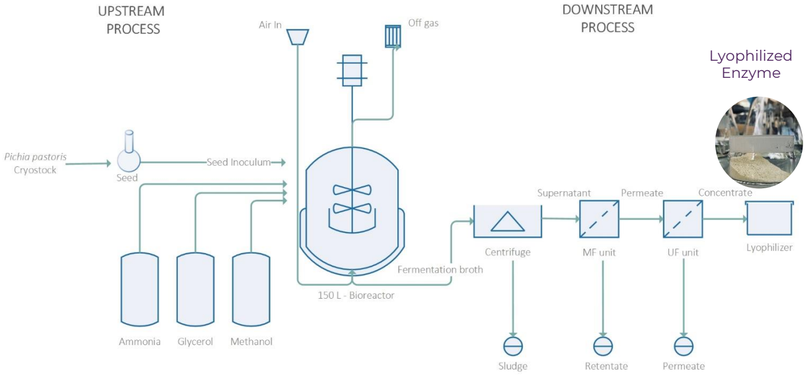
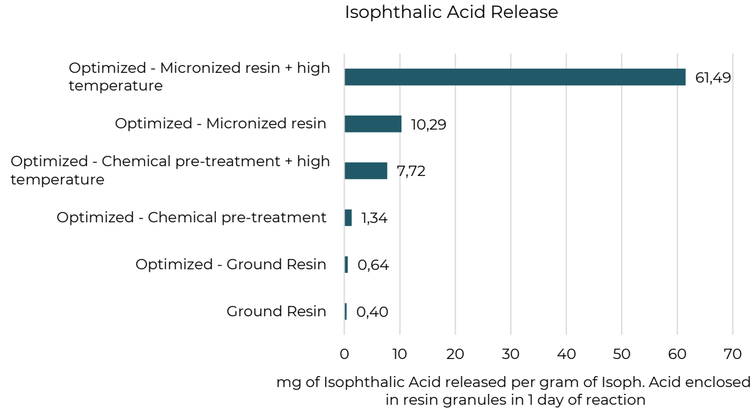
OUR ACTIVITIES COVERED IN THE PROJECT

Production of selected enzymes and scale-up

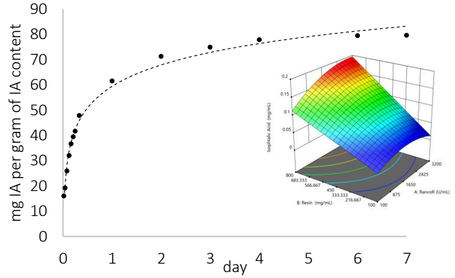


- ✓ Production of **8 different proteins** variants
- ✓ **Production & purification process scale-up**
- ✓ Test of a dedicated **methanol-free protein expression protocol**

Enzymatic biodegradation of polyester thermoset resins



- ✓ **Set-up** of **enzymatic reaction conditions**
- ✓ Optimization of **enzyme/resin** ratio
- ✓ Characterization of most influent **variables** during biocatalysis
- ✓ Application of **peroxidases** and **hydrolases**



FUNDED PROJECTS

PRIME
Processi e prodotti innovativi di chimica verde

PRIME è un progetto finanziato dal **P.O.R FESR 2014/2020 Asse I – Azione I.1b.2.2 della Regione Piemonte**, nell'ambito della **Piattaforma Tecnologica per la Bioeconomia.**

PRIME aims to study, develop and demonstrate advanced green chemistry processes in integrated biorefineries capable to valorize renewable raw materials, waste and process by-products in bioproducts and biomaterials with innovative and functional properties.

OUR ACTIVITIES COVERED IN THE PROJECT

Development of two fermentation processes devoted to the production of PHA from the conversion of waste carbon sources

- ✓ Fermentation **process development** for the species ***Haloferax mediterranei***
- ✓ Fermentation **process development** the specie ***Cupriavidus necator***
- ✓ Fermentation processes **scale-up**
- ✓ **Solvent-free PHA purification** process set-up and scale-up
- ✓ **PHA** characterization

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Your biotech partner

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