



***Overview of FP7 (KBBE) and H2020  
(Societal Challenge 2) projects  
related to the Algae Biorefineries  
sector***







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(Societal Challenge 2) projects related  
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## **FP7-KBBE - Specific Programme "Cooperation": Food, Agriculture and Biotechnology**

### **FOOD, AGRICULTURE AND BIOTECHNOLOGY**

The advancement of knowledge in the sustainable management, production and use of biological resources (microbial, plant and animal) will provide the basis for safer, eco-efficient and competitive products and services for agriculture, fisheries, feed, food, health, forest-based and related industries. The FP7-KBBE programme contributed to the implementation of existing and prospective policies and regulations in the area of public, animal and plant health and consumer protection. New renewable energy sources were supported under the concept of a European knowledge-based bio-economy. Science, industry and society came together to address the social, economic and environmental challenges of sustainable management of biological resources.

The research activities included:

- Sustainable production and management of biological resources from land, forest, and aquatic environments: enabling research on sustainable production systems; plant and animal production and health; animal welfare; fisheries and aquaculture, including exploitation and sustainable use of their biodiversity.
- Tools to implement relevant strategies, policies and legislation supporting the European knowledge based bio-economy.
- The integrity and control of the food chain ("fork to farm") will be subject to research, addressing food, health and well-being.
- Life sciences and biotechnology for sustainable non-food products and processes will develop improved crops and forest resources, feed-stocks, marine products and biomass technologies for energy, environment, and high added value products such as materials and chemicals.

Several European Technology Platforms contributed to setting common research priorities in various fields, like food technologies and processes, plant genomics, forestry and forest-based industries, global animal health, and animal farm breeding.

#### **What's the benefit for industry and SMEs:**

The creation of a European Bio-Economy is expected to open the way for innovations and effective technology transfer, aiming to include all industries and economic sectors that produce, manage and otherwise exploit biological resources as well as related services from the supply or consumer industries. These activities are in line with the European strategy on life sciences and biotechnology and is expected to promote competitiveness of European agriculture and biotechnology, seed and food companies and in particular high-tech SMEs, while improving social welfare and well-being.



## BAMMBO

### ***Sustainable production of biologically active molecules of marine based origin***

#### At a glance

**Acronym:** BAMMBO

**Title:** Sustainable production of biologically active molecules of marine based origin

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** Sustainable culture of marine microorganisms, algae and/or invertebrates for high added value products

**Call:** FP7-KBBE-2010-4

**Start date:** 01/03/2011

**End date:** 28/02/2014

**Duration:** 36 (months)

**Total Cost:** € 4,338,536.00

**EC Contribution:** € 2,992,421.00

**Consortium:** 11 participants

**Project Coordinator:** LIMERICK INSTITUTE OF TECHNOLOGY, IE

#### Abstract

Innovation is the most important engine of growth and jobs in knowledge-based bio-economies. The scope of BAMMBO (Biologically Active Molecules of Marine Based Origin) is ambitious. This is intentional. BAMMBO will provide innovative solutions to overcome existing bottlenecks associated with culturing marine organisms in order to sustainably produce high yields of value-added products for the pharmaceutical, cosmetic and industrial sectors. BAMMBO will screen and identify target marine organisms (e.g. bacteria, fungi, sponges, microalgae, macroalgae and yeasts) from diverse global locations for potential as sustainable producers of high-added value molecules (HVAB's). Our project will apply analytical methods for the extraction, purification and enrichment of targeted bioactive compounds. A detailed life cycle analysis of the production pathways developed in the project will be undertaken to fully evaluate the sustainability of production of biologically active products from marine organisms. BAMMBO will exploit knowledge and technologies developed during the project and effectively manage their transfer to relevant stakeholders in industry and the research community, as well as to policy-makers. We have brought together a multidisciplinary consortium of specialist Research and SME partners representing 8 countries including partners from ICPC countries Russia and Brazil, and from EU member states at Mediterranean, Adriatic and Atlantic coasts. In adhering to the European Strategy for Marine and Maritime Research this three year project will encourage capacity-building, integration and synergies across relevant marine sectors. Innovative technologies developed in the project will be demonstrated with the involvement of industry partners, and the results will be of interest not only to companies directly involved in the marine sector, but to other large scale industry players such as pharmaceutical companies with interest in added-value bioactive compounds.





## BAMMBO

### Project's Participants List

*Sustainable production of  
biologically active molecules  
of marine based origin*

Project's partners	Name	Country
1	LIMERICK INSTITUTE OF TECHNOLOGY	IE
2	UNIVERSITE DE NICE SOPHIA ANTIPOLIS	FR
3	UNIVERSIDADE ESTADUAL DE CAMPINAS	BR
4	ALGAE HEALTH LIMITED	IE
5	GREENSEA SAS	FR
6	UNIVERSIDAD DE SANTIAGO DE COMPOSTELA	ES
7	INSTITUTO POLITECNICO DE LEIRIA	PT
8	UNIVERSITE CATHOLIQUE DE LOUVAIN	BE
9	UNIVERSITEIT GENT	BE
10	FEDERAL STATE UNITARY ENTERPRISE STATE SCIENTIFIC-RESEARCH INSTITUTE OF GENETICS AND BREEDING OF INDUSTRIAL MICROORGANISMS	RU
11	UNIVERSITA DEGLI STUDI DI GENOVA	IT



## BISIGODOS

### ***High value-added chemicals and BIoreSIns from alGae biorefineries produced from CO2 provided by industrial emissions***

#### At a glance

**Acronym:** BISIGODOS

**Title:** High value-added chemicals and BIoreSIns from alGae biorefineries produced from CO2 provided by industrial emissions

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** The CO2 algae biorefinery

**Call:** FP7-KBBE-2013-7-single-stage

**Start date:** 01/11/2013

**End date:** 30/04/2017

**Duration:** 42 (months)

**Total Cost:** € 5,642,097.83

**EC Contribution:** € 3,853,417.00

**Consortium:** 14 participants

**Project Coordinator:** AIMPLAS - ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS, ES

#### Abstract

BISIGODOS aims to address the production of valuable algae derived chemicals, amino acids and high added-value bio-resins for coatings, printing, food and hair care and adhesives applications, starting from algae biomass fed directly with CO2 from industrial emissions (cement, steel factory, thermal power plants, etc.) as a raw material that is cost-effective and renewable. The process is assisted by solar radiation, nutrients and sea water microalgae. This approach is based on the technology developed by the Partner Biofuel Systems (BFS) to produce bio-oil. In order to develop such technology, several innovative approaches are proposed: - New algae strains production optimization and CO2 energetic balance improvement. -Optimization of photo-bioreactors - Study and adaptation of separation of algae components based on hybrid technologies. - Production of algae derived chemicals for surfactants applications and amino acids for food applications - Production of bio-based resins from algae based fatty acids and bio-oil aromatic moieties. Similar studies have been carried out at laboratory level to obtain a broad range of algae derived chemicals; however BISIGODOS' project aims to work at semi-industrial scale using the BFS industrial photo-bioreactors facilities. Results obtained at this scale, under a well-controlled process, will permit to validate the lab scale results and to develop new ones (mainly in the bioresin field) gaining a real knowledge of the industrial-market possibilities that the microalgae technologies offer and contributing to define the roadmap of the technology.



