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## Session IV - A.I.M.S. Cluster

Monday, July 15, 2024, 13:30 - 15:30, Room S4C – 3<sup>rd</sup> Floor

### Prospecting aquatic and terrestrial natural biological resources for biologically active compounds

Session IV is devoted to the research activities of A.I.M.S. Cluster which consists of the EU projects MARBLES, InnCoCells, SECRETed and Algae4IBD funded under H2020: Prospecting aquatics and terrestrial natural biological resources for biologically active compounds. The A.I.M.S. Cluster aims to bridge the gaps among the 3 projects and add value to their research activities by identifying and addressing common methodological challenges.

### Schedule



#### Chair of Session IV

**Nikolaos Fokialakis, Ph.D.**

Professor at National and Kapodistrian University, Greece

Vice president of Society for Medicinal Plant and Natural Product Research (GA)



**13:30 – 13:50**

#### Presenter

**Manuel Salvador, Ph.D.**

Technical Coordinator at IDENER R&D

**Title:** SECRETed - Sustainable Exploitation of bio-based compounds revealed and engineered from natural sources



**13:50 – 14:10**

#### Presenter

**Alain Goossens, Ph.D.**

Professor at Vlaams Instituut voor Biotechnologie VZW

**Title:** InnCoCells - Innovative high-value cosmetic products from plants and plant cells

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**14:10 – 14:30**

**Presenter**

**Fernando Reyes**

Head of the Chemistry Department at Fundacion MEDINA

**Title:** MARBLES - Marine Biodiversity as Sustainable Resource of Disease-Suppressive Microbes and Bioprotectants for Aquaculture and Crop Diseases



**14:30 – 14:50**

**Presenter**

**Manuel Salvador, Ph.D.**

Technical Coordinator at IDENER R&D

**Title:** Unlocking the potential of marine biotechnology: Biosurfactants and siderophores Integrative Management Platform



**14:50 – 15:10**

**Presenter**

**Kieran Walshe**

Founder and CEO of Accuplex Diagnostics

**Title:** Innovative end-user applications based on siderophores



**15:10 – 15:30**

**Presenter**

**Amir Akhgari, Ph.D.**

Senior Scientist at VTT Technical Research Centre of Finland Ltd

**Title:** Sustainable skin care ingredients from plant cells with scientifically proven efficacy

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### SECRETed

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

SECRETed is an EU-H2020 project aimed at leveraging aquatic biotechnology to create innovative industrial products for sectors like agrochemicals, pharmaceuticals, cosmetics, and chemistry. The project focuses on developing hybrid molecules with customised properties by combining biosynthetic genes from marine and extremophilic microorganisms. Utilising machine learning algorithms, SECRETed will uncover genetic mechanisms responsible for biosynthesis and expand chemical diversity. It will construct a unique database comprising molecular structures, physicochemical characteristics, bioactivities, and genetic mechanisms. Reverse engineering biosynthetic gene clusters will standardise and modularise genetic elements to enhance industrial exploitation. Industry-driven formulations will be developed based on engineered combinations of genetic elements expressed in microbial hosts, with new strains designed, built, and tested iteratively for sustainable industrial processes.

Link to the Project: <https://www.secreted.eu/>



### InnCoCells

Innovative high-value cosmetic products from plants and plant cells

The InnCoCells project aims to create sustainable production processes for cosmetic ingredients using underutilised plant resources. Techniques like cell cultures, aeroponics, and greenhouse cultivation will be optimised with metabolic engineering tools to increase yields of bioactive compounds. Pilot-scale production and extraction will demonstrate the viability of these processes for at least ten ingredients. A cascade biorefinery approach will maximise



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resource utilisation. Techno-economic assessments and life cycle analyses will ensure economic feasibility and environmental sustainability. Safety and efficacy of ingredients will be validated through innovative assays without animal testing. Stakeholder engagement, including industry, academia, farmers, policymakers, and consumers, will guide research. Communication strategies will be tailored for different stakeholders, and regulatory compliance will be ensured. The project aims to strengthen the European bioeconomy by fostering innovation in biobased goods and markets.

Link to the Project: <https://www.innocells.org/>



## MARBLES

Marine Biodiversity as Sustainable Resource of Disease-Suppressive Microbes and Bioprotectants for Aquaculture and Crop Diseases

The MARBLES project aims to harness marine microbial biodiversity for sustainable bioprospecting, targeting applications in aquaculture, agriculture, and healthcare. By focusing on unique host-microbe interactions in marine environments, including marine sponges, microalgae, and fish, the project seeks to discover novel bioactive molecules and microbial consortia. Employing a systems-wide genomics approach, MARBLES aims to uncover disease-suppressive microbiomes and explore chemicals that induce bioactive compound production. The project aims to deliver microbes, consortia, bioactive natural products, and derivatives for combating infectious diseases in various industries. MARBLES emphasises cost-effectiveness and environmental and health benefits, offering alternatives to existing practices. Collaboration with SMEs and large companies in aquaculture, crop protection, and health sectors is integral. The project aligns with international protocols and UN sustainable development goals, contributing to SDG 2, 3, 12, 13, and 14, as well as ongoing UN processes.

Link to the Project: <https://marblesproject.eu/>



## Algae4IBD

From nature to bedside - Algae based bio compound for prevention and treatment of inflammation, pain and IBD

Algae4IBD aims to develop commercial products for Inflammatory Bowel Disease (IBD) prevention and treatment using aquatic natural biological resources. With the emerging developments in natural product, notable success has been achieved in discovering natural products and their synthetic structural analogues with anti-inflammatory activity. However, global biodiversity remains a largely unexploited resource for natural bioactive molecules with an enormous potential for developing commercial products with public health benefits. Micro

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and macroalgae, found in marine and freshwater, have been identified as promising sources of bioactive compounds including small molecules and secondary metabolites with a wide range of bioactivities as an antioxidant, anti-inflammatory and cancer preventive. Consumption of algae could, therefore, provide defence against chronic inflammatory diseases such as IBD, that until date have no effective cure. This project offers nature to bedside approach, using an entire development along the value chain for a new biodiscovery therapeutic approach by developing and examining algae-based compounds for IBD patients while guaranteeing algae's biodiversity preservation. We propose innovative solutions for increasing the use of algae-based ingredients and to ensure the science-based improvement of nutritional quality and its effect on public health. The researchers, companies and hospitals involved in the different stages of the project will use the biodiversity of algae, both micro and macro, as a wide source for bioactive compounds using state-of-the-art cultivation and extraction technologies for obtaining sufficient amounts of the bio-active molecules together with novel processing protocols. It will result in novel algal-based, high-quality bioactive compounds at GMP grade and lower costs for dual purposes – IBD prevention and treatment in relevance to the food as well as the pharmaceutical industries.

Link to the project: <https://algae4ibd.eu/>