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Marine Biotechnology Research Projects funded for Blue Growth under Horizon 2020

CORDIS database search in work programme 2014-2015

Work Package 4

Outreach to external activities

Publication date: 17 June 2016

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MarineBiotech

PROJECT & PUBLICATION INFORMATION

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Deliverable name: **Update of relevant regional, national and European initiatives and research projects**
Lead Beneficiary: **Project Management Juelich (JUELICH)**

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EXECUTIVE SUMMARY

The free accessible EU project database CORDIS (http://cordis.europa.eu/) was used to extract information about projects having a focus on R&D in marine biotechnology (MBT). The search was limited to projects that are funded by the European Commission under the cross-cutting "Call for Blue Growth: Unlocking the potential of Seas and Oceans (2014-2015)" within the "Societal Challenge 2 - Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy".

In 2014 and 2015 20 calls were published under this Blue Growth call that were assignable to the priority domains "New offshore challenges", "Ocean observation technologies/systems", "Sustainable exploiting the diversity of marine life" and "Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area". 140.7 Mio € were dedicated to overall 43 projects, including 7 coordination and support actions (CSAs), to support Blue Growth. Only the following 8 research projects, which were funded with overall 25.4 Mio €, had a clear focus on MBT:

- TASCMAR - Tools And Strategies to access to original bioactive compounds from Cultivation of MARine invertebrates and associated symbionts
- MARISURF - NOVEL, SUSTAINABLE MARINE BIO-SURFACTANT / BIO-EMULSIFIERS FOR COMMERCIAL EXPLOITATION
- NOMORFILM -Novel marine biomolecules against biofilm. Application to medical devices
- INMARE - Industrial Applications of Marine Enzymes: Innovative screening and expression platforms to discover and use the functional protein diversity from the sea
- Lipid - The untapped potential of omega-3; from fish oil to healthy bowels
- BLUE IODINE -Boost BLUE economy through market uptake an innovative seaweed bioextract for IODINE fortification
- SEA-MORE-YIELD - A Blue Biotechnology Solution for the Reduction of Pod Shatter in Bio-Oil Producing Crops
- SMILE - Slimming MIcroaLgae Extract: Development of a new highly effective microalgae based slimming ingredient for nutraceutical applications

This report summarizes these 8 projects and related calls, providing a base for further analysis on the strategic belongings of the ERA-MBT consortium.

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BACKGROUND

One important aim of the Marine Biotechnology ERA-NET (ERA-MBT) is to develop a MBT strategy for the ERA-NET itself and beyond in the context of the European bioeconomy. This aim is addressed in the same-named work package 2 of the ERA-MBT description of work (DoW). Next to the outputs from the Marine Biotechnology CSA and other initiatives the strategy development should build on other data sources like EU project databases, to get an impression of the EC funding priorities in MBT under Horizon 2020. The activities in this work package should be completed in collaboration with other work packages in order to provide a strategic direction to the consortium.

Following to the ERA-MBT DoW in work package 4 (/task 4.1) the accessible EU project database CORDIS was used to extract information about projects with a focus on R&D in marine biotechnology (MBT). This information should serve as one brick within the information basis in the ERA-MBT strategy development in work package 2. Because of the huge amount of funded projects and the hardly definable frame (keywords, time frame) for a CORDIS database search, it was limited to projects that are funded by the European Commission under the Horizon 2020- "Call for Blue Growth: Unlocking the potential of Seas and Oceans (2014-2015)" within the "Societal Challenge 2 - Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy". Further MBT related projects were not extractable with the filter function of CORDIS and therefore not deliverable with appropriate efforts. Additionally, an analysis of the titles and abstracts from projects funded within the ERA-NET Industrial Biotechnology (ERA-IB) was done with the same aim. It became clear that there were no obviously MBT-related projects funded within this initiative. Because of a short-term responsibility shift for this deliverable report from the ERA-MBT partner IWT (now VLAIO) to JUELICH the list of research coordination and networking activities for potential cooperation possibilities with ERA-MBT is not part of this report.

Hence this document delivers a list of research projects which are funded under the EU Research and Innovation program HORIZON 2020 (2014-2015) and which are related to marine Biotechnology. It lists eight MBT projects that are funded under the Blue Growth (BG) call frame "Unlocking the Potentials of Seas and Oceans" in the year 2014-2015 and that should support sustainable growth in the marine and maritime sectors as a whole. Possibly there are more projects funded under this call with a relation to MBT. But either the MBT relation is not obvious in title or abstract. Or the relation to MBT is only an indirect or a weak one.

