A – Algae4IBD

I – InnCoCells

M – MARBLES

S – SECRETed

Cluster of Projects

funded by H2020 Topic FNR-11-2020

Algae4IBD

Health from aquatic resources

QUICK FACTS

Name: Algae4IBD
Consortium: 21 partners from 11 countries
Coordinator: Migal Galilee Research Institute, Israel
Duration: 48 months (June 2021 – May 2025)
Budget: €7.5 million

CONTACT

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SOCIAL MEDIA

@Algae4IBD
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@algae4ibd

Algae-based biocompounds for the prevention and treatment of IBD

THE CONCEPT

What if the solution for a chronic disease lies in our oceans, rivers or lakes? The **Algae4IBD** project will answer this question. By studying compounds from marine and freshwater microalgae and macroalgae (seaweed) from laboratory/pilot to market scale, we will transform aquatic natural resources into biologically active compounds for the prevention and treatment of inflammatory bowel disease (IBD). Specifically, we will develop algae-derived compounds while preserving algal biodiversity by pioneering new cultivation and extraction technologies. Algae4IBD proposes innovative solutions to the sustainable use of algae-derived products with improved nutritional quality to achieve a positive impact on IBD patients.

Algae4IBD OBJECTIVES

1. Explore overlooked microalgae and macroalgae for novel compounds.
2. Develop orally available and cost-effective solutions for IBD patients.
3. Focus on pain relief, inflammation and a healthy microbiome.
4. Find solutions for inflammation and pain relief by developing novel products.
5. Develop nutraceuticals, pharmaceuticals, food supplements and functional foods to prevent, manage and treat IBD.
6. Improve the wellbeing of IBD patients and reduce the number of hospitalizations.
7. Create an Algae4IBD bank with more than 1000 species of macroalgae and microalgae.
8. Study 150 species from the Algae4IBD bank with the most promising bioactivities.
9. Develop synthesis strategies with no more than 5-7 steps.

AIMS CLUSTER OBJECTIVES

The AIMS cluster is a group of four projects funded under the same H2020 programme. The four projects are Algae4IBD, InnCoCells, MARBLES and SECRETed.

The main objectives are:

* to bridge gaps between the four projects
* to address common challenges
* to pursue joint dissemination and communication activities
* to add value to each individual project and to the AIMS cluster as a whole

QUICK FACTS

Name: InnCoCells
Consortium: 17 partners from 11 countries
Coordinator: VTT Ltd, Finland
Duration: 48 months (May 2021 – April 2025)
Budget: €8 million

CONTACT

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SOCIAL MEDIA

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Bioactive cosmetic ingredients based on underutilized engineered plant resources

THE CONCEPT

Higher plants synthesize a diverse range of bioactive, low-molecular-weight metabolites described as small molecules or natural products, offering enormous industrial potential particularly as cosmetic ingredients. The **InnCoCells** project will develop scientifically validated cosmetic ingredients derived from sustainable cell cultures and plants cultivated in the greenhouse, field or in aeroponic facilities. We are developing production processes based on plants, plant cells and agricultural waste streams as well as assays for the scientific validation of cosmetic ingredients. We are developing production processes based on plants, plant cells and agricultural waste streams as well as assays for the scientific validation of cosmetic ingredients.

InnCoCells OBJECTIVES

1. Mine biological, genetic and chemical resources for the biodiscovery and sustainable exploitation of at least 10 metabolic pathways in various plant species.
2. Develop a multi-step evaluation pipeline for plant-derived bioactive molecules.
3. Develop, assess and optimize production processes and technologies for at least 20 ingredients, utilizing three major production platforms.
4. Explore the potential of at least 10 agri-food by-products/waste fractions by implementing a cascade biorefinery approach to generate value-added products.
5. Establish environmentally sustainable pilot-scale production and purification technologies for at least 10 active, fully-characterized cosmetic ingredients.
6. Ensure product safety, regulatory approval and the sustainability and profitability of the proposed processes by life cycle assessment and techno-economic analysis.
7. Promote knowledge exchange among academic and industrial partners, establish a Stakeholder Group to facilitate the dissemination and exploitation of project results, and launch an effective public communication and engagement strategy.

