Industrial Applications of Marine Enzymes: The INMARE Project

The Challenge...

Global challenges such as over population, diminishing natural resources, pollution and human health, have ignited the quest for more sustainable and cleaner industrial processes and products. This, in turn, is driving the demand for new industrially useful enzymes.

Most enzymes are isolated from microorganisms and recent scientific advances mean that it is relatively easy to produce new enzymes. The real problem is that only a very small percentage of new enzymes are useful in industrial processes. Finding new enzymes for industry is a long and complex process, with a low success rate.

...The Solution

INMARE, a four-year European research project that brought together industrial and academic partners, set out to transform the enzyme biodiscovery process and to isolate new enzymes from the ocean. INMARE stands for 'Industrial Applications of Marine Enzymes' and it had three specific objectives:

- to develop a smoothly functioning consortium combining research-excellent academic partners with industrial marketplayers;
- to shorten & streamline the industrial enzyme pipeline by increasing the value of enzyme collections; and
- to identify new lead products and prototypes during the projects lifetime.

"The marine microbiome hosts more microbial species, biomass, biomolecules and genomic potential than any environment on our planet. Focusing our search here has contributed to the success of INMARE"

Professor Peter Golyshin, INMARE Coordinator and Professor of Environmental Genomics, Bangor University

How has INMARE advanced industrial enzyme biodiscovery?

INMARE's aim was to accelerate enzyme discovery and provide industry with new enzyme solutions in a faster and more resource efficient way.

They did this by first searching for new enzymes from microorganisms that live in the ocean, in some of the most extreme environments on the planet. Why? Because these enzymes are already adapted to working in harsh environmental conditions, and so could be perfectly suited to perform in equally harsh industrial conditions. INMARE then focused on identifying 'promiscuous' enzymes, that are capable of accepting many substrates and therefore usable in more than one industrial setting. By identifying markers of enzyme promiscuity, INMARE was able to fast-track the discovery of these industrially versatile enzymes, resulting in one of the world's largest collections of promiscuous enzymes.

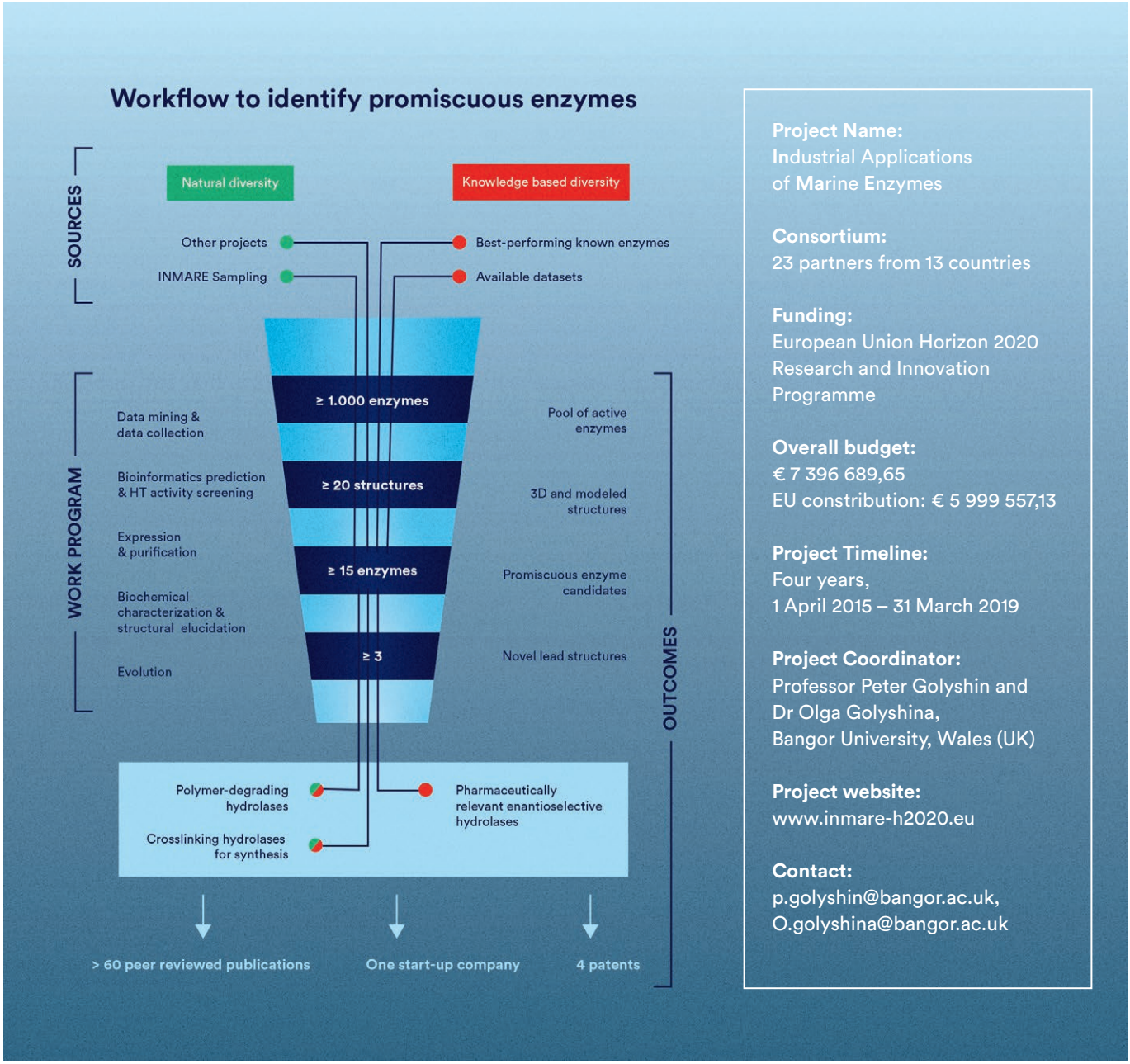
INMARE's Legacy

INMARE has provided industry with a suite of over 1000 active enzymes, some of which already perform better than current commercial products. It has also developed innovative screening tools, sequence analysis pipelines and expression platforms. All of which will fast-track future work in enzymes and bioactives discovery. At the end of the project, INMARE's work had already resulted in four patents and the establishment of one start-up company.

INMARE has advanced our knowledge on marine bioactives and enzyme discovery, as well as answered more fundamental questions about marine microbial adaptation. Much of this knowledge has been captured in over 60 peer-reviewed publications and book chapters. Finally, INMARE has produced a wealth of biological resources; samples, genomic and metagenomics libraries, bioactive compounds and enzymes, all of which can and will support future avenues of research.

For more information on INMARE please visit www.inmare-h2020.eu

INMARE at a glance



Project Name:
Industrial Applications of Marine Enzymes

Consortium:
23 partners from 13 countries

Funding:
European Union Horizon 2020 Research and Innovation Programme

Overall budget:
€ 7 396 689,65
EU constribution: € 5 999 557,13

Project Timeline:
Four years,
1 April 2015 – 31 March 2019

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