



Biotechnology
Department



Canary Islands Institute of Technology (ITC)



Technology and Innovation for a Sustainable Development

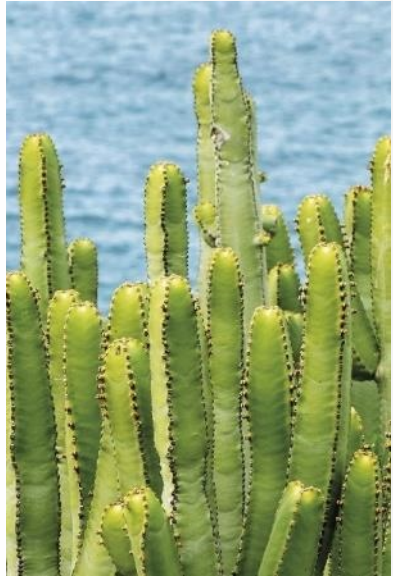




Biotechnology

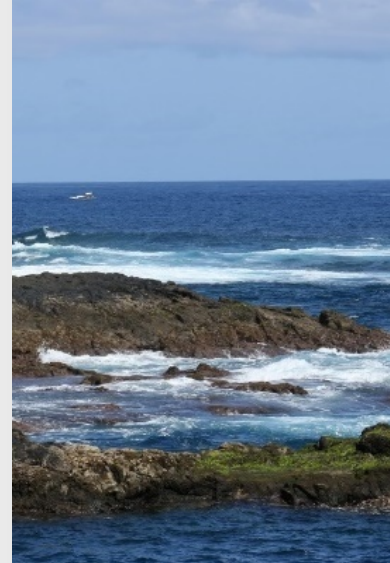
We promote Blue Biotechnology and productive valuation of Marine Vegetable Aquaculture (algae) in the Canary Islands

Our motivation



Rich
Biodiversity

Existence of
native strains



Excellent
enviromental
conditions

Development
of production
and processing
technologies



High potential
for industrial
applications

Economic
diversification



Scientific-technological services through the Platform of Excellence in **Blue Biotechnology and Aquaculture BIOASIS**

Biotechnology Department

Budget (2021)
€ 2 M

Activity

- Scientific-technologic-logistic support for industrial production/processing/post-processing of marine microalgae
- Experimental development and applied research in production/processing/post-processing of marine native microalgae in testing scale and DEMOs



Production, processing and post-processing facilities and areas

Interdisciplinary team (25 people) with highly qualified and experienced PhDs and Technicians in the field of **blue biotechnology**

Milestones



2000

LIFE – BIOALGA Project

Demonstration of the cultivation of microalgae as a new agro-industrial activity associated with the reuse of urban wastewater and the biofiltration of CO₂ from combustion gases



2005

First semi-industrial experimental plant for microalgae cultivation in Spain

Suitability of Pozo Izquierdo conditions favored the location of the first industrial plant for cultivation and processing of microalgae in Spain, and one of the first and largest in Europe, for large-scale production for nutraceutical and food purposes in collaboration with private companies



2010

Venturi: device to minimize the impact of the discharge of brine from desalination plants into the sea

Technical feasibility study about Venturi diffusers to improve the dilution process in brine discharges from desalination plants; the Venturi project made it possible to evaluate the profitability and effectiveness of these devices in these discharges



2012

Incubation of the first microalgae cultivation company in the Canary Islands: Algalimento

Creation of the first microalgae cultivation company in the Canary Islands (food sector), with the aim of obtaining food made from microalgae that produce carotenes and Omega-3 fatty acids



2021

High Technology Incubator (HTI)

Start-up of the HTI - High Technology Incubator for Blue Biotechnology and Aquaculture companies in Pozo Izquierdo (SPEGC-ITC agreement, INCYDE financing)



2020

BIOSOST Project

Implementation of sustainable infrastructure and equipment for the development of the Pozo Izquierdo Blue Biotechnology Industrial Technological Area



2018

Birth of BIOASIS

BIOASIS Gran Canaria brand is born, Platform of Excellence in Blue Biotechnology and Aquaculture



2016

UPE-BIO

Creation of the first incubator for Biotechnology companies in the Canary Islands (UPE-BIO)