## BISIGODOS

### Project's Participants List

***High value-added chemicals and BioreSIns from alGae biorefineries produced from CO2 provided by industrial emissions***

Project's partners	Name	Country
1	AIMPLAS - ASOCIACION DE INVESTIGACION DE MATERIALES PLASTICOS Y CONEXAS	ES
2	3V TECH EQUIPMENT & PROCESS SYSTEMS SPA	IT
3	PROCESS DESIGN CENTER BV	NL
4	PHYCOSOURCE SARL	FR
5	BECKER INDUSTRIAL COATINGS LIMITED	UK
6	SUN CHEMICAL LIMITED	UK
7	CROMOGENIA UNITS SA	ES
8	CRODA INTERNATIONAL PLC	UK
9	GRUENE-BIORAFFINERIE.AT GMBH	AT
10	CASPEO SARL	FR
11	Teknologian tutkimuskeskus VTT Oy	FI
12	BANGOR UNIVERSITY	UK
13	THE UNIVERSITY OF WARWICK	UK
14	BIO FUEL SYSTEMS S.A.	ES



## D-FACTORY

### *The micro algae biorefinery*

#### At a glance

**Acronym:** D-FACTORY

**Title:** The micro algae biorefinery

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** The CO<sub>2</sub> algae biorefinery

**Call:** FP7-KBBE-2013-7-single-stage

**Start date:** 01/12/2013

**End date:** 30/11/2017

**Duration:** 48 (months)

**Total Cost:** € 10,083,863.54

**EC Contribution:** € 7,177,440.00

**Consortium:** 13 participants

**Project Coordinator:** UNIVERSITY OF GREENWICH, UK

#### Abstract

The D-Factory aims to set a world benchmark for a sustainable biorefinery based on biomass from halophilic microalgae. Representing the largest (100s ha) of current commercial cultivation technologies for any microalga, *Dunaliella* microalgal biomass production uses raceways and lakes, and will be expanded with biorefinery concepts by drawing in European innovations in key biomass processing technologies: supercritical CO<sub>2</sub>; high performance counter-current chromatography; and the use of membranes, to produce carotenes and other bioactive compounds, emulsifiers and polymers. Combining this force with world-renowned expertise in the biochemistry of *Dunaliella* (Ben-Amotz) we will tailor the productivities of strains sourced by the Marine Biological Association for biorefinery requirements and add to the mix, experience in constructing and using the two most advanced systems for cultivating microalgae: a series of photobioreactors developed by A4F Portugal - currently scaled-up to the largest size in the world, 1.100 m<sup>3</sup>, and open raceways by NBT Israel - 10 ha in operation for + 30 years. Novel harvesting technology will be developed based on spiral plate technology and ultramembrane filtration. Within 36 months we will be ready to showcase a sustainable D-Factory demonstration in Europe. Designs, flowsheets and integrated schemes along with sustainability assessments (technological, environmental, economic and social) will produce benchmarks for a wide range of products and paths. These will be used in the D-Factory business case developed by Hafren Investments to raise investment for the first prototype D-Factory in Europe. The D-Factory demonstration is scheduled to be operational in 48 months. It will reach stakeholders across the globe via an Innovation Platform and will serve as a robust manifestation for the business case for global investment in algae biorefineries and in large-scale production of microalgae using photobioreactors, algal raceways and lakes.



## Project's Participants List

## D-FACTORY

*The micro algae biorefinery*

Project's partners	Name	Country
1	UNIVERSITY OF GREENWICH	UK
2	A4F ALGAFUEL SA	PT
3	DYNAMIC EXTRACTIONS LTD	UK
4	EVODOS B.V.	NL
5	HAFREN INVESTMENT LIMITED	UK
6	INSTITUTO DE BIOLOGIA EXPERIMENTAL E TECNOLÓGICA	PT
7	IFEU - INSTITUT FÜR ENERGIE UND UMWELTFORSCHUNG HEIDELBERG GMBH	DE
8	IN Srl	IT
9	MARINE BIOLOGICAL ASSOCIATION OF THE UNITED KINGDOM	UK
10	NATECO2 GMBH & CO KG	DE
11	NATIONAL TECHNICAL UNIVERSITY OF ATHENS - NTUA	EL
12	NATURE BETA TECHNOLOGIES N.B.T. LTD	IL
13	SP SVERIGES TEKNISKA FORSKNINGSPENNINGEN AB	SE



**GIAVAP**

## ***Genetic Improvement of Algae for Value Added Products***

### **At a glance**

**Acronym:** GIAVAP

**Title:** Genetic Improvement of Algae for Value Added Products

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** Modification of marine or freshwater algae to better suit industrial applications

**Call:** FP7-KBBE-2010-4

**Start date:** 01/01/2011

**End date:** 31/12/2013

**Duration:** 36 (months)

**Total Cost:** € 7,184,970.60

**EC Contribution:** € 5,596,607.00

**Consortium:** 14 participants

**Project Coordinator:** BEN-GURION UNIVERSITY OF THE NEGEV, IL

### **Abstract**

Microalgae are a highly promising resource for the sustainable production of a wide variety of biomaterials for a wide range of applications. Microalgae can transform solar energy at high efficiency directly into valuable biological products using marginal water resources, waste nutrients and exhaust CO<sub>2</sub> without the needs for high value cropland. A wide variety of eukaryotic microalgae of high evolutionary diversity produce naturally valuable products like polyunsaturated fatty acids, carotenoids, medically active carbohydrates etc. Nevertheless only a few commercially viable algal products have entered the market. Algal cultivation and induction of high value product accumulation is a complex problem, algae grow in diluted solutions and require large areas and water volumes, causing high cultivation and harvesting costs and posing contamination problems and variable productivities due to climate variability. Genetic modifications to make microalgae better suit industrial applications are possible over a wide range of target mechanisms: stress tolerance, product accumulation pathways, cellular chlorophyll contents, novel metabolic pathways, resistance to pathogens and competition, etc. Due to the wide variability of algal strains under consideration, available techniques for genetic manipulations have to be adapted or developed for all algal strains of interest. Our consortium will adapt genetic engineering techniques to various algal strains of economic interest focusing on carotenoid and PUFA production and the overexpression of peptides of commercial value. In parallel we will develop cultivation technologies, harvesting and extraction methods for lipids, carotenoids and proteins using existing model algae strains that will then be adapted to suitable improved strains. Furthermore products will be tested for energy, pharmaceutical, nutritional or medical applications for economic evaluation of the production processes and their economic exploitation.