FUNDED PROJECTS

The avaible information from CORDIS about the "BG"-calls and projects was tranfered to an excel sheet for visualisation and statistical evaluation. The following table (table 1) gives an overview about the calls that where published under the "Call for Blue Growth: Unlocking the potential of Seas and Oceans (2014-2015)" within the "Societal Challenge 2 - Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy".

Table 1 Published calls for Blue Growth: Unlocking the Potential of Seas and Oceans (2014-2015); Boltd letters: Calls where MBT related projects are funded in.

Funded under/Priority Domain/ Call Topic	Number of funded projects	EU contribution [€]	Total project costs [€]
H2020-EU.2.3.1. - Mainstreaming SME support, especially through a dedicated instrument H2020-EU.3.2. - SOCIETAL CHALLENGES - Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy	20	7.963.658	11.376.661
Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area	20	7.963.658	11.376.661
BG-12-2014 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	1	2.241.584	3.202.263
BG-12-2014-1 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	11	550.000	785.719
BG-12-2015 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	2	3.519.099	5.027.284
BG-12-2015 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	1	1.402.975	2.004.250
BG-12-2015-1 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	5	250.000	357.145
H2020-EU.3.2. - SOCIETAL CHALLENGES - Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy	23	132.732.641	136.967.047
Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area	8	28.806.089	30.165.960
BG-10-2014 - Consolidating the economic sustainability and competitiveness of European fisheries and aquaculture sectors to reap the potential of seafood markets	2	9.996.203	10.483.248
BG-11-2014 - Monitoring, dissemination and uptake of marine and maritime research	1	3.997.488	3.997.488
BG-13-2014 - Ocean literacy – Engaging with society – Social Innovation	2	7.191.520	7.191.520
BG-14-2014 - Supporting international cooperation initiatives: Atlantic Ocean Cooperation Research Alliance	1	3.447.000	4.295.138
BG-15-2014 - European polar research cooperation	1	2.174.503	2.174.504
BG-16-2015 - Coordination action in support of the implementation of the Joint Programming Initiative on 'Healthy and Productive Seas and Oceans'	1	1.999.375	2.024.063
New offshore challenges	4	19.678.498	20.619.020
BG-05-2014 - Preparing for the future innovative offshore economy	1	1.977.951	1.977.951
BG-06-2014 - Delivering the sub-sea technologies for new services at sea	2	12.422.993	13.127.816
BG-07-2015 - Response capacities to oil spills and marine pollutions	1	5.277.554	5.513.253
Ocean observation technologies/systems	3	29.410.113	29.410.113
BG-08-2014 - Developing in-situ Atlantic Ocean Observations for a better management and sustainable exploitation of the maritime resources	1	20.652.921	20.652.921
BG-09-2014 - Acoustic and imaging technologies	2	8.757.192	8.757.192
Sustainable exploiting the diversity of marine life	8	54.837.941	56.771.954
BG-01-2015 - Improving the preservation and sustainable exploitation of Atlantic marine ecosystems	2	19.094.620	19.433.781
BG-02-2015 - Forecasting and anticipating effects of climate change on fisheries and aquaculture	2	10.586.851	10.782.068
BG-03-2014 - Novel marine derived biomolecules and industrial biomaterials	3	19.156.913	19.159.416
BG-04-2014 - Enhancing the industrial exploitation potential of marinederived enzymes	1	5.999.557	7.396.690
Sum	**43**	**140.696.298**	**148.343.708**

The table shows that the EC dedicates about 140.7 Mio € for Blue Growth projects under its working programme for 2014 and 2015 (http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-food_en.pdf) . The aim of this overriding Blue Growth call 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. Within the Blue Growth calls there are four cross cutting priority domains definable:

- Sustainable exploiting the diversity of marine life
- Ocean observation technologies/systems
- New offshore challenges
- Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area

The priority domain »Sustainable exploiting the diversity of marine life« covers MBT related topics by the calls »Novel marine derived biomolecules and industrial biomaterials (BG-03-2014)« and the call »Enhancing the industrial exploitation potential of marine-derived enzymes (BG-04.2014)«. Further there is one call »Supporting SMEs efforts for the development – deployment and market replication of innovative solutions for blue growth (BG-12-2014-1)« under the domain »Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area« that addresses SMEs which are active in the field marine biotechnology or in the field of aquaculture related marine technologies and services.