Activity

Experimental development and applied research in
PRODUCTION/PROCESSING/POST-PROCESSING of marine
native microalgae in testing scale and DEMOs

technological transfer ←



Scientific-technologic-logistic support for industrial
PRODUCTION/PROCESSING/POST-PROCESSING of marine
microalgae

→ Companies (incubated/lodged in
technological-industrial Pozo Izquierdo area)

Experimental development and applied research in
PRODUCTION/PROCESSING/POST-PROCESSING of marine
native microalgae in testing scale and DEMOs

Experimental Development

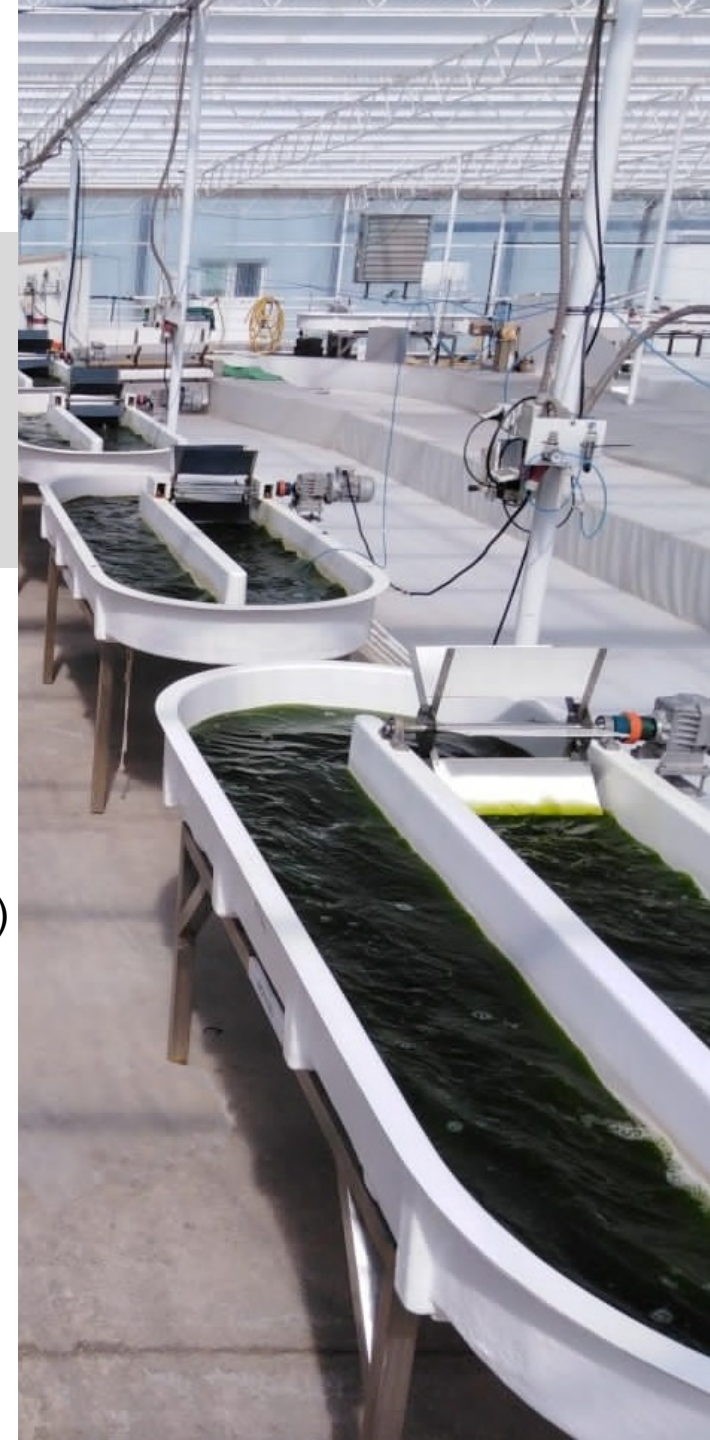
... on new biotechnological processes
(bioremediation, flue gas capture,)

... on new cultivation and processing technologies
(native strains / biotechnological suitability / initial phase BEA)

*Dunaliella salina; Tetraselmis striata; Chlorella vulgaris; Arthrospira platensis;
Nannochloropsis gaditana; Navicula salinicola; Isochrysis galbana*

... on product applications
(human food, animal nutrition, cosmetics, nutraceuticals,
agricultural biostimulants, biofuels, ...)

