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Sustainable Exploitation
of bio-based Compounds Revealed
and Engineered from naTural sources

Project Details

Start Date: 1 June 2021

Duration: 4 years

EU Contribution: 7.787.818 €



What is the SECRETed Project?

SECRETed is a H2020 project funded under the FNR-11-2020 topic, aiming to fully exploit aquatic biotechnology for the production of novel industrial products for the pharmaceutical, cosmetics, agrochemical, marine and chemistry sectors. The SECRETed project aims to develop novel molecules with tailor-made properties by the combination of biosynthetic genes of amphiphilic compounds (biosurfactants and siderophores) produced by marine and extremophilic microorganisms.

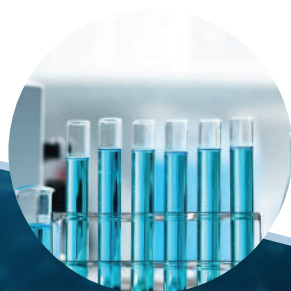
State of the Art

- o Microbial collection screening.
- o Machine learning for new-to-nature molecules.
- o Model-based biodiversity expansion.
- o Biotechnological exploitation.
- o Scalability and demonstration.



Lead Beneficiary 48 Months

- WP1: Ethics requirements (IDE R&D)
- WP2: Microbial collections screening (MATIS)
- WP3: Databases integration and Industry-driven designs (IDE R&D)
- WP4: Systems metabolic engineering for microbial platform optimization (USE)
- WP5: Lab-scale fermentation and chemical characterization of compounds (UoA)
- WP6: Pilot systems for process optimization (BBEPP)
- WP7: Proof of concept for end users' applications (SE)
- WP8: Sustainability assessments (Blue Synergy)
- WP9: Communication, dissemination and exploitation (EXELISIS)
- WP10: Management and Coordination (IDE R&D)



The Objectives

- To unlock the potential of marine and extremophilic bacteria for the development of tailor made amphiphilic molecules.
- To screen and detect Biosynthetic gene clusters for the synthesis of biosurfactants and siderophores based on 4 different aquatic microbial collections.
- To develop a genomic and chemical database including siderophore and biosurfactant production pathways and gene clusters, as well as their chemical structures and physiochemical properties.
- To formulate a 'mix and match' modelling pipeline, where 'mixing' of modular genetic elements is 'matched' with tailor-made compounds.
- To characterize compounds and optimize production and purification methods.
- To develop and validate a mathematical model for production process.
- To demonstrate proposed solutions and developed microbial strains in pilot plant scale (TRL-6).
- To assess environmental, economic and social perspectives of the proposed solutions.

The Impact

- Developing novel natural, sustainable, eco-friendly, cheaper and readily accessible products with significant bioactive properties for the pharmaceutical, cosmetic, agrochemical, marine and chemistry sectors.
- Sustainable exploitation, cultivation and processing of promising organisms.
- Public-private cooperation in European biotechnology by integrating 'green' (plant), 'blue' (marine) and 'white' (industrial).
- Reduce the pressure on harvesting wild populations and increase knowledge about biodiversity potential.