The following table shows the projects that are funded under these three call.

Table 2 MBT related projects funded within Blue Growth call »Unlocking the Potential of Seas and Oceans (2014-2015)«

Priority domain/topics/funding scheme/project acronyme	Number of funded projects	EU contribution [€]	Total project costs [€]
Horizontal aspects, socio-economic sciences, innovation, engagement with society and ocean governance across the blue growth focus area	4	200.000	285.716
BG-12-2014-1 - Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth	4	200.000	285.716
SME-1 - SME instrument phase 1	4	200.000	285.716
BLUE IODINE	1	50.000	71.429
Lipid	1	50.000	71.429
SEA-MORE-YIELD	1	50.000	71.429
SMILE	1	50.000	71.429
Sustainable exploiting the diversity of marine life	4	25.156.470	26.556.105
BG-03-2014 - Novel marine derived biomolecules and industrial biomaterials	3	19.156.913	19.159.416
RIA - Research and Innovation action	3	19.156.913	19.159.416
MARISURF	1	4.749.648	4.749.648
NOMORFILM	1	7.651.315	7.651.316
TASCMAR	1	6.755.950	6.758.453
BG-04-2014 - Enhancing the industrial exploitation potential of marinederived enzymes	1	5.999.557	7.396.690
IA - Innovation action	1	5.999.557	7.396.690
INMARE	1	5.999.557	7.396.690
Sum	**8**	**25.356.470**	**26.841.821**

It becomes obvious that only MBT related projects are funded under the calls BG-03-2014 and BG-04-2014 and that 50% of the overall funded MBT related projects are SME oriented. Comparing the

overall funding in the overriding Blue Growth call with the funding of these eight projects shows that 18% of the funding for Blue Growth is related to MBT.

MARINE BIOTECHNOLOGY RELATED CALLS

In the following the content of the three mentioned calls is extracted from the working programme 2014-2015.

BG-3-2014: Novel marine derived biomolecules and industrial biomaterials

Specific Challenge: Due to the rich biodiversity and the specific physical and chemical conditions of the marine ecosystems, seas and oceans possess the capacity to produce a variety of molecules with unique features, unmatched biochemical diversity and structural complexity. This explains the increased recognition of marine organisms and microorganisms as a source of bioactive compounds and biomaterials with biotechnological, pharmaceutical or other industrial application. However, while an increasing number of marine derived products are becoming commercialized, increasing the efficiency of the marine biodiscovery pipelines and developing sustainable technologies using marine sources in an environmentally responsible manner are still important challenges to be addressed.

Scope: Proposals should aim to develop innovative approaches to address the technical bottlenecks of marine resource identification, sustainable supply, discovery pipelines (e.g. separation, structure elucidation, identification of the profile of bioactives, de-replication strategies, mode of action, etc.) as well as more efficient production in biological systems. Proposals should be industry-driven. Proposals should cover the innovation chain from research, to development, and proof of concept. Legal aspects linked to securing clear access to marine resources, including related infrastructures and bio-resources banks and collections, their sustainable use as well as Access and Benefit Sharing aspects, should be properly considered. Environmental viability of the proposed concept should also be taken on board.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 6–10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts

Expected impacts:

- Enhance the competitiveness and sustainability of European industry sectors such as pharmaceutical, nutraceuticals cosmetic, industrial biotechnology and fine chemical, through increased efficiency of marine biodiscovery pipelines;
- Bring broad societal benefits, by allowing development of novel, improved or more economic and eco-friendly end-products and processes;
- Structuring of the European Research Area in this field;
- Contribute to the implantation of the objectives of the EU Blue Growth.

Type of action: Research and innovation actions

BG-4-2014: Enhancing the industrial exploitation potential of marine-derived enzymes

Specific challenge: If we consider the vast reservoir of enzymes identified through the latest large-scale marine genomics and metagenomics sequencing projects, the potential to unveil novel interesting enzymes from marine sources remains very high. However, this potential does not automatically guarantee novel commercial products. The challenge at hand is posed by both current limitations in screening and expression technologies as well as by issues of property rights and intellectual property. Both are still limiting factors that require further attention.

