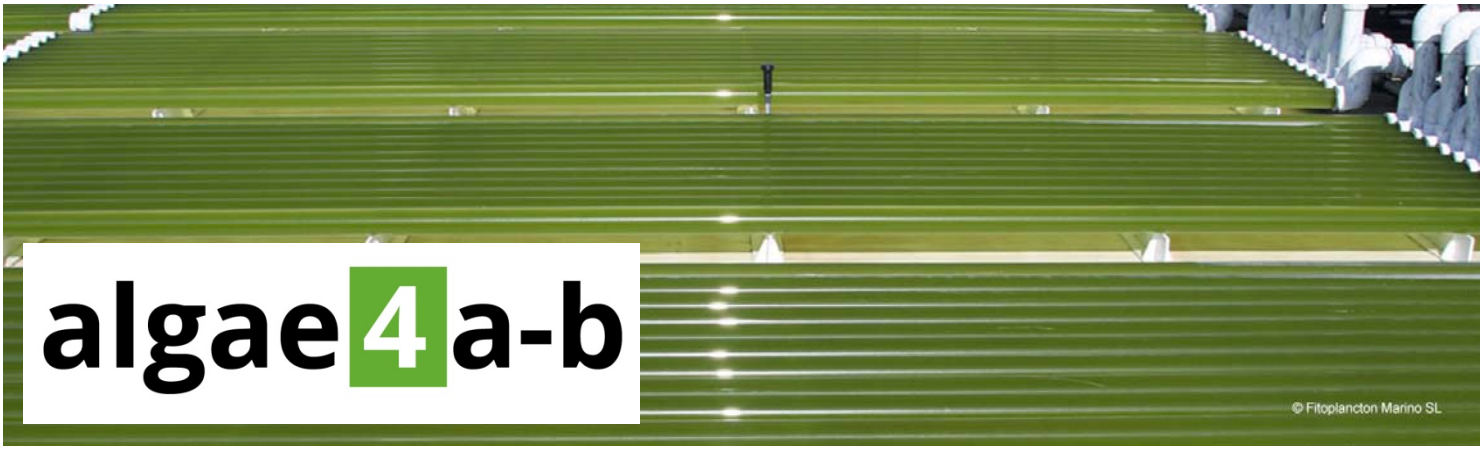


Algae for Aquaculture and Beauty

Newsletter 2 – December 2016

Consortium

Project Coordinator
CNRS, CERMAV
France

Fitoplancton Marino, S.L.
Spain

Agricultural University Of Athens
Greece

Instituto Andaluz De Investigacion y Formacion Agraria Pesquera Alimentaria
Spain

Apivita SA
Greece

Centro De Ciencias Do Mar Do Algarve
Portugal

Lifesequencing, SL
Spain

The project

Microalgae were always an exciting target for Aquaculture, Cosmetology and Biotechnology, as they represent a largely untapped reservoir of novel and valuable bioactive compounds.

The ALGAE4A-B (Algae For Aquaculture and Beauty) project seeks to exploit microalgae diversity, as a source for state-of-the art high-added-value biomolecules in aquaculture and cosmetics.

ALGAE4A-B aspires to foster both European capacity building and the strategic objectives of EU Blue Growth and Marine Biotechnology to harness the untapped potential of European seas and coasts for training and sustainable growth.

Microalgae Biomass Production

The diversification of microalgae biomass production towards two independent applications will give the microalgae industry access to alternative markets in an uncertain, highly competitive and fast changing commercial environment.

Basic and applied research

The project will combine both basic and applied multidisciplinary research in the fields of –omics technologies, biochemistry and applied biotechnology in order to:

- Develop and optimize low-input and application-based microalgae culture systems
- Develop "-omic" resources for both microalgae and fishes
- Develop downstream processing of high added value products from microalgae, with an emphasis on polysaccharides, proteins, enzymes and antioxidants
- Develop, formulate and evaluate in vitro a new range of cosmetic and nutraceutical products for aquaculture

Key figures

972 000 € EC funding
7 partners
4 years (2016-2019)

More information on www.algae4ab.eu

Workshop 2 – Grenoble, France – February 20th-24th 2017 "Sweet Microalgae"