**GIAVAP**

## Project's Participants List

***Genetic Improvement of Algae for Value Added Products***

Project's partners	Name	Country
1	BEN-GURION UNIVERSITY OF THE NEGEV	IL
2	ROTHAMSTED RESEARCH LIMITED	UK
3	JOHANN WOLFGANG GOETHE UNIVERSITAET FRANKFURT AM MAIN	DE
4	GEORG-AUGUST-UNIVERSITAET GOETTINGEN STIFTUNG OEFFENTLICHEN RECHTS	DE
5	UNIVERSITY COLLEGE LONDON	UK
6	A4F ALGAFUEL SA	PT
7	ROSETTA GENOMICS LTD	IL
8	UNIVERSITE DU MAINE	FR
9	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	FR
10	UNIVERSITA DEGLI STUDI DI FIRENZE	IT
11	ALGATECHNOLOGIES (1998) LTD	IL
12	NIMROD SHAHAM AND AMOS ZAMIR - CERTIFIED PUBLIC ACCOUNTANTS	IL
13	ROSETTA GREEN LTD	IL
14	A B SEEDS LTD	IL



## MIRACLES

### ***Multi-product Integrated bioRefinery of Algae: from Carbon dioxide and Light Energy to high-value Specialties***

#### At a glance

**Acronym:** MIRACLES

**Title:** Multi-product Integrated bioRefinery of Algae: from Carbon dioxide and Light Energy to high-value Specialties

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** The CO<sub>2</sub> algae biorefinery

**Call:** FP7-KBBE-2013-7-single-stage

**Start date:** 01/11/2013

**End date:** 31/10/2017

**Duration:** 48 (months)

**Total Cost:** € 11,911,240.00

**EC Contribution:** € 8,991,903.00

**Consortium:** 26 participants

**Project Coordinator:** WAGENINGEN UNIVERSITY, NL

#### Abstract

Microalgae are a promising feedstock for sustainable supply of commodities and specialties for food and non-food products. Despite this potential the implementation is still limited which is mainly due to unfavourable economics. Major bottlenecks are the lack of available biomass at acceptable costs and the absence of appropriate biorefinery technologies. The 4-year MIRACLES project aims to resolve these hurdles by development of integrated, multiple-product biorefinery for valuable specialties from algae for application in food, aquafeeds and non-food products. The focus is on development and integration of mild cell disruption and environmentally friendly extraction and fractionation processes including functionality testing and product formulation based on established industrial strains. The project will also develop new technologies for optimization and monitoring of valuable products in the algal biomass during cultivation and innovative photobioreactor and harvesting technology that will enable substantial cost reduction. A new technology will be developed for CO<sub>2</sub> concentration from the air for algal growth and new industrial algae strains for extreme locations will be selected via bioprospecting to expand the resource base for the algae industry and enable cultivation in areas less suitable for agriculture such as deserts. The work is supported by market assessment, integral biorefinery designs, techno-economic and sustainability assessment, and the creation of business plans for full valorisation of algal biomass. Integrated value chains will be demonstrated to deliver proof-of-concept and demonstrate economic feasibility. MIRACLES is an industry driven R&D and innovation project with a multidisciplinary approach aimed at generating robust business cases through technology development. The consortium has 26 partners with 11 prominent research organisations. Strong industrial leadership is guaranteed through the participation of 12 SMEs and 3 NMI/end users.





## Project's Participants List

## MIRACLES

***Multi-product Integrated bioRefinery of Algae: from Carbon dioxide and Light Energy to high-value Specialties***

Project's partners	Name	Country
1	WAGENINGEN UNIVERSITY	NL
2	FUNDACION CANARIA PARQUE CIENTIFICO TECNOLOGICO DE LA UNIVERSIDAD DE LAS PALMAS DE GRAN CANARIA	ES
3	UNIVERSITEIT TWENTE	NL
4	UNIVERSITETET I BERGEN	NO
5	UNIVERSIDAD DE HUELVA	ES
6	Universidad de Antofagasta	CL
7	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	NL
8	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES
9	VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK N.V.	BE
10	EWOS INNOVATION AS	NO
11	DYADIC NEDERLAND BV	NL
12	FITOPLANCTON MARINO, S.L.	ES
13	SPAROS LDA	PT
14	RODENBURG PRODUCTIE BV	NL
15	IMENZ BIOENGINEERING BV	NL
16	CHIMAR HELLAS AE	EL
17	VALUE FOR TECHNOLOGY BVBA	BE
18	NATAC BIOTECH SL	ES
19	NOVA-INSTITUT FUR POLITISCHE UND OKOLOGISCHE INNOVATION GMBH	DE
20	IDCONSORTIUM SL	ES
21	ECO TREASURES BVBA	BE
22	STICHTING CROPEYE	NL
23	UNILEVER RESEARCH AND DEVELOPMENT VLAARDINGEN BV	NL
24	DSM FOOD SPECIALTIES BV	NL
25	THOMAS MORE KEMPEN VZW	BE
26	UNI RESEARCH AS	NO



## PUFACHAIN

### *The Value Chain from Microalgae to PUFA*

#### At a glance

**Acronym:** PUFACHAIN

**Title:** The Value Chain from Microalgae to PUFA

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** The CO<sub>2</sub> algae biorefinery

**Call:** FP7-KBBE-2013-7-single-stage

**Start date:** 01/11/2013

**End date:** 31/10/2017

**Duration:** 48 (months)

**Total Cost:** € 7,149,939.60

**EC Contribution:** € 5,124,066.00

**Consortium:** 9 participants

**Project Coordinator:** GEORG-AUGUST-UNIVERSITAET GOETTINGEN STIFTUNG OEFFENTLICHEN RECHTS, DE

#### Abstract

The overall goal of the project is to develop a robust scientific and technological basis for substantiating strategic and technical decisions for the industrial development of high-value products from algae. This shall contribute to develop this new and sustainable resource for market. The concept of the proposal is strictly oriented to the value chain of microalgae. Starting at the very end of the value chain the proposal picks up a concrete application of high market relevance. The main targeted application is the use of high purified omega 3 fatty acids (DHA/EPA) as building blocks in modern oleo chemistry to gain high value products for nutrition and pharmaceutical applications. These applications will define specifications that propagate backwards along the various value-adding stages of the value chain. These stages include biology, cultivation technology and down-stream technology. So the aim of this project is to realize a concrete exemplary value chain, develop the technical interfaces between the different value adding stages and investigate the still open research aspects on every single stage while addressing the needs of the value chain as a whole. Finally, an integrated processing, combining all technical steps, will be implemented for demonstration. A comprehensive and holistic sustainability approach will complement the scientific and commercial advances on each value-adding stage. A consortium with 6 companies and 3 research institutes will integrate state of the art science and technologies in order to assemble a complete process from feedstock production and harvesting to oil extraction and purification. Innovative technologies will be combined taking advantage of a complimentary partnership with the best available expertise in the sector in Europe. These processes will be evaluated for their sustainability and scaled-up from lab to demonstrative prototype level.