Scope: Proposals should address the development and demonstration of innovative technologies for high throughput enzyme screening and/or for the expression of marine enzymes and proteins through dedicated hosts and should focus on respective key research challenges including purification systems and upscaling of the marine enzymes. Screening should take into account industrial technical specifications of the enzymes of interest. Win-win academic and industry cooperation and/or agreements on issues related to property rights and intellectual property should be considered in order to maximise the exploitation potential. The Commission considers that proposals requesting a contribution from the EU in the range of EUR 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Enhance the competitiveness and sustainability of European industry sectors such as consumer products, pharmaceutical, cosmetic, and fine chemicals, through increase efficiency in the enzyme identification-to-market success rate;
- Bring broad societal benefits by facilitating the development of novel, improved or more economic and eco-friendly end-products and processes;
- Contribute to realising the objectives of European policy initiatives, such as the EU Blue Growth Strategy and EU Strategy for Key Enabling Technologies.

Type of action: Innovation actions

BG-12-2014/2015: Supporting SMEs efforts for the development - deployment and market replication of innovative solutions for blue growth

Specific challenge: 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 activities60.

Scope: 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). The activities could, for example, comprise risk assessment, market study, user involvement, Intellectual Property (IP) management, innovation strategy development, partner search, feasibility of concept and the like to establish a solid high-potential innovation project aligned to the enterprise strategy and with a European dimension. 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. The proposal should give the specifications of the elaborated business plan, which is to be the outcome of the project and the criteria for success. 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. For technological innovation a Technology Readiness Levels of 6 or above (or similar for non-technological innovations) are envisaged; please see part G of the General Annexes. Proposals shall be based on an elaborated business plan either developed through phase 1 or another means. Particular attention must be paid to IP protection and ownership; applicants will have to present convincing measures to ensure the possibility of commercial exploitation ('freedom to operate').

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. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Projects should last between 12 and 24 months.

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.

Successful beneficiaries will be offered coaching and mentoring support during phase 1 and phase 2. This service will be accessible via the Enterprise Europe Network and delivered by a dedicated coach through consultation and signposting to the beneficiaries. The coaches will be recruited from a central database managed by the Commission and have all fulfilled stringent criteria with regards to business experience and competencies. Throughout the three phases of the instrument, the Network will complement the coaching support by providing access to its innovation and internationalisation service offering. This could include, for example, depending on the need of the SME, support in identifying growth potential, developing a growth plan and maximising it through internationalisation; strengthening the leadership and management skills of individuals in the senior management team and developing in-house coaching capacity; developing a marketing strategy or raising external finance.

Expected impact:

- 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).

Type of action: SME Instrument (70%)

MARINE BIOTECHNOLOGY RELATED PROJECTS

In the following the content of the eight mentioned projects is extracted from the information deposited in CORDIS. Project partners and their contact data were extracted from the web or by personal contacts.

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

Project reference: 663292

From 2015-02-01 to 2015-07-31, closed project

Total cost: EUR 71 429; EU contribution: EUR 50 000; Coordinated in: Portugal

Objective

The main objective of the project is to produce in a cost effective way new 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 a 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 biorefinary 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 biorefinary process has been developed for small production. This has now to be better defined in order to process a higher amount of product UBQ is a high-tech company, and are specialized in the production of natural extracts obtained from marine seaweed.

For the 1st 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 biorefinary process for a higher production

