

algae4a-b

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Algae for Aquaculture and Beauty

Newsletter 1 – June 2016

Consortium



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The project

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

ALGAE4A-B (Algae For Aquaculture and Beauty) project seeks to exploit the microalgae diversity, as a source for state-of-the art high-added-value biomolecules in aquaculture and cosmetics. ALGAE4A-B aspires to foster both the European capacity building and the strategic objectives of EU Blue Growth and Marine Biotechnology to harness the untapped potential of Europe's seas and coasts for training and sustainable growth.

Microalgae Biomass Production

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

Basic and applied research

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

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

Key figures

972 000 € EC funding

7 partners

4 years (2016-2019)

More information on www.algae4ab.eu

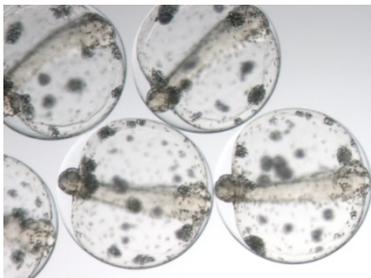
Workshop 1 – El Puerto de Santa Maria, Spain – June 20-22nd 2016

Microalgae production technologies and applications to marine fish aquaculture

The first workshop of Algae4A-B took place at El Puerto de Santa María (Spain) from 20-22nd June 2016 and was organized by IFAPA. This seminar dealt with most **recent advances in biotechnology applied to fish and microalgae production** and brought together **40 registered participants** and an important number of experts belonging to industry and academia to discuss these topics.

The workshop was organized in three sessions.

The first session was aimed at explaining **how innovation networks can provide new tools and knowledge to optimize fish aquaculture procedures and microalgae biomass production**. The **Algaecom** project, which preceded Algae4A-B was presented as an excellent model of a collaborative project that promoted the development of genomic tools to build an analysis platform to monitor microalgae mass production as well as the design of new high-added value products for cosmetics that will arrive on the market in 2017. Similar results were obtained for the high impact and innovations brought by the **AQUAGENET** project, a network for biotechnology for fish, molluscs and pathogens was also presented. The success of modern aquaculture depends on the control of the biological lifecycle and this can only be achieved by **interdisciplinary approaches that bring together the most advanced knowledge and technologies**. Genomics databases and species-specific tools were presented as essential instruments to respond to targeted bottlenecks in aquaculture of commercial species. Such approaches have already contributed to overcome problems related with disease resistance, growth and reproduction and hence competitiveness of this primary productive sector.



The second session was focused on **microalgae production technologies and applications**.

Advanced research lines about the role of phytoplankton in trophic webs and their usefulness for environmental toxicology

monitoring studies were shown. Phytoplankton communities appear as key component and sustain different kinds of aquaculture practice and underpin the production of high-quality fish and mollusks. Improved management of microalgae populations in integrated production systems is an essential step needed to improve their total production as well as the quality of seafood products. In addition to their important function as primary trophic elements of the food chain, microphytobenthos (represented principally by benthic diatoms and cyanobacteria) were also presented as a **suitable tool for monitoring contamination of coastal zones** particularly for scientific risk assessment in situations where the sediment is considered a significant vehicle of contamination.

Some other speakers highlighted **biotechnological applications of selected microalgae for cosmetics and as a source of bioactive compounds**. Successful case studies of microalgae-derived products close to the market particularly for cosmetics and pigments were presented.

The methodologies for transforming microalgae using into really highly-productive biofactories using transgenesis were considered as was this kind of approach as a strategy for generation of the knowledge-base that is a competitive means by which to improve the performance of microalgae biomass production.

The third session was dedicated to **fish biotechnology including genetics, bio-informatics and genomics**, the use of fish cell lines to evaluate bioactive compounds and the importance of immune system



barriers and epigenetics to improve fish aquaculture production was highlighted. The last advances in genetic maps, important for genetic selection, and their applications for mapping genes influencing production traits of interest onto chromosomes were shown. One of the illustrative case studies shown was the **contribution of genetic maps for the identification of novel sex markers**. Finally, the latest technologies for long-read sequencing were carefully explained and how these novel applications can contribute to aquaculture was discussed. The usefulness of bioinformatic pipelines and databases for the discovery of new genes and markers illustrated with some examples from fish, mollusks and microalgae was showed. These talks revealed the importance of these rapidly developing approaches to respond to targeted questions in aquaculture and microalgae production in order to move aquaculture towards the genomic era and the DNA economy.