## Project's Participants List

## PUFACHAIN

*The Value Chain from  
Microalgae to PUFA*

Project's partners	Name	Country
1	GEORG-AUGUST-UNIVERSITAET GOETTINGEN STIFTUNG OEFFENTLICHEN RECHTS	DE
2	A4F ALGAFUEL SA	PT
3	MAHLE INNOWA GMBH	DE
4	NATEX PROZESSTECHNOLOGIE GESMBH	AT
5	CREMER OLEO GMBH & CO. KG	DE
6	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	DE
7	IFEU - INSTITUT FUR ENERGIE UND UMWELTFORSCHUNG HEIDELBERG GMBH	DE
8	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	NL
9	EURACONSULT AG	DE



# SPLASH

## *Sustainable PoLymers from Algae Sugars and Hydrocarbons*

### At a glance

**Acronym:** SPLASH

**Title:** Sustainable PoLymers from Algae  
Sugars and Hydrocarbons

**Framework:** FP7

**Research Work Programme:** Food,  
Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** Biotechnology  
for novel biopolymers

**Call:** FP7-KBBE-2012-6-singlestage

**Start date:** 01/09/2012

**End date:** 31/08/2016

**Duration:** 48 (months)

**Total Cost:** € 12,103,986.60

**EC Contribution:** € 8,942,932.00

**Consortium:** 21 participants

**Project Coordinator:** STICHTING DIENST  
LANDBOUWKUNDIG ONDERZOEK, NL

### Abstract

The 4-year SPLASH project will develop a new biobased industrial platform using microalgae as a renewable raw material for the sustainable production and recovery of hydrocarbons and (exo)polysaccharides from the species *Botryococcus braunii* and further conversion to renewable polymers. The project comprises 20 partners of which 40% SME and several large corporates plus universities and research institutes. Two bioproduction platforms will be explored: (1) green alga *Botryococcus braunii* on its own and (2) the green microalga *Chlamydomonas reinhardtii*, to which the unique hydrocarbon and polysaccharides producing genes from *Botryococcus* will be transferred. SPLASH will deliver knowledge, tools and technologies needed for the establishment of a new industry sector: Industrial Biotechnology with algae and/or algal genes for the manufacture of polyesters and polyolefins. The building blocks for these polymers will be derived from the sugars (polyesters) and hydrocarbons (polyolefins) exuded by the algae: adipic acid from galactose, 2,5-furandicarboxylic acid from glucose, rhamnose and fucose, 1,4-pentanediol from rhamnose and fucose, ethylene from 'green naphtha', propylene from 'green naphtha'. The conversion of ethylene and propylene to polyolefins is common technology, and will not be included in the project. The sugar-derived building blocks will be converted to new condensation polymers, including poly (ethylene 2,5-furandioate) (PEF) and poly(1,4-pentylene adipate-co-2,5-furandioate). End-use applications include food packaging materials and fibres for yarns, ropes and nets. The project encompasses (1) development of *Botryococcus* as an industrial production platform, (2) Systems biology analysis, (3) Development of procedures for production, in situ extraction and isolation, (4) product development.



**SPLASH**

## Project's Participants List

*Sustainable PoLymers from Algae  
Sugars and Hydrocarbons*

Project's partners	Name	Country
1	STICHTING DIENST LANDBOUWKUNDIG ONDERZOEK	NL
2	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	EL
3	ORGANIC WASTE SYSTEMS NV	BE
4	PAQUES BV	NL
5	NIELS-HENRIK NORSKER	DK
6	VALUE FOR TECHNOLOGY BVBA	BE
7	AVANTIUM CHEMICALS BV	NL
8	LIFEGLIMMER GMBH	DE
9	PURSUIT DYNAMICS PLC	UK
10	NOVA-INSTITUT FUR POLITISCHE UND OKOLOGISCHE INNOVATION GMBH	DE
11	FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV	DE
12	THE CHANCELLOR, MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE	UK
13	PNO CONSULTANTS BV	NL
14	UNIVERSIDAD DE HUELVA	ES
15	WAGENINGEN UNIVERSITY	NL
16	UNIVERSITAET BIELEFELD	DE
17	WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER	DE
18	EGE UNIVERSITESI	TR
19	LANKHORST EURONETE PORTUGAL SA	PT
20	RHODIA OPERATIONS	FR
21	CELLULAC LIMITED	IE



## SUNBIOPATH

### *Towards a better sunlight to biomass conversion efficiency in microalgae*

#### At a glance

**Acronym:** SUNBIOPATH

**Title:** Towards a better sunlight to biomass conversion efficiency in microalgae

**Framework:** FP7

**Research Work Programme:** Food, Agriculture and Fisheries, and Biotechnology

**Research Thematic Priority:** Sustainable use of seas and oceans - Biomass from micro- and macro-algae for industrial applications

**Call:** FP7-KBBE-2009-3

**Start date:** 01/01/2010

**End date:** 28/02/2013

**Duration:** 38 (months)

**Total Cost:** € 4,366,894.60

**EC Contribution:** € 2,998,182.00

**Consortium:** 10 participants

**Project Coordinator:** UNIVERSITE DE LIEGE, BE

#### Abstract

SUNBIOPATH - towards a better sunlight to biomass conversion efficiency in microalgae - is an integrated program of research aimed at improving biomass yields and valorisation of biomass for two Chlorophycean photosynthetic microalgae, *Chlamydomonas reinhardtii* and *Dunaliella salina*. Biomass yields will be improved at the level of primary processes that occur in the chloroplasts (photochemistry and sunlight capture by the light harvesting complexes) and in the cell (biochemical pathways and signalling mechanisms that influence ATP synthesis). Optimal growth of the engineered microalgae will be determined in photobioreactors, and biomass yields will be tested using a scale up approach in photobioreactors of different sizes (up to 250 L), some of which being designed and built during SUNBIOPATH. Biomethane production will be evaluated. Compared to other biofuels, biomethane is attractive because the yield of biomass to fuel conversion is higher. Valorisation of biomass will also be achieved through the production of biologicals. Significant progress has been made in the development of chloroplast genetic engineering in microalgae such as *Chlamydomonas*, however the commercial exploitation of this technology still requires additional research. SUNBIOPATH will address the problem of maximising transgenic expression in the chloroplast and will develop a robust system for chloroplast metabolic engineering by developing methodologies such as inducible expression and trans-operon expression. A techno economic analysis will be made to evaluate the feasibility of using these algae for the purposes proposed (biologicals production in the chloroplast and/or biomethane production) taking into account their role in CO<sub>2</sub> mitigation.



## Project's Participants List

## SUNBIOPATH

*Towards a better sunlight to biomass conversion efficiency in microalgae*

Project's partners	Name	Country
1	UNIVERSITE DE LIEGE	BE
2	UNIVERSITAET BIELEFELD	DE
3	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	FR
4	UNIVERSITA DEGLI STUDI DI VERONA	IT
5	WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER	DE
6	WEIZMANN INSTITUTE OF SCIENCE	IL
7	UNIVERSITE DE GENEVE	CH
8	UNIVERSITY COLLEGE LONDON	UK
9	KARLSRUHER INSTITUT FUER TECHNOLOGIE	DE
10	WAGENINGEN UNIVERSITY	NL







***Horizon 2020 - Societal Challenge 'Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research, and the Bioeconomy' – 2014/2015 calls – Projects***





## Call for Blue Growth: Unlocking the potential of Seas and Oceans

### *H2020-BG-2014*

Rapid technological progress in working offshore in ever-deeper waters, the need to reduce greenhouse gas emissions, and the need to look at how the 71 % of the planet that is seas and oceans can deliver human necessities such as food and energy in a sustainable way have opened up an opportunity for blue growth with the aim to harness the huge potential of Europe's oceans, seas and coasts for jobs and growth. This focus area addresses this overall challenge through five cross-cutting priority domains supporting the Blue Growth Agenda: valorising the diversity of marine life; sustainable harvesting the deep-sea resources; new offshore challenge; ocean observation technologies; and the socioeconomic dimension. The aim of the focus area is to improve the understanding of the complex interrelations between various maritime activities, technologies, including space enabled applications, and the marine environment to help boost the marine and maritime economy by accelerating its potential through R&I in a sustainable manner. It will enhance sectorial and cross-sectorial cooperation by building on major international, national and regional initiatives.