→ **technological transfer to private companies**



Technical-logistical support for the industrial development of microalgae production

1st Area of Technological-Industrial Development

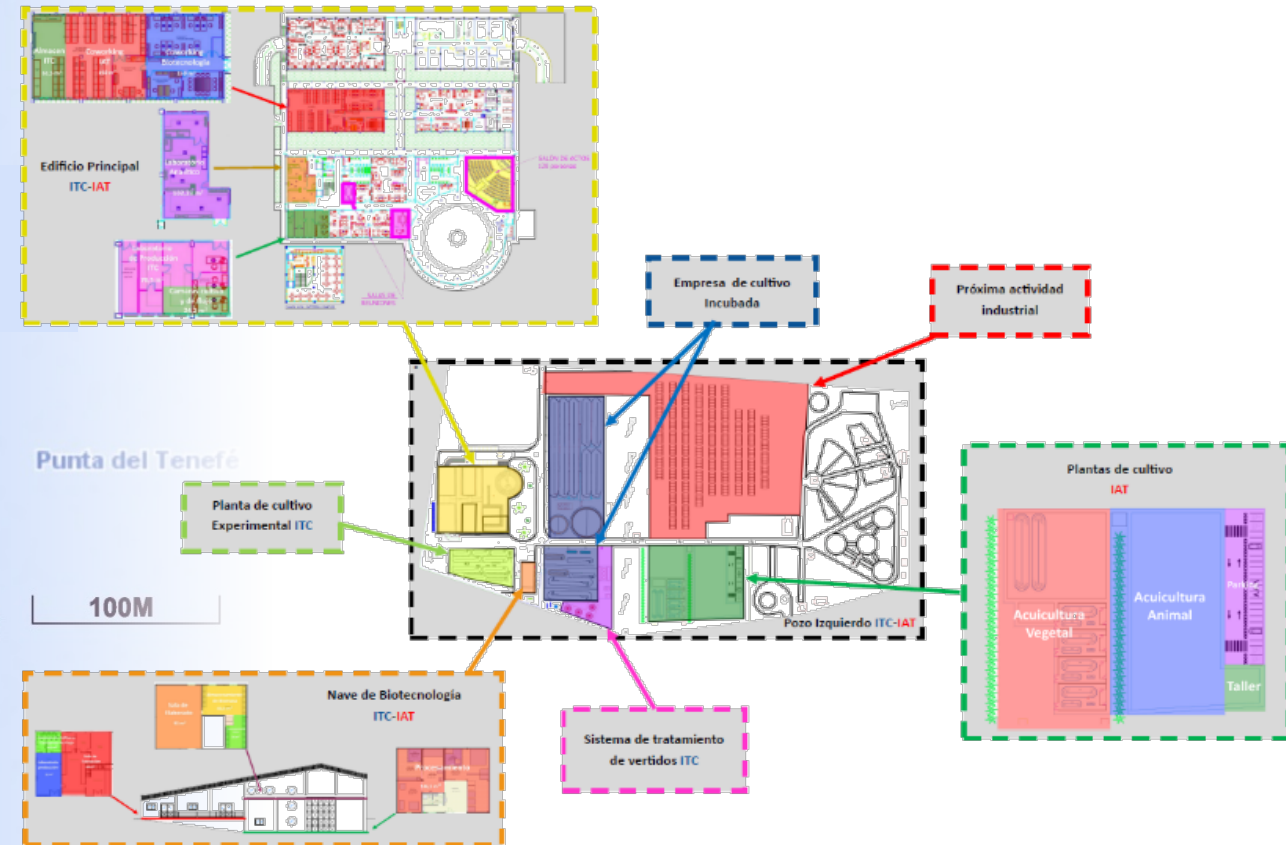
→ Pozo Izquierdo Pole



- Supply of **any type of water**: sea water, hypersaline water, brine, desalinated water (not processed) ...
Sanitizing capacity: **ultrafiltration**
- Implementation of the **first comprehensive management system** for the treatment of discharges from this type of activity (experimental stage)
- **Processing and post-processing plant** with registered sanitary records (for companies): centrifuge, atomizer, lyophilizer, supercritical extractor, ...
 - Electricity supply through renewable energies
 - Combustion gases from industrial processes

