The ROBUSTOO Newsletter

With the contribution of: CONSORZIO ITALBIOTEC

October 22, 2025

OXIDATIVE BIOCATALYST BULLETIN

The Power of Enzymes in Industry

Welcome to the very first issue of the ROBUSTOO newsletter! With this project, we embark on an exciting journey at the crossroads of industrial biotechnology, sustainability, and innovation.

The Power of Enzymes in Industry

As the European Union has placed sustainability at the centre of its industrial strategy, industrial biotechnology has become one of the most dynamic forces shaping the transition to a greener, more resilient, and more competitive European economy. At the heart of this transformation are enzymes: nature's catalysts, capable of driving chemical reactions with remarkable precision, efficiency, and selectivity. When harnessed and engineered for industrial use, enzymes can not only enhance the performance of production processes but also reduce their environmental footprint, opening the way to new or more sustainable products and value chains.

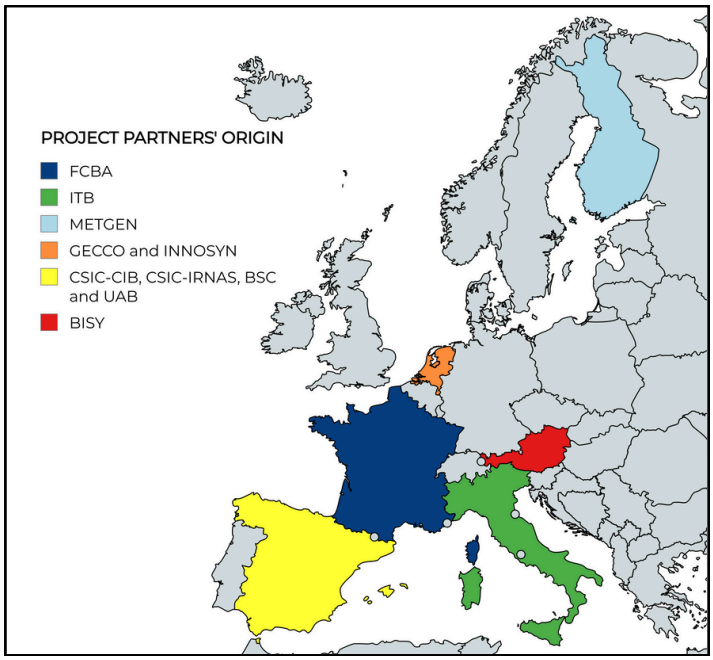
Enzymes have long been used in sectors such as food, textiles, detergents, and pharmaceuticals. What makes them so powerful in an industrial context is their ability to operate under mild conditions, such as lower temperatures, reduced need for toxic solvents, and higher energy efficiency; this translates into fewer greenhouse gas emissions, lower operating costs and processes that are both eco-friendly. As industries seek to align with the EU Green Deal and the global shift towards circularity, enzymes are increasingly recognised as key enablers of innovation.

Enzymes and Europe's Sustainability Ambitions

Initiatives such as the Circular Economy Action Plan and the Bioeconomy Strategy provide a strong framework for reducing dependency on fossil-based resources and accelerating the adoption of renewable and bio-based alternatives. Within this policy landscape, enzymes represent a critical tool to bridge scientific discovery and market application, reinforcing Europe's position as a global leader in green innovation.

From Discovery to Application

Yet, the journey from discovery to large-scale application is not straightforward. Enzymes often need to be engineered to withstand industrial conditions, integrated into complex production systems, and tailored to meet the requirements of specific sectors. This is where collaborative research and innovation projects like ROBUSTOO come into play. Funded by the European Union and the Horizon Europe programme, this project brings together 10 European partners combining academic expertise, technological know-how, and industrial insight to bridge the gap between lab-scale potential and real-world application.



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About ROBUSTOO

ROBUSTOO aims to demonstrate how cutting-edge enzyme technologies can support this transition. Building on the achievements of previous EU-funded initiatives, the project will harness the potential of three oxidative enzymes to develop novel and greener routes for the production of bio-based chemicals and materials:

- Unspecific Peroxygenases (UPOs)
- Laccases
- Hydroxymethylfurfural Oxidases (HMFOs)

ROBUSTOO's ambition, in fact, is twofold: on the one hand, to discover and engineer robust new variants with high performance at the conditions required for industrial application, and on the other, to scale up the production of these recombinant enzymes and their selected biotransformations. By doing so, the project will bridge the gap between research and real-world implementation, opening new opportunities for biotech SMEs and industry.

Stay Connected

As this first newsletter reaches you, our aim is to provide not only an introduction to the project but also a broader perspective on why enzyme technologies matter more than ever. Over the coming issues, we will share updates on the progress of our research, highlight key results, and showcase how enzymes are being applied across different industries.

Enzymes are not just tools for today's industries; they are catalysts for the future. By unlocking their full potential, we can reimagine how we produce, consume, and reuse materials, ensuring that Europe stays at the forefront of innovation while delivering tangible benefits for the environment and society.

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