The Blue Growth economy in the EU is expected to grow to 7 million people employed by 2020. Actions in this area will support the EU 'Blue Growth' strategy and relevant EU policies (e.g. Sea Basins Strategies and Action Plans) as well as provide support for international cooperation.

To maximize the impacts of activities undertaken under this Focus Area, the 2014 WP of Horizon 2020, focuses on key priorities for the EU, so as to mobilize the necessary critical mass to tackle these large cross-cutting challenges with adequate scale and scope.

***The 2014 Work – Programme under the Societal Challenge 2 (Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy) of Horizon 2020, puts emphasis on the sustainable exploitation of the diversity of marine life, on valuing and mining marine biodiversity.***

In this 2014 Programme, the new offshore challenges were tackled through a support action (CSA) preparing potential further large-scale offshore initiatives and one initiative focused on sub-sea technologies. Also a large-scale initiative on improving ocean observation systems/technologies is supported in the 2014 Programme as well as one activity on acoustic and imaging technologies. Finally, several horizontal activities regarding socio-economic issues, valorising research outcomes or engaging with society as well as projects targeting SMEs were promoted in 2014.

In terms of international cooperation, the 'Blue Growth' Focus Area will support the new Atlantic Ocean Research Alliance launched by the Galway Statement in May 2013<sup>1</sup>.

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<sup>1</sup> Galway Statement on Atlantic Ocean Cooperation Launching a Canada- European Union- United States of America Research Alliance (Galway, 24th of May 2013)



HORIZON 2020

## At a glance

**Acronym:** NOMORFILM

**Title:** Novel marine biomolecules against biofilm - Application to medical devices

**Call:** H2020-BG-2014-2

**Topic:** BG-03-2014

**Instrument:** Research & Innovation action

**Start date:** 01/04/2015

**End date:** 31/03/2019

**Duration:** 48 months

**Total Cost:** € 7,651,315.75

**EC Contribution:** € 7,651,315.75

**Consortium:** 15 partners

**Project Coordinator:** Fundacio Centre de Recerca en Salut Internacional de Barcelona, ES

## NOMORFILM

### *Novel marine biomolecules against biofilm - Application to medical devices*

#### Abstract

Microalgae are a source of secondary metabolites useful as new bioactive compounds. Activity of these compounds against bacterial pathogens and biofilm formation has not been determined yet. Biofilm formation is especially important in infections and tissue inflammation related to implants and catheters. These problems finally cause a release of the implant, which must be removed and replaced by a new one, entailing an increase in antibiotic consumption, together with a health costs of about 50,000-90,000 € per infection episode.

Taking both problems in account, the search of new antimicrobial agents that will be effective against the bacteria in their two ways of life, planktonic and biofilm stage, is a priority need in the clinical practice.

For this reason, the overall objective of NOMORFILM project is to search for antibiofilm compounds isolated from microalgae that will be useful in the treatment of this kind of infections and could be incorporated in the manufacturing of medical prosthetic devices. For this purpose, 4,000 microalgae species will be deeply screened specifically for new antibacterial and antibiofilm molecules. Structural elucidation of bioactive compounds from these extracts will assure that only new chemical entities, therefore with anticipated new mechanisms of action, will arise to further project stages, those including toxicity tests and animal models.

Most industrially interesting antibiofilm molecules will be incorporated into nanoparticles in order to develop manufacturing methodologies able to incorporate these compounds into real prosthetic devices matrixes. Marketing of results are assured by the presence of diverse SMEs along the manufacture and distribution of prosthetic devices, and the corresponding consortium agreements with respect to IPRs.



## NOMORFILM

### Project's Participants List

***Novel marine biomolecules  
against biofilm - Application to  
medical devices***

Project's partners	Name	Country
1	FUNDACIO CENTRE DE RECERCA EN SALUT INTERNACIONAL DE BARCELONA (CRESIB)	ES
2	UNIVERSIDADE DE COIMBRA (UNIVERSIDADE DE COIMBRA)	PT
3	UNIVERSIDAD DE OVIEDO (UNIOVI)	ES
4	KAROLINSKA INSTITUTET (KI)	SE
5	UNIVERSITA DEGLI STUDI DI FIRENZE (UNIFI)	IT
6	UNIVERSIDAD DE ALMERIA (UNIVERSIDAD DE ALMERIA)	ES
7	KOBENHAVNS UNIVERSITET (UCPH)	DK
8	THE PROVOST, FELLOWS, FOUNDATION SCHOLARS & THE OTHER MEMBERS OF BOARD OF THE COLLEGE OF THE HOLY & UNDIVIDED TRINITY OF QUEEN ELIZABETH NEAR DUBLIN (TRINITY COLLEGE DUBLIN )	IE
9	Fotosintetica & Microbiologica S.r.l. (F&M)	IT
10	NANOMEDPHARMA LTD (NMP)	UK
11	KTEDOGEN SRL (KTEDOGEN SRL)	IT
12	MBA INCORPORADO SL (MBA INCORPORADO)	ES
13	PYROGENESIS SA (PYROGENESIS)	EL
14	CIIMAR - Centro Interdisciplinar de Investigação Marinha e Ambiental (CIIMAR)	PT
15	UNIVERSITE PIERRE ET MARIE CURIE - PARIS 6 (UPMC)	FR



## TASCMAR

### ***Tools And Strategies to access original bioactive compounds from Cultivation of MARine invertebrate and associated symbionts***

HORIZON 2020

#### **At a glance**

**Acronym:** TASCMAR

**Title:** Tools And Strategies to access original bioactive compounds from Cultivation of MARine invertebrates and associated symbionts