Activity

Technical-logistical support for the industrial development of microalgae production 1st Area of Technological-Industrial Development → Pozo Izquierdo Pole



POLE III

Technological-Industrial Development Area Pozo Izquierdo

Marine plant aquaculture

3.5 ha of land available at ITC for the
development of industrial microalgae
production projects
(+ 40 ha annexed land)

- Multidisciplinary scientific technological advice
- Increased supply of analytical services
 - New lines of financing to support entrepreneurs, specialized training, and hiring researchers

Services

through Platform of
Excellence in

Blue Biotechnology and Aquaculture

BIOASIS
GRAN CANARIA
HUB OF BLUE BIOTECHNOLOGY AND AQUACULTURE

on-shore cultivation of
algae, crustaceans, mollusks and fish

POLE I

Scientific-Research Area Taliarte

Multidisciplinary scientific and technological
advice in the sector, common analytical services,
financing lines to support entrepreneurs,
specialized training, hiring researchers, ...

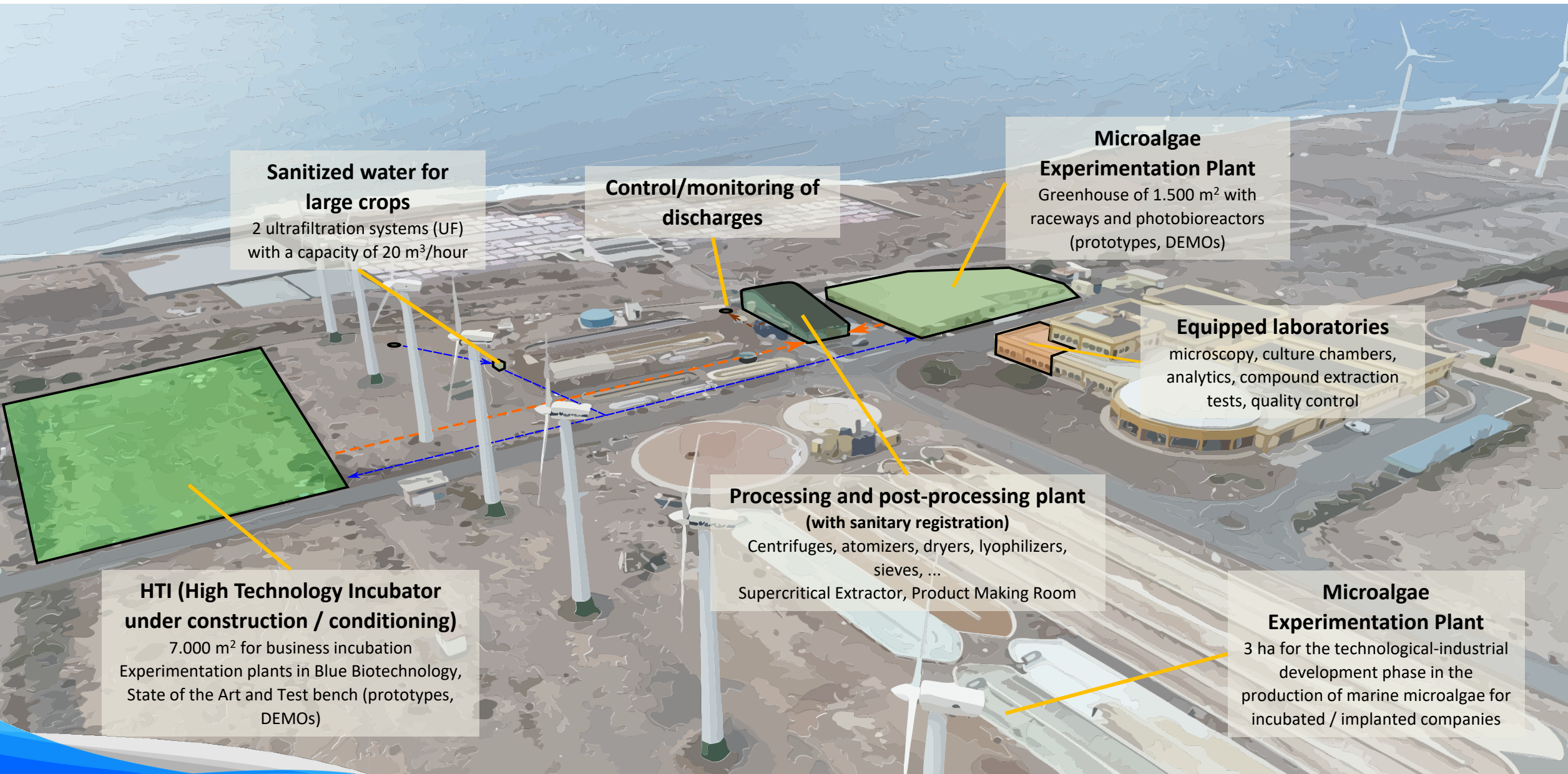
POLE II

Experimentation and Incubation Area Arinaga

Animal aquaculture

(7-12 ha)

Technological Infraestructure

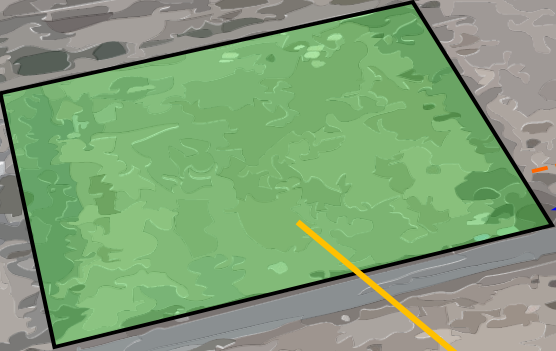


Sanitized water for large crops
2 ultrafiltration systems (UF) with a capacity of 20 m³/hour

Control/monitoring of discharges

Microalgae Experimentation Plant
Greenhouse of 1.500 m² with raceways and photobioreactors (prototypes, DEMOs)

Equipped laboratories
microscopy, culture chambers, analytics, compound extraction tests, quality control



HTI (High Technology Incubator under construction / conditioning)
7.000 m² for business incubation
Experimentation plants in Blue Biotechnology, State of the Art and Test bench (prototypes, DEMOs)

Processing and post-processing plant (with sanitary registration)
Centrifuges, atomizers, dryers, lyophilizers, sieves, ...