Fish aquaculture is still at the beginning of applying novel biotechnologies. Fish cell lines were shown as a suitable model for in vitro bioassays since many fish genes retain conserved physiological roles with other vertebrate. This model is of particular interest to aid in the identification of bioactive molecules, which can be used in the development/improvement of feeds, cosmetics or drug design. One of the main applications is epigenetics and modulation of innate immune barriers. The effects of thermal imprinting during early developmental stages with impact on growth performance during grow-out stages were demonstrated and appear to be a novel and promising approach for transfer to industry. Also, innate immunity was shown as the main protection in fish larvae tightly regulated during development. Main barriers against pathogens such as the skin, gut and gills express a different set of specific genes that can be used as markers for immune response. Improved knowledge about development, formation and regeneration is critical and enable modulation and improvement of health and welfare in fish.

Round tables between industry and academia provided interesting debates on **knowledge exchange, mechanisms for transfer of technology and the way in which new technologies can be brought to production cycles**. In all cases, highly competitive science linked to producers appeared as a key mechanism for a successful response to common challenges and to orientate research towards new achievements, results and products. The close collaboration between industry and academia was identified as an indispensable factor for technology transfer that will benefit society by promoting competitive and sustainable aquaculture.

Workshop schedule

Day 1	Monday 20th June 2016 Opening and topic introduction	
	Registration Welcome and opening remarks Algae4A-B project presentation AquaGenet, a network for biotech in aquaculture. Fitoplankton Marino, S.L. over 10 years enhancing microalgae production	Mr C. Unamunzaga <i>Fitoplankton</i> Dr M. Manchado <i>IFAPA</i> E. Mantecón <i>Fitoplankton Marino</i>
Day 2	Tuesday 21 June 2016 Microalgae production technologies and applications	Moderator: Carlos Unamunzaga
	The trophic value of phytoplankton Transgenic microalgae as platforms for production of foreign proteins & valuable compounds Microalgal applications stemming from experimental lab work Ecotoxicology of microphytobenthos AlgaeCom: exploitation of microalgae for the production of high-added-value cosmeceuticals Microalgae in cosmetics New microalgae based product development – from lab to market Round table and conclusions	Dr J.P. Cañavate <i>IFAPA</i> Dra R. León <i>University of Huelva</i> Dra A. Bartual <i>University of Cádiz</i> Dr I. Moreno <i>ICMAN-CSIC</i> Dr E. Fletmetakis <i>University of Athens</i> Dra D. Georgiou <i>APIVITA</i> Dr K. Gardikis <i>APIVITA</i> Mr C. Unamunzaga / Dr J.P. Cañavate
Day 3	Wednesday 22 June 2016 Biotechnology applied to Marine fish and Microalgae	Moderator: Manuel Manchado
	Modulating barrier function and innate immunity in marine fish Development of integrated genetic maps in marine organisms Bioinformatic platforms for the study of marine organisms Screening for bioactivity: what can stable cell lines expressing fish genes tell us? Molecular tools applied as a quality control in microalgae production systems Epigenetic regulation in sole. The role of methyltransferases. Deciphering the functions of apolipoproteins in sole Round table and conclusions	Dra. D. Power <i>CCMAR</i> Dra. L. Rebordinos <i>University of</i> Dr. G. Claros <i>University of Málaga</i> J. Cardoso <i>CCMAR</i> Dr C. Infante <i>Fitoplankton Marino</i> Mrs J. Firmino <i>University of Algarve</i> Mr. J. Román <i>IFAPA</i>
Day 4	Thursday 23 June 2016 General assembly / Executive Committee meeting	
	Algae4A-B General assembly and Executive committee meeting Algae4A-B General assembly and Executive committee meeting	All Algae4A-B partners All Algae4A-B partners
Day 5	Friday 24 June 2016 General assembly / Executive Committee meeting	
	Visit at Fitoplankton Marino, S.L. Visit at El Toruño Research center	All Algae4A-B partners All Algae4A-B partners



Talks available on www.algae4a-b.eu

Kick-off meeting

El Puerto de Santa Maria, Spain - 27th January 2016



First General assembly

El Puerto de Santa Maria, Spain - 23rd June 2016



Algae4A-B Implemented secondments

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

CNRS => FITMAR - Dr. William Helbert - Dr. Claire Boisset – Helbert – 2 months

Fitoplankton Marino possesses a unique collection of microalgae, including original cyanobacteria, that were harvested in many places in the world but whose potential has been little investigated. Therefore Fitoplankton Marino proposed to identify new polysaccharide producing microalgae focussing on the cyanobacteria and fractionate these new polysaccharides. Composition analyses will be conducted at CNRS and biological activity tests will be carried out at AUA. In this context, the first objective of the secondment was to train CNRS members to the culture of microalgae, including maintaining methods and upscaling culture strategies. The second objective was then to prepare polysaccharide samples for further analyses in CNRS and AUA.



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