2.1. Refinement of the Market analysis at EU and global level

2.2. Business Plan, including defining in detail the prices, commercialization strategy, possible partnership.

Project partners

INSTITUTION	NAME	E-MAIL
UBQ II LDA	No public available	geral@ubqmadeira.com

Lipid - The untapped potential of omega-3; from fish oil to healthy bowels

Project reference: 673467

From 2015-05-01 to 2015-11-01, closed project

Total cost: EUR 71 429; EU contribution: EUR 50 000; Coordinated in: Iceland

Objective

Europe's consumers are increasingly requesting products that are organically and sustainably produced. At the same time, Europe has been lacking incentives to develop and bring to markets new marine products, without increasing pressure on natural resources. The innovation in question; a natural, sustainably produced medicine based on marine oils, addresses these challenges. It is based on the discovery that omega-3 oils have proven to have laxative effects. It offers parents and pediatricians a pain-free alternative to other pharmaceutical products, in a market where no new products have been introduced for decades. The innovation also paves the way for the full utilization of marine products, demonstrating that by-products can be of high value for other industries, including the pharmaceutical sector. The aim of the applicant is to develop this innovation all the way towards a market-ready, licensed pharmaceutical product. The pharmaceutical industry is one of the largest industries in the world in regards to revenues. Over 100 million people worldwide, suffer from constipation. The active ingredient of the innovation product would be a new and a unique addition to this growing market. The applicant seeks support to be able to obtain a solid analysis of the market potential for the innovation. If successfully brought to markets, it will reach the milestone of being the first non-generic, registered drug, tested in clinical trials in humans that was discovered, developed and produced in one of Europe's most peripheral corners, Iceland.

Project partners

INSTITUTION	NAME	E-MAIL
LIPID PHARMACEUTICALS EHF	No public available	info@lipid.is

Sea-More-Yield: A Blue Biotechnology Solution for the Reduction of Pod Shatter in Bio-Oil Producing Crops

Project reference: 652506

From 2014-11-01 to 2015-04-30, closed project

Total cost: EUR 71 429; EU contribution: EUR 50 000; Coordinated in: Ireland

Objective

The objective of the Sea-More-Yield proposal is to commercialise a disruptive blue biotechnology solution to address a bio-oil crop productivity challenge. Three years of independant trials have consistently demonstrated a 20% increase in yield over the current market leading product. Sea-More-Yield powered by Plant Signal Induction (PSI) is a novel patent pending blue biotech innovation to reduce pod shatter in Oilseed Rape (OSR) delivering €5.5bn at the farm gate if implemented across the EU-27. End result, more food and energy security, a theme underscored by Horizon 2020.Sea- More-Yield represents an excellent opportunity for the H2020 SME instrument as it will launch the participating SME Brandon Products into new markets, promote growth, and create high returns of investment. Sea-More-Yield is aligned with the call topic supporting SMEs efforts for the development - deployment and market replication of innovative biotechnology solutions for blue growth. Sea-More-Yield is a perfect example of such an opportunity. The basis of the Sea-More-Yield technology is the seaweed bioresource used in biostimulant manufacture, which is a complex and unique resource whose chemical, biochemical and biological properties provides major undiscovered potential. The main beneficiaries of the development of Sea-More-Yield will be Brandon Products; Growers of OSR gain from increased net margins, increased yield, increased quality premiums; Oil processors will have a larger quantity of high quality oil; Product distributors will have a disruptive technology with a proven mode of action; Consumers will benefit from a predictable harvest = predictable production costs = more stable pricing; The environment less agrochemicals, fertiliser more biofuel and leading to more sustainable biofuel production.

Project partners

INSTITUTION	NAME	E-MAIL
BRANDON PRODUCTS LTD	No public information available	brandon@brandonproducts.com

SMILE - Slimming MIcroaLgae Extract : Development of a new highly effective microalgaebased slimmingingredient for nutraceutical applications

Project reference: 663699

From 2015-03-01 to 2015-08-31, closed project

Total cost: EUR 71 429; EU contribution: EUR 50 000; Coordinated in: France

Objective

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 allow 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 analyzing 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.

Project partners

INSTITUTION	NAME	E-MAIL
MICROPHYT	Remi Pradelles	Remi.pradelles@microphyt.eu

MARISURF - NOVEL, SUSTAINABLE MARINE BIO-SURFACTANT / BIO-EMULSIFIERS FOR COMMERCIAL EXPLOITATION

Project reference: 635340

From 2015-09-01 to 2020-08-31, ongoing project

Total cost: EUR 4 749 647,5; EU contribution: EUR 4 749 647,5; Coordinated in: United Kingdom