Workshop schedule

Day 1	Monday 20th February 2017	CERMAV Belledonne Room
	Opening and topic introduction	
	16:00-17:00	Registration
	17:00-17:30	Welcome and opening remarks
	17:30-18:30	Introduction of CERMAV (William Helbert)
Day 2	Tuesday 21st February 2017	CERMAV Belledonne Room
	Morning session	
	09:30-10:15	Algal biomass as an alternative feedstock for plastics (Jean-François Sassi, CEA)
	10:15-11:00	Microalgae: intersting organisms to decipher the evolutionary adaptation of the N-glycostation pathways (Muriel Bardor, Univ. Rouen)
	11:00-11:30	*Coffee Break*
	11:30-12:15	Analytical Methods and chromatography (to be confirmed, CNRS)
	12:15-13:00	Electron microscopy of polysaccharides (Jean-Luc Putaux, CNRS)
	13:00-15:00	*Lunch*
	Afternoon session	
	15:00-16:30	Visit of analytical facilities of CERMAV
Day 3	Wednesday 22nd February 2017	CERMAV Belledonne Room
	Morning session	
	09:30-10:15	Micro-algae for biomanufacturing of high-added value biopolymers (Ghislaine Tissot-Lécuelle, Alganelle)
	10:15-11:00	Screening of GH and PL activities (William Helbert, CNRS)
	11:00-11:30	*Coffee Break*
	11:30-12:00	Chemo-enzymatic synthesis of glycoconjugates (Sebastien Fort, CNRS)
	12:00-14:00	*Lunch*
	Afternoon session	
	14:00-16:00	Round table/Open discussion
Day 4	Thursday 23rd February 2017	CERMAV Belledonne Room
	Algae4A-B Review meeting	All Algae4A-B partners
	Algae4A-B Review meeting	All Algae4A-B partners
Day 5	Friday 24th February 2017	CERMAV Belledonne Room
	General assembly meeting	
	09:30-11:00	Management session (PIs)
	11:00-11:30	*Coffee Break*
	11:30-12:15	Concluding Remarks
	12:15-13:00	*Lunch*

Workshop organisation
Dr. William Helbert
CERMAV
Algae4A-B Project Coordinator
CNRS, Grenoble, France

Registration modalities
Access to the workshop will be free of charge upon registration. More information on www.algae4ab.eu

Practical information
CERMAV-CNRS
Domaine Universitaire de Grenoble
601 rue de la chimie
St Martin d'Hères - France
Room Belledonne
www.cermav.cnrs.fr

Talks will be available on www.algae4ab.eu

Algae4A-B Implemented secondments

Research and Innovation Staff Exchange (RISE) projects fund short-term exchanges ("secondments") for staff to develop careers combining scientific excellence with exposure to other countries and sectors. RISE enables more interaction between academia and non-academic organisations within Europe and worldwide.

APIVITA => CCMAR
Sofia Letsiou – 2 months

The aim of this study was to produce two marine teleost primary cell lines derived from skin of the marine teleost sea bass. This will be used as a comparative model for human skin established cell lines to test for microalgae extract activity (towards D3.4/D3.5). During the experiments we developed a protocol based on cell extraction from skin fish of the marine teleost sea bass.

APIVITA => IFAPA
Konstantinos Gardikis – 3 months

The main objective of the secondment was to develop a reference gene panel focused on innate immunity using the genomic knowledge available for sole to be applied in RNA-seq studies that will be carried out to evaluate the effects of microalgae extracts in fish (WP2). Also, the secondment was used to demonstrate the procedures used in aquaculture for the management of early stages of fish and to provide training in the main techniques to be used with sole and seabream embryos in lab conditions.

APIVITA => CCMAR
Anna Patera – 2 months

The aim of this study was sample preparation for subsequent omics analysis in the context of (D2.2). This process entailed the set-up of cell cultures and the identification of the approach to be used and method optimization for the extraction of material for omics analysis. The work during the visit was focused on developing the cell culture approach and the methodology for the "omics" approach.

APIVITA => IFAPA
Danae Georgiou – 3 months

The objectives of the secondment was to collaborate in actions related with WP2 about the "-omics" in fish establishing cross tools between cosmetics and aquaculture studies using similar tools for analysis. A reference gene panel used in human skin to evaluate the effect of microalgae extracts was equally established for Senegalese sole using the genomic information available in such species. This information is suitable for qPCR and RNA-seq for the evaluation of functional elements in microalga. Also, training in the main techniques related to fish management during early developmental stages was provided to optimize the trials for microalgae evaluation

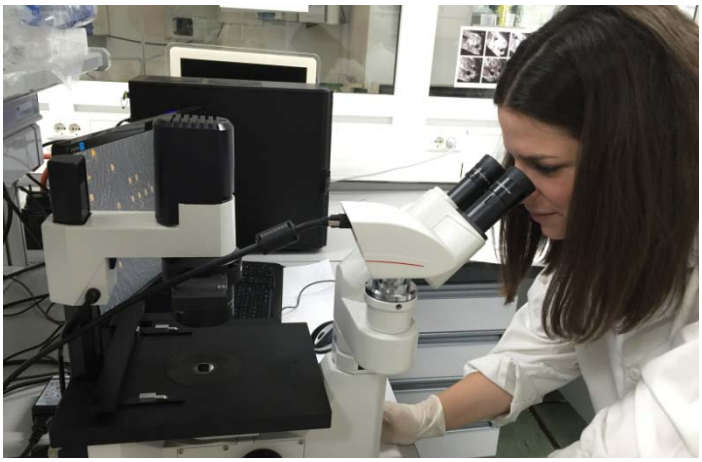
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 691102.