**Call:** H2020-BG-2014-2

**Topic:** BG-03-2014

**Instrument:** Research & Innovation action

**Start date:** 01/04/2015

**End date:** 31/03/2019

**Duration:** 48 months

**Total Cost:** € 6,758,452.50

**EC Contribution:** € 6,755,950.25

**Consortium:** 13 partners

**Project Coordinator:** Centre National de la Recherche Scientifique (CNRS), FR

#### **Abstract**

TASCMAR project aspires to develop new tools and strategies in order to overcome existing bottlenecks in the biodiscovery and industrial exploitation of novel marine derived biomolecules (secondary metabolites and enzymes) with applications in the pharmaceuticals, nutraceuticals, cosmeceuticals and fine chemicals industries. Exploitation of neglected and underutilized marine invertebrates and symbionts from the mesophotic zone will be combined with innovative approaches for the cultivation and extraction of marine organisms from lab to pilot-scale, using the unique prototypes Platotex™ and Zippertex™, both reaching the Technology Readiness Level 7. Thus, marine dedicated cultivation and extraction equipment will be built and validated. These unique improvements will ensure sustainable supply of biomass and promote the production of high added value bioactive marine compounds. An integrated, holistic technological metabolomic approach will be applied, in conjunction with bioactivity profiling, as filtering and bio-prioritisation tools. Moreover, state-of-the-art analytical instrumentation and in-house databases will be employed for the dereplication and characterization of valuable compounds. A panel of libraries (marine organisms, extracts, pure metabolites and biocatalysts) will be constructed and exploited throughout the project. A focused panel of in-vitro, cell-based, in-ovo and in-vivo bioassays for discovering metabolites with anti-ageing and/ or angiogenesis modulating activity will frame the entire work-flow and will reveal the lead compounds. In addition, the catalytic potential of mesophotic symbionts and deriving enzymes candidates will be evaluated in the fine chemicals and bioremediation industries. The project activities will be constantly assessed via effective management for their societal, economic and environmental impact in order to find the best compromise between industrial development and sustainable growth.



## TASCMAR

### Project's Participants List

***Tools And Strategies access to original bioactive compounds from Cultivation of MARine invertebrate and associated symbionts***

Project's partners	Name	Country
1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)	FR
2	ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON (National and Kapodistrian University of Athens)	EL
3	TEL AVIV UNIVERSITY	IL
4	CHULALONGKORN UNIVERSITY	TH
5	UNIVERSITE DE LA REUNION	FR
6	CRELUX GMBH	DE
7	BICT SRL	IT
8	PIERRE GUERIN SAS	FR
9	IMARE NATURAL SL	ES
10	ASTAREAL AB	SE
11	APIVITA KALLYNTIKA DIAITITIKA FARMAKA ANONYMI EMPORIKI KAI VIOTECHNIKIETAIREIA (APIVITA)	EL
12	T6 ECOSYSTEMS SRL	IT
13	ASSOCIATION ECO OCEAN (EcoOcean)	IL







## **Call for supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth**

*HORIZON 2020 dedicated SME instrument*

The potential of Europe's Oceans, seas and coasts is significant for job and growth creation if the appropriate investments in research and innovation are made. SMEs contribution to the development of the 'Blue Growth Strategy' (COM (2012) 494) can be significant in particular in the fields of marine biotechnology (related applications, key tools and technologies) as well as aquaculture related marine technologies and services. However, SMEs lack access to finance to develop their activities and the economic and financial crisis has made access to finance even more difficult. This is particularly true in the previously mentioned maritime sectors, where access to finance for SMEs is considered as one of the most important barriers for the development of innovative maritime economic activities<sup>2</sup>.

The SME instrument consists of three separate phases and a coaching and mentoring service for beneficiaries. Participants can apply to phase 1 with a view to applying to phase 2 at a later date, or directly to phase 2.

In phase 1, a feasibility study shall be developed verifying the technological/practical as well as economic viability of an innovation idea/concept with considerable novelty to the industry sector in which it is presented (new products, processes, design, services and technologies or new market applications of existing technologies). Bottlenecks in the ability to increase profitability of the enterprise through innovation shall be detected and analysed during phase 1 and addressed during phase 2 to increase the return in investment in innovation activities. The proposal should contain an initial business plan based on the proposed idea/concept. Funding will be provided in the form of a lump sum of EUR 50,000. Projects should last around 6 months.

In phase 2, innovation projects will be supported that address the specific challenge of Blue Growth and that demonstrate high potential in terms of company competitiveness and growth underpinned by a strategic business plan. Activities should focus on innovation activities such as demonstration, testing, prototyping, piloting, scaling-up, miniaturisation, design, market replication and the like aiming to bring an innovation idea (product, process, service etc.) to industrial readiness and maturity for market introduction, but may also include some research. Proposals shall contain a specification for the outcome of the project, including a first commercialisation plan, and criteria for success. The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2.5 million would allow phase 2 to be addressed appropriately. Projects should last between 12 and 24 months.

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<sup>2</sup> Blue Growth Study - Scenarios and drivers for Sustainable Growth from the Oceans, Seas and Coasts – Ecorys, 2012



In addition, in phase 3, SMEs can benefit from indirect support measures and services as well as access to the financial facilities supported under Access to Risk Finance of this work programme.

The expected impacts for this type of calls are the following:

- Enhancing profitability and growth performance of SMEs by combining and transferring new and existing knowledge into innovative, disruptive and competitive solutions seizing European and global business opportunities.
- Market uptake and distribution of innovations tackling the specific challenge of Blue Growth in a sustainable way.
- Increase of private investment in innovation, notably leverage of private co-investor and/or follow-up investments.
- The expected impact should be clearly described in qualitative and quantitative terms (e.g. on turnover, employment, market seize, IP management, sales, return on investment and profit).



HORIZON 2020

## At a glance

**Acronym:** BLUE IODINE

**Title:** Boost BLUE economy through market uptake an innovative seaweed bioextract for IODINE fortification

**Call:** H2020-SMEINST-1-2014

**Topic:** BG-12-2014-1

**Instrument:** SME Instrument Phase 1

**Start date:** 01/02/2015

**End date:** 31/07/2015

**Duration:** 6 months

**Total Cost:** € 71,429.00

**EC Contribution:** € 50,000.00

**Project Beneficiary:** UBQ II LDA, PT

## BLUE IODINE

### ***Boost BLUE economy through market uptake an innovative seaweed bioextract for IODINE fortification***

#### **Abstract**

The main objective of the project is to produce in a cost effective way high quality seaweed iodine products and become market leaders in this niche market. The expected revenue in 5 years will be 3.3 million euro and we expect to increase our staff in 20 people.

Iodine deficiency is one of the three most common nutritional deficiencies and is spread all over the world and 40% of the world's population remains at risk for iodine deficiency.

Seaweed is the most reliable source of natural iodine. However, seaweed creation is dominated by larger players, mainly from Asia. Our strategy is not to compete with them, but target for a niche market that is yet incipient – high quality seaweed creation for the development of natural protein products, rich in essential aminoacids and natural iodine.

The seaweeds created in the fish aquaculture farms are autochthonous from our region and have high iodine content and a high degree of stability. They are better than the products in the market (iodine composition 30% higher and vitamin C 300% higher than usually commercialized seaweed products) and with our already tested innovative biorefinery process we will be able to put the product in the market at a competitive price (10% to 30% lower). A nutritional analysis has been done. The biorefinery process has been developed for small production. This has now to be better defined in order to process a higher amount of products UBQ is a high-tech company, and are specialize in the production of natural extracts obtained from marine seaweed.

For the first stage project, the objectives are to study the:

- 1.1. Refinement of the nutritional and biochemistry analysis of the selected seaweed
- 1.2. Requirements for upscale the innovative biorefinery process for a higher production
- 2.1. Refinement of the Market analysis at EU global level
- 2.2. Business Plan, including defining in detail the prices, commercialization strategy, possible partnership.