Objective

Surfactants and emulsifiers constitute an important class of chemical agents that are widely used in almost every sector of modern industry. The huge market demand is currently met almost exclusively by synthetic, mainly petroleum-based, chemical products, which are usually non-biodegradable and mostly toxic or GM plant based products (used in foods), which are undesirable by some end-users. Their biologically produced counterparts (i.e. bio-surfactants and bio-emulsifiers) offer more green sustainable alternatives. This has led to a number of manufactures, looking for ways to increase competitiveness through searching for underexploited sources such as the marine environment. Our objectives are to develop (1) innovative approaches in discovering, characterizing and producing novel marine-derived bio-surfactants from a large bacterial collection (greater than 500 strains) housed at Heriot Watt University, originally isolated from various coastal and open ocean waters around the world, (2) novel, economic, and eco-friendly endproducts with commercial applications in order to replace synthetic counterparts, and (3) to demonstrate the functionality of new product development for commercial exploitation. Our collection consists of novel bacterial species, originally isolated for their ability to degrade oils, with proven promise in this respect. For this reason, our consortium (consisting of academic institutions, industrial companies and end-users) offering a wide range of expertise, will address the technical bottlenecks for meeting our objectives, namely those of marine resource identification, sustainable supply, discovery pipeline and efficient production in biological systems. The relevance of our proposal to the work programme is underlined by its expected impact in increasing efficiency of discovery pipelines, the development of more economic and eco-friendly end-products and finally in contributing to the implementation of the objectives of the EU Blue Growth.

MARISURF project partners

INSTITUTION	NAME	E-MAIL
Heriot-Watt University	Mihalis Panagiotidis	m.panagiotidis@hw.ac.uk
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Democritus University of Thrace	Dr. Aglaia Pappa	apappa@mbg.duth.gr
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NOMORFILM - Novel marine biomolecules against biofilm. Application to medical devices

Project reference: 634588

From 2015-04-01 to 2019-03-31, ongoing project

Total cost: EUR 7 651 315,75; EU contribution: EUR 7 651 315; Coordinated in: Spain

Objective

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. This project also addresses the biosynthesis of the targeted bioactive compounds in sustainable microalgae co-cultures, diminishing cultivation costs by mimicking natural aquatic ecosystems. 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 partners

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TASCMAR -Tools And Strategies to access to original bioactive compounds from Cultivation of MARine invertebrates and associated symbionts

Project reference: 634674

From 2015-04-01 to 2019-03-31, ongoing project

Total cost: EUR 6 758 452,5; EU contribution: EUR 6 755 950,25; Coordinated in: France

Objective

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 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 bioprioritisation 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, cellbased, 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 fine chemicals and bioremediation industries. The project activities will be constantly assessed via effective management for their societal, economical and environmental impact in order to find the best compromise between industrial development and sustainable growth.

TASCMAR project partners

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INMARE - Industrial Applications of Marine Enzymes: Innovative screening and expression platforms to discover and use the functional protein diversity from the sea

Project reference: 634486

From 2015-04-01 to 2019-03-31, ongoing project

Total cost: EUR 7 396 689,65; EU contribution: EUR 5 999 557,13; Coordinated in: United Kingdom

Objective

INMARE stands for "Industrial Applications of Marine Enzymes: Innovative screening and expression platforms to discover and use the functional protein diversity from the sea". It is a collaborative Innovation Action to streamline the pathways of discovery and industrial applications of new marine enzymes and bioactives for targeted production of fine chemicals, drugs and in environmental clean-up applications. The INMARE consortium will unify the multidisciplinary expertise and facilities of academic and industry partners. This will include integrating the following core activities: advanced technologies to access and sample unique marine biodiversity hot-spots; state-of-the art technologies for construction of metagenomic libraries; innovative enzyme screening assays and platforms; cutting-edge sequence annotation pipelines and bioinformatics resources; high-end activity screening technology; bioanalytical and bioprocess engineering facilities and expertise, nanoparticlebiocatalysts; high-quality protein crystallization and structural analysis facilities and experts in IP management for biotechnology. The companies involved in the project are market leaders in enzyme production and biocatalysis processes designed to efficiently deliver safer (pharmaceuticals) cheaper (agriculture) and biobased (biopolymers) products. They also have impressive track record in environmental clean-up technologies and are committed to promoting public understanding, awareness and dissemination of scientific research. The main emphasis will be focused on streamlining and shortening the pipelines for enzyme and 'bioactive compound' discovery towards industrial applications through the establishing of marine enzyme collections with a high proportion of enzymes-"allrounders". The project will also prioritize the identification of novel lead products and the delivery of improved prototypes for new biocatalytic processes.

INMARE project parnters

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