Algae4A-B Implemented secondments

APIVITA => IFAPA

Markella Kafourou – 3 months

The main objective of the secondment was to participate in the actions related with -omics bioanalysis that facilitate the evaluation of microalgae effects in aquaculture. Particularly, we collaborated in the optimization of procedures to evaluate the effect of microalgae extracts on larvae of sole. Bioinformatics using the sole genome was used to establish a similar panel of genes to that used to test the effects of microalgae on human skin. These objectives are suitable for the comparison of results across genomic studies both in cosmetics and aquaculture to compare the effects of microalgae.



AUA => FITMAR

Evangelia Chronopoulou– 3 months

The purpose of the secondment was experimental work and the transfer of knowledge for the analysis and generation of "-omics" resources from microalgae. Extraction, catalomic analysis and initial fractionation of selected extracts from microalgae strains grown under different culture conditions were achieved. The large enzyme and protein diversity from microalgae will provide with new and diverse range of proteins and biocatalysts exhibiting new properties. In addition, they will put up our knowledge for a better understanding of molecular and biochemical mechanisms that regulate microalgae metabolism.

AUA => FITMAR

Nikolaos Labrou– 3 months

The purpose of the secondment was the transfer of knowledge and the development of research activities for the analysis and generation of "omics" resources for selected microalgae strains currently under production in FITMAR. Catalomics analysis of selected microalgae strains grown under differential environmental and nutritional regimes was achieved. The obtained results on catalomics analysis will provide knew knowledge on the exploitation of microalgae as a source of enzymes carrying new and surprising catalytic activities. In addition, the obtained resources will provide both the consortium and scientific community with a valuable asset for metabolic modelling and prediction tools.

LIFESEQ => CCMAR

Juan Martinez– 2 months

Evaluation of methods for nucleic acid isolation (RNA and DNA). Quality control analysis and sample selection based on immune response profiles. Bioinformatic pipeline development for NGS data analysis.

AUA => FITMAR

Emmanouil Flemetakis – 3 months

This secondment focused on the establishment of genomic, transcriptomic and metabolomic resources for selected microalgae species currently under production in FITMAR. These include the laboratory-scale microalgae cultures and the preparation of high quality RNA for transcriptome analysis of microalgae grown under differential environmental and nutritional regimes. In addition, microalgae samples of different strains were prepared for the comprehensive analysis of metabolome under the different growing regimes. The obtained resources will provide a new insight in the understanding the molecular and biochemical mechanisms controlling the optimum CMC growth and the basis for future improvements in cell productivity and metabolism.

AUA => FITMAR

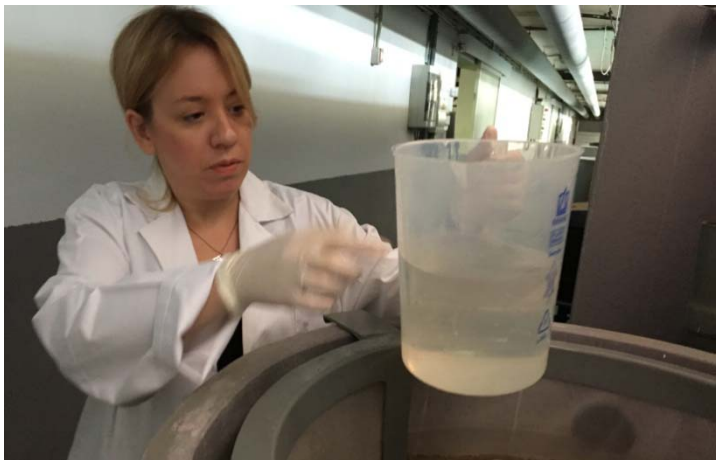
Aikaterini Kalliampakou – 3 months

The purpose of the secondment was the work and transfer of knowledge on the establishment of genomic, transcriptomic and metabolomic resources for selected microalgae species currently under production in FITMAR. These include the laboratory-scale microalgae cultures and the preparation of small-molecule metabolite extracts of selected microalgae strains grown under differential environmental and nutritional regimes. These will be used for the comprehensive analysis of microalgae target strains metabolome under the different growing regimes. The obtained resources will provide a new insight in the understanding the molecular and biochemical mechanism controlling the optimum CMC growth and will provide the basis for future improvements in cell productivity and metabolism.