## ECO-LOGIC GREEN FARM

***Design of an agricultural greenhouse for intensive growing of microalgae in fresh / sea water with a syngas production plant and organic farming of chickens and pigs outdoors***

### Abstract

According to many international studies, world population growth and climate change will end in a reduction of food, energy and pharmaceutical resources. One possible solution is an increase in the production of microalgae. The business opportunity consists in the construction of a production plant integrating algae cultivation in photobioreactors with a syngas CHP as a source of carbon, required for the photosynthetic process of microalgae. Market application deriving from algae include: biomass for combustion and organic matrix for anaerobic digestion plants; food supplements for human/animal use; pharmaceutical/cosmetics products; fertilizers; complete pilot line for cultivation. Other applications include licensing of concept, technology and brand and experimental photobioreactors for bio-lighting algae research. It is a growing market with a world potential estimated at +30% each year and a global size of 150M€ in 2016. Key reasons explaining its novelty are: reduced need of land; use in low-quality agricultural land; no emissions of greenhouse gases/pollutants; absence of aggressive waters; significant amount of carbon dioxide captured and stored; pure product with high  $\Omega 3$  content. Potential customers include: food supplement producers and retailers; livestock and poultry producers; pharmaceutical and cosmetics industry; agricultural product retailers and farmers; bio-fuel refineries; agricultural and processing companies interested in market replication or in becoming licensees; research institutions; general public, families and young people. The structure of the work plan starts with the management (WP1), includes one WP devoted to a pilot line for microalgae production, including PBRs for research on bio-lighting algae (WP2) and continues with a WP dealing with pilot production, performance verification and market replication (WP3). WP4 will take care of dissemination, exploitation and marketing. Communication will be covered by WP5.

HORIZON 2020

### At a glance

**Acronym:** ECO-LOGIC GREEN FARM

**Title:** Design of an agricultural greenhouse for intensive growing of microalgae in fresh / sea water with a syngas production plant and organic farming of chickens and pigs outdoors.

**Call:** H2020-SMEINST-2-2015

**Topic:** SFS-08-2015

**Instrument:** SME Instrument Phase 2

**Start date:** 01/08/2015

**End date:** 31/01/2017

**Duration:** 18 months

**Total Cost:** € 3,554,500.00

**EC Contribution:** € 2,488,150.00

**Project Beneficiary:** SOCIETA' AGRICOLA SERENISSIMA S.S., IT

## EECHYMA

### *Eco-efficient high-yield production of antioxidant compounds from microalgae*

HORIZON 2020

#### At a glance

**Acronym:** EECHYMA

**Title:** Eco-efficient high-yield production of antioxidant compounds from microalgae

**Call:** H2020-SMEINST-1-2015

**Topic:** SFS-08-2015-1

**Instrument:** SME Instrument Phase 1

**Start date:** 01/10/2015

**End date:** 31/03/2016

**Duration:** 6 months

**Total Cost:** € 71,429.00

**EC Contribution:** € 50,000.00

**Project Beneficiary:** ALGONESIA  
TECHNOLOGIES, FR

#### Abstract

Eco-efficient high-yield production of antioxidant compounds from microalgae. Through the development of a disruptive photo bioreactor design and cultivation protocol, we plan to reach a production of high-quality microalgae with an improved content in valuable antioxidants, at a reduced production cost. This cost reduction will be obtained through a dramatic reduction of the energy required for the production, greatly improving the sustainability of microalgae production. The microalgae products can enter the formulations of nutritional supplements or animal food.



## SMILE

### ***Slimming MicroAlgae Extract: Development of a new highly effective microalgae-based slimming ingredient for nutraceutical applications***

HORIZON 2020

#### **At a glance**

**Acronym:** SMILE

**Title:** Slimming MicroAlgae Extract:  
development of a new highly effective  
microalgae based slimming ingredient for  
nutraceutical applications

**Call:** H2020-SMEINST-1-2014

**Topic:** BG-12-2014-1

**Framework:** H2020

**Instrument:** SME Instrument Phase 1

**Start date:** 01/03/2015

**End date:** 31/08/2015

**Duration:** 6 months

**Total Cost:** € 71,429.00

**EC Contribution:** € 50,000.00

**Project Beneficiary:** MICROPHYT, FR

#### **Abstract**

The SMILE project aims at developing a microalgae-based innovative natural marine ingredient with scientifically demonstrated benefits on weight management and metabolism issues. Obesity and overweight concerning 37% of world population in 2013 (The Lancet, 2014) represent major global health challenges causing millions of deaths worldwide. Well integrated comprehensive strategies can contribute to overweight management. Specifically developed bioactive compounds used in food supplements can help people wanting to lose weight. Consumers are looking for safe, effective (scientifically proven), affordable and natural solutions on these issues that represent today an unmet need. Marine environment is full of biological compounds that could represent relevant answers to these needs. Especially, a specific marine carotenoid found in algae, has received a strong and recent interest from the industry as several scientific publications have demonstrated superior efficacy of this molecule in comparison of existing products targeting weight reduction. However, the only available sourcing (a macroalgae) presents several drawbacks such as the presence of micro-pollutants and some sustainability issues. Through an innovative and patented technology, Microphyt produces sustainably and markets unique bioactive compounds extracted from the untapped diversity of microalgae. Microphyt has identified few strains which are difficult to produce in competitors' systems and that are able to produce high quantities of this specific marine carotenoid. Moreover, our specific process allows the optimal production of this compound combined with PUFAs which exhibit demonstrated synergistic effects on metabolism. In this context SMILE ingredient represents a high added value potential for Microphyt. Phase 1 feasibility study aims at further analysing IPR and regulatory status of the different strains, releasing a detailed business plan based on market feedback and pursue the scale up of the best selected strain.

## Springwave2014

### ***Transitioning to microalgae as a sustainable, high-quality large-scale food source through launching the first daily drink containing spirulina***

#### At glance

**Acronym:** Springwave2014

**Title:** Transitioning to microalgae as a sustainable, high-quality large-scale food source through launching the first daily drink containing spirulina

**Call:** H2020-SMEINST-1-2014

**Topic:** SFS-08-2014-1

**Framework:** H2020

**Instrument:** SME Instrument Phase 1

**Start date:** 01/02/2015

**End date:** 31/07/2015

**Duration:** 6 months

**Total Cost:** € 71,429.00

**EC Contribution:** € 50,000.00

**Project Beneficiary:** ALGAMA SAS, FR

#### Abstract

To meet the challenges of growing world food consumption, environmental preservation and sustainable food production, spirulina has been identified as an extremely valuable solution by many international bodies. However, this microalgae is still a largely underutilised food resource. The reasons are organoleptic (foul taste and smell) and, most importantly, cultural (algae are not part of the Western culinary art). To eliminate organoleptic barriers, ALGAMA brings a strong innovation by extracting high-quality nutrients from microalgae. To overcome cultural resistance, ALGAMA wants to create consumer awareness through an appealing mass-market product: "Springwave", the first daily drink containing high-quality spirulina nutrients. This first product will be followed by a large variety of spirulina-based food products. User needs to be met upon completion of the project are the trends (and societal challenges) health and well-being. Consumers are increasingly concerned with the nutritional properties of their food, but also that the food is natural and sustainable. Other user benefits are taste, texture similar to water and the ready-to-use approach. The feasibility study will assess 3 key levels: 1. Commercial: Define strategy for mass-market expansion in France, UK, Germany, Netherlands and Sweden 2. Industrial: Analyse and decide on environment-friendly model to increase production capacity from 15 000 to 1 000 000 bottles per year 3. Legal: Identify legal and IP issues for the launch of Springwave outside France For mass-market commercialisation of our spirulina-based beverage, total funding requirement during 2 years for Phase 2 is estimated at € 3 300 000. After testing its beverage in France, ALGAMA intends to expand in Northern Europe (UK, Germany, Netherlands and Sweden) where the health awareness is strongest and the functional product consumption highest, before entering into the first two biggest functional beverage consumption markets: USA and Japan.