AIMS CLUSTER ACTIVITIES

The kick-off meeting of the AIMS Cluster (**pictured right**) was held remotely on 25th May, 2022, and included the following:

* General presentations of clustered projects
* Round table to discuss common challenges
* Round table to optimize common dissemination and communication activities

A further meeting to plan common dissemination and communication activities was held remotely on 14th June 2022

MARBLES

HARNESSING MARINE MICROBES FOR DRUG DISCOVERY AND SUSTAINABLE PRODUCTION OF FISH & CROPS

QUICK FACTS

Name: MARBLES
Consortium: 14 partners from 10 countries
Coordinator: Leiden University, the Netherlands
Duration: 60 months (May 2021 – April 2026)
Budget: €7.5 million

CONTACT

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SOCIAL MEDIA

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MARBLES project

Microbial consortia and bioactive molecules to fight infectious diseases

Aplysina fistularis
© Detmer Sipkema (WU)

THE CONCEPT

The marine environment remains a largely untapped and poorly understood source of natural products that could have great potential in the pharmaceutical and food industries. Barriers include finding and identifying bacteria and their molecules, sustainably extracting active ingredients, and the commercial and regulatory challenges of bringing a discovery to market. With a growing global population and the climate and biodiversity crises, the **MARBLES** project will address these challenges by sustainably harnessing new marine bioactive compounds with pharmaceutical and nutritional applications, as well as producing microbes and microbial communities for bioprotection.

MARBLES OBJECTIVES

1. Identify microorganisms and their bioactive compounds with antimicrobial properties that could be used as bioprotectants in aquaculture and agriculture, or potentially in human health applications.
2. Improve screening regimes and develop formulations for the sustainable commercial exploitation of novel bioactive compounds.
3. Provide environmentally friendly alternatives to the use of antibiotics in aquaculture as well as the use of synthetic agrochemicals in agriculture.
4. Build upon science-based advice to strengthen ongoing policy discussions concerning biotechnology.
5. Share the advances in marine biotechnology and the importance of marine biodiversity.

COMMON DISSEMINATION, COMMUNICATION AND EXPLOITATION ACTIVITIES

- √ Social media campaigns
- √ Video recordings and podcasts
- √ Joint participations in events
- √ Press releases
- √ Joint publications
- √ Share knowledge for exploitation strategies

COMMON CHALLENGES

- * Certification of the origin of microorganisms
- * Hazards and potential risks of substances
- * Toxicity evaluation in vitro, ex vivo and in vivo
- * Mutagenicity, genotoxicity, allergenicity, heavy metals, and pesticide traces
- * Data format and pipeline for sample evaluation
- * Upscaling of production
- * Ethics for preclinical assessment
- * Structural identification of molecules
- * European regulations and guidelines for risk assessment and management
- * Important certifications

QUICK FACTS

Name: SECRETed
Consortium: 15 partners from 9 countries
Coordinator: Idener R&D, Spain
Duration: 48 months (June 2021 – May 2025)
Budget: €7.8 million

