Description of the project

Welcome to the 1st e-bulletin of SABANA. This project was submitted to the European Union’s Horizon 2020 Research and Innovation program, under the topic H2020-BG-2016-2017 Blue Growth: Demonstrating an ocean of opportunities. As Innovation Action, it received funding from the under the Grant Agreement No. 727874 and started on December 1st of 2016. During four years, research and innovation activities will be performed to achieve the final goal: to build and operate a demonstration facility for producing biofertilizers/biopesticides and aquafeed at 5 ha scale.

Overall concept of the SABANA Project, showing priority products and sustainability, as well as the fit of the project into the Circular Economy concept.

Major objectives of SABANA project include:

- **Large scale production**: To develop robust and scalable technology for microalgae production (including harvesting and processing), in continuous mode all year round, at minimum cost. Economic analysis must to be used in decision making.

- **Sustainable production**: To integrate the treatment of wastes and increase the sustainability of the entire process. Life Cycle Analysis determines what is possible or not..

- **Markets/commercialization**: Only products now requested by markets and legally accepted are considered. Business plan is the driver of the project.

For more information please visit: [www.eu-sabana.eu](http://www.eu-sabana.eu)
Contact: info@sabana.eu
Partners

The project is led by the University of Almeria but major actors are the companies involved into the project (FCC Aqualia, GEA Westfalia, A.I.A. S.p.A., Biorizon Biotech) in addition to high reputation research centers at EU level (Karlsruhe Institute of Technology, Mikrobiologicky Ustav, Universita Degli Studi Di Milano, Univ. Las Palmas de Gran Canaria, Széchenyi Istvan University, Consorzio Italiano Biogas e Gassificazione). In addition to 11 partners from 5 EU countries, Fundacion Cajamar and IFAPA also collaborate in this project.

Work packages:

The work plan is divided in eight work packages combining scientific/technical research and innovation with market development and techno-economic and sustainability analysis.

Main tasks:

- Techno-economic analysis of developed production systems
- Sustainability analysis of proposed production schemes
- Enhancement of biological control of microalgae based systems
- Improvement of large-scale microalgae production technology
- Development of integral utilization of biomass processes
- Scale-up and demonstration of the developed technology
- Development of new products/applications based on microalgae
- To establish a Training Center for teaching and collaboration with other institutions
- Collaboration with other EU projects, companies, associations, etc.
- Creation of a Data Center for online availability of real data to associate entities.

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Objectives
SABANA aims at developing a large-scale integrated microalgae-based biorefinery for the production of biostimulants, biopesticides and feed additives, in addition to biofertilizers and aquafeed, using only marine water and nutrients from wastewaters (sewage, centrate and pig manure). The objective is to demonstrate the technical, environmental and social feasibility of producing valuable products for agriculture and aquaculture by using only marine water and wastewater as nutrients source.

Kick off meeting
Kick-off meeting was held at the University of Almeria on December 1st/2nd, 2017. During these days the partners review the work plan and developed working sessions for each one of the major tasks to be performed. It was an exciting event also used to disseminate the start of the project for the society.

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WP1 Techno-economic analysis
Techno-economic analysis performed allows to identify biofertilizers/biostimulants for agriculture and aquafeed for aquaculture as most interesting products to be produced from microalgae biomass, especially when combining with wastewater treatment. The utilization of wastes (wastewater and manure) is the best strategy to reduce the production cost to achieve commercial processes.

Market price and size of different microalgae-based products

Influence of production technology/raw materials into the microalgae production cost.

WP2 Sustainability
The objective of this task is to identify potential social, environmental, health, safety and economic impacts throughout the production process developed.
Where relevant mitigation measures will be developed and – if possible within the framework of this project- implemented, based on available best practices, exploiting the data and experience gained during the project in consultation with all partners involved in the production pathway.

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WP3 Engineering
The basic engineering of the 1 ha facility is finished, the detail engineering of this scale being in progress to start to build the first research/innovation area. Optimized raceway reactors and thin-layer cascades will be evaluated.

Schemes of some of the reactors to be evaluated in SABANA project at the 1 ha facility. At this scale reactors up to 1.000 m$^2$ will be evaluated.

Schemes of some of the reactors to be evaluated in SABANA project at the 5 ha facility. At this scale reactors up to 5.000 m$^2$ will be evaluated.
WP6 Biology
The SABANA project is based on the marine microalgae strains of the Spanish Bank of Algae (BEA) and the freshwater microalgae strains of the Mosonmagyaróvár Algal Culture Collection (MACC). Similar criteria are considered in both cases to select the most promising strains for the project purposes, like fast and homogenous growth and either plant growth promoting or antimicrobial activity, which are detected with preliminary bioassays before the start of the project. Specific marine strains are selected from the BEA for aquaculture purposes.

In the MACC (left) 970 freshwater microalgal strains are maintained and are cultivated in an algal culture apparatus (right) installed in a temperature controlled room.

In case of freshwater microalgae fast growing Scenedesmus (10), Chlorella (10) and Chlamydomodium (1) green microalgal strains are selected for detection of their plant biostimulating effect with bioassays. Cyanobacterial strains, like Anabaena (5), Nostoc (5), Tolypothrix (2) and Calothrix (3) are involved into the bioassays for antimicrobial activity against plant pathogens.

Similar to what it is described for MACC, at BEA, 1600 cyanobacteria and microalgal strains from different environmental conditions, bioprosp ected at the macaronesian region, are maintained and evaluated for biotechnological purposes.

Regarding aquaculture possibilities, different strains are being grown with the main objective of obtaining possible candidates as a dietary protein ingredient for fishmeal and as a source of HUFA for fish oil replacement. Compared to standard strains such as Tetraselmis, Isochrysis, Chlorella or Nannochloropsis some other marine strains (Chaetoceros, Odontella, Rhodomonas, Nannochloris or Picochlorum) will be produced for comparison.

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WP8 Dissemination

SABANA project will disseminate the most relevant achievements using different tools/systems, including web page, social media networks, newsletter among others.

Next training courses related with SABANA project includes:

Microalgae and Seaweed Products in Plant/Soil-Systems

36-27 June 2017
Mosonmagyaróvár - Hungary

1st Announcement

Organisers

Department of Plant Sciences
Faculty of Agricultural & Food Sciences
Szent István University
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