FITMAR => AUA

Eulalia Mantecon – 2 months

The objective of the secondment at the AUA has been to set up new lab-scale facilities for experimental microalgae growth. These facilities consist of a set of 1l and 2l photobioreactors, in which different parameters (pH, temperature, light intensity) can be modified. Growth of target strains has been tested using such new facilities in order to optimize protocols and good performance of all new equipments and devices.



CCMAR => APIVITA

Joao Cardoso – 1 month

The purposes of the secondment were in vitro screening to test the bioactivity of microalgae derived extracts on human dermal cell lines and the technology transfer of in vitro assays developed in APIVITA to CCMAR for the establishment and testing of fish skin cell primary cultures.

Algae4A-B Implemented secondments

FITMAR => AUA

Carlos Infante – 2 months

The objective of the secondment has been to begin the set-up of a real-time RT-PCR platform for gene expression analysis in *Tetraselmis chuii*. First draft genome sequence already obtained in the scenario of project AlgaeCom has been used as a starting point to search sequences involved in defence against oxidative stress such as Superoxide Dismutase (SOD) and Glutathione Reductase (GR). For real-time RT-PCR analyses, the same process has been followed for potential housekeeping genes. Criteria for the best performance of primer pairs have been established. Thus, a first set of primers has been already designed to check the effects of variable outdoor conditions in *Tetraselmis* cultures. It will be complemented soon with additional target genes involved in other biological processes with interest in cosmetic industry.

IFAPA – APIVITA

Ana Manuela Crespo – 3 months

The secondment activity was focused on the chemical and enzymatic characterization of microalgae extracts to be used in cosmetics and aquaculture. Some techniques related to the catalomic, catabolomic and protein characterization were optimized for the evaluation of some metabolic activities, antioxidant capacity and protein profiles. The achieved results are of interest to find novel applications for aquaculture and cosmetics and will help to understand the performance in these fields.

IFAPA – APIVITA

Carlos Carballo – 3 months

The secondments aimed at the optimization of methodologies for the purification and characterization of hatching enzymes from sole as a biotechnological by-product to be used in cosmetics. The studies to characterize different hatching liquid batches, the optimization of screening methods to monitor the protease content and the methodologies to purify the enzymes were started.

CCMAR – LIFESEQ

Patricia Pinto – 1 month

The objectives of the secondment were the microbiome analysis of skin and gut of pigmented or albino sole (*Solea senegalensis*) as well as the environmental water and food and the transcriptome analysis (RNA-seq) from the skin and gut of pigmented and albino sole.

FITMAR => AUA

Sonia Torres – 2 months

The objective of the secondment was to assay potential bioactive properties of different microalgae extracts obtained at FITMAR's premises. For this purpose, in vitro tests using Primary Human Dermal Fibroblasts (NHDF) isolated from normal human adult skin were performed. In order to evaluate the possible protective effects of the tested extracts against cell damage induced by oxidative stress, fibroblasts were initially incubated in the presence of varying H_2O_2 concentrations used as a stressor. Evaluation of extract effect in fibroblast sustainability was based on ATP intracellular determination. Moreover, total RNA was isolated from selected treatments, and first strand cDNA was synthesized in order to further study transcript accumulation for selected genes involved in several skin-related processes. A RT-qPCR platform will be applied for expression analysis of the respective human genes available in AUA.

IFAPA – APIVITA

Manuel Manchado – 1 month

The secondment aimed at the characterization of microalgae extracts to be evaluated in aquaculture. The identification of target assays to characterize the antioxidant capacity and some metabolic effects was done. Moreover, a molecular and in silico characterization of hatching enzymes using a genomic analysis was also carried out in order to establish the target genes to be later purified to be applied in cosmetics.

FITMAR => AUA

Carlos Unamunzaga – 2 months

The objective of the secondment was to optimize protocols for separation of Superoxide Dismutase (SOD) present in microalgae extracts from *Isochrysis galbana*. Aqueous Two-Phase Separation (ATPS) protocol has been employed. Effect of different protein inputs in ATPS have also been studied. Thus, total protein recovery in both phases as well as partition between them have been determined in relation to the initial input. In parallel to protein content analysis, total SOD activity has also been measured using an indirect colorimetric assay. As a whole, a valuable reference asset has been developed for further downstream processing of microalgae extracts regarding SOD enrichment.

More information on www.algae4ab.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 691102.