CONTACT

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SOCIAL MEDIA

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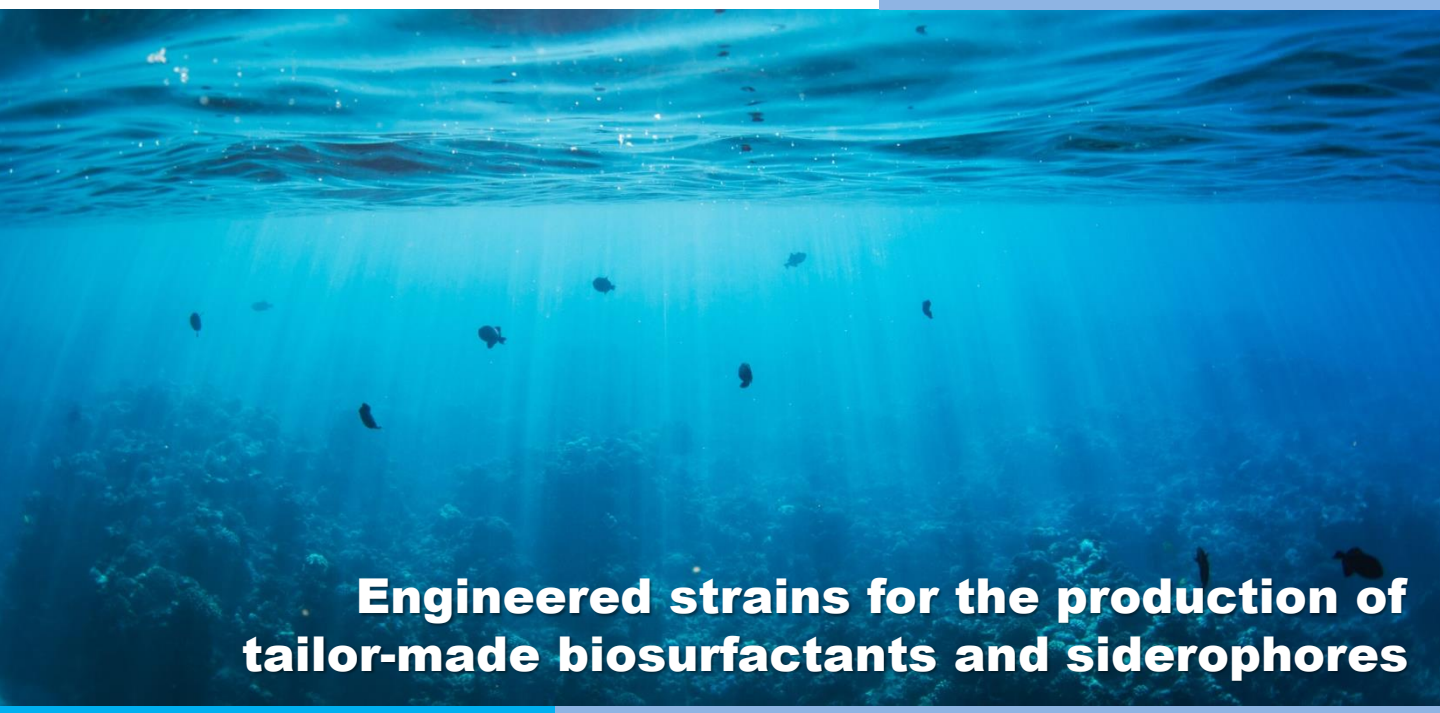

Engineered strains for the production of tailor-made biosurfactants and siderophores

THE CONCEPT

The **SECRETed** project will fully exploit aquatic biotechnology for the development of biosurfactants and siderophores with tailor-made properties for applications in oncology, pharmaceuticals, cosmetics and the agrochemical sector. The potential benefits of the hybrid molecules and industry-driven formulations will be broadened by combining genes encoding enzymes that synthesize amphiphilic compounds, and expressing them in marine and extremophilic microorganisms. Gene clusters responsible for the production of target molecules will be reverse engineered and new strains will be designed, built and tested in an iterative cycle, facilitating the development of sustainable industrial processes and end-user applications.

SECRETed OBJECTIVES

1. Unlock the potential of marine and extremophilic bacteria for the development of tailor-made amphiphilic molecules.
2. Screen and detect biosynthetic gene clusters for the synthesis of biosurfactants and siderophores based on four different aquatic microbial collections.
3. Develop a database of siderophore and biosurfactant production pathways and gene clusters, as well as their chemical structures and physiochemical properties.
4. Formulate a 'mix and match' modelling pipeline, where 'mixing' of modular genetic elements is 'matched' with tailor-made compounds.
5. Characterize newly discovered and engineered compounds and optimize their production and purification methods.
6. Develop and validate a mathematical model of the production process.
7. Demonstrate proposed solutions and microbial strains at the pilot-plant scale.
8. Assess environmental, economic and social perspectives of the proposed solutions.