HORIZON 2020

## At a glance

**Acronym:** VegaAlga

**Title:** Sustainable agricultural eco-system: business and technological solution for eco-conscious vegetable cultivation using on-site produced algae fertilizer

**Call:** H2020-SMEINST-1-2015

**Topic:** H2020-SMEINST-1-2015

**Framework:** H2020

**Instrument:** SME Instrument Phase 2

**Start date:** 01/09/2015

**End date:** 01/09/2017

**Duration:** 24 months

**Total Cost:** € 1,693,842.50

**EC Contribution:** € 1,185,689.00

**Project Coordinator:** ZOLDSEGCENTRUM  
KERESKEDELMI TERMELTETO ES  
SZOLGALTATO KFT, HU

**Beneficiary:** MULTISENSE LABOR FEJLESZTO  
ES SZOLGALTATO KORLATOLT FELELOSSEGU  
TARSASAG, HU

## VegaAlga

***Sustainable agricultural eco-system: business and technological solution for eco-conscious vegetable cultivation using on-site produced algae fertilizer***

### Abstract

Both regulations and customer needs resulted in expansion of the market for green labelled food products cultivated at sustainable way. Nevertheless, the availability of affordable technological tools for the production of green vegetables is limited. Furthermore vegetable suppliers (in Europe typically farmers with small land) neither have the essential technological knowledge nor the willingness to change the cultivation methods. Realizing these trends, Vegetable Trading Centre (VTC), a regional market leader of Vegetable production and trading, and Multisense, a technology intensive start-up, put together this proposal, aiming at the establishment of a sustainable agricultural eco-system. An innovative technology for on-site production of microalgae and their usage as bio-fertilizer in vegetable cultivation has been piloted at VTC. In the proposed business model, this technology will be sold to farmers helping them to make microalgae based fertilizer on their own land at cost-effective eco-friendly way. The trader (Vegetable Trading Center) guarantees to buy the vegetables produced this eco-conscious way and bring them to superstores at high price. In this phase 2 proposal we target to upgrade and generalize the pilot site to a commercial technology, obtaining upgraded sensor and control system, make generalized designs, user manuals and descriptions, use cases, as well as demonstrate the efficiency in extensive field trials. Furthermore, starting with the suppliers of VTC, we aim at expand our business model to Europe and carry out the early marketing actions within the project.





## **Horizon 2020 - Societal Challenge 'Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research, and the Bioeconomy' – 2016/2017**

One of the proposed focus area calls of Societal Challenge 2 – for the translation into the calls 2016-2017 – is the "**Blue Growth - Demonstrating an ocean of opportunities**". This call will test, demonstrate, scale-up and bring to the market innovative marine and maritime technologies, products and services, as well as exploring the interactions between the oceans and human health, and strengthening the European capability to observe and map oceans and seas basins and improving the professional skills and competences for those working and being trained to work within the blue economy. Among the topics of the H2020-BG-2016/2017 call, the following topic focuses on **Algae Biorefineries**. The proposals received for this call are currently under evaluation.

### **BG-01-2016: Large-scale algae biomass integrated biorefineries (22 M euro)**

#### **Specific Challenge:**

In a context of growing demand for resources and competition for land use, sustainably capturing the potential of seas and oceans is critical for the European Union. New markets, services and products will only arise from innovative, resource-efficient and integrated approaches which cut across economic sectors such as marine biomass integrated bio-refineries. Despite the large potential of products derived from algae, implementation is still limited mainly due to unfavourable economics. At present, microalgae are being applied in a limited volume (< 10 000 tonnes dry weight/year) in various niche markets (including food supplements) and macroalgae mass production is facing several challenges including the lack of space to further expand. To reach broader economic viability, costs of algal biomass production need to be reduced and the scale of production needs to be increased significantly. Even when the price of biomass production is reduced, algal biomass needs to be refined into multiple products in order to increase its total value and achieve economic feasibility. An integrated biorefinery concept of macro- or micro-algae and higher value bulk or speciality products can lead to economically feasible and environmentally sustainable processes. Thus, cost reductions in biomass production and harvesting in a sustainable way are essential for the further development and scale-up of the algal bioeconomy sector.

#### **Scope:**

Proposals should focus on demonstration projects that will scale-up the production and harvesting of integrated marine algae products and bring them nearer to the market in an economically, environmentally and socially sustainable manner. Although the focus is on algae that grow in salt water, fresh water algae may be part of the work as well. The work should build on existing or new marine and maritime technologies. Proposals should address key challenges for scaling up integrated algae production systems, for example higher yielding algae species, optimised operation conditions and energy saving, limited contaminants, recycled nutrients and water, optimal CO<sub>2</sub> use, storage and preservation of harvests before treatment, etc. Proposals should



adopt a holistic, life-cycle approach and assess the broader environmental impact, for example from investigating the conditions for the access to sites, up to reducing the impact on the environment and improving education and skills in these sectors. Stakeholder engagement across the value chain, environmental and social acceptance should also be investigated, with the involvement of representatives of the coastal communities concerned.

**Expected Impact:**

In the context of the seas and oceans to optimise algae mass production and secure the sustainable development of integrated bio-refineries, proposals will:

- Develop marine innovation by de-risking investments and demonstrating the technical and economic feasibility of environmentally sustainable large-scale algae biomass production for biorefineries producing a range of value-added products.
- Bring to the market new, cost-effective and environmentally friendly technologies and production systems.
- Increase stakeholder engagement in and societal acceptance of sustainable algal biomass production.
- Enhance the competitiveness of European industry by supporting new jobs, growth and investment while ensuring environmental sustainability and a low environmental impact.
- Improve the professional skills and competences of those working and being trained to work within the blue economy.

**Type of Action:** Innovation action





## **EUROPEAN COMMISSION**

Director-General for Research and Innovation  
Directorate F – Bioeconomy  
Unit F.4 – Marine Resources

European Commission  
Building COV2 - 9<sup>th</sup> floor  
B-1049 Brussels

Contact Person: Paola Reale  
E-mail: [paola.REALE@ec.europa.eu](mailto:paola.REALE@ec.europa.eu)

**Horizon 2020 website:** <https://ec.europa.eu/programmes/horizon2020/>

**Bioeconomy website:** <https://ec.europa.eu/research/bioeconomy>



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