Supercritical Extractor, Product Making Room

Microalgae Experimentation Plant
3 ha for the technological-industrial development phase in the production of marine microalgae for incubated / implanted companies

Facilities

Biotechnology Laboratories

- Laboratories with a total surface area of 185 m²
- 42 m² culture chamber
- Microscopy room
- Production testing, analytical and control areas



Experimental Production Plant

- 1500 m² greenhouse with photobioreactors and raceways up to 20 m³
- Outdoor plant with raceway up to 45 m³

Processing and Post-processing Plant (sanitary registration)

- 350 m² warehouse on two levels for harvesting, drying, storage, post-processing of biomass
- Harvesting capacity up to 10 m³/h, drying up to 15 l/h
- Microgrid for autonomous work based in photovoltaic energy with lithium-ion batteries (90 kWh)



Equipment

Experimental production, processing and post-processing Plant

Screening Machine

Ultrafiltration

Atomizer

Lyophilizer

Microfiltration

Active carbon filter

Centrifuge

Peristaltic Pump

Biodisc



HPLC

Flow Booth

Incubator-cabinet

Extractor cabin

Rotavapor

Balances

Calorimeter

Confocal microscope

Flow citometer

Viscometer

Autoclave

Flocculation Tester

Milli-Q Equipment

Spectrophotometer



Biotechnology Laboratories

Currently, we also work in ...



REBECA
Red de Excelencia en
Biotecnología Azul

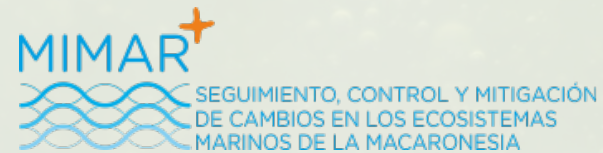
<https://www.proyettorebeca.eu/>



<https://www.spegc.org/bioasis/>



<https://www.proyettorebeca.eu/>



<https://www.proyectomimarplus.com/>



<https://macbioblue.com/>



<https://islandap.org/>



<http://proyectobiosost.com/>

Trajectory

Approximately 30
people trained in
microalgae production
(researchers, researchers and
technicians)

More than 20 training/
dissemination organized

1 national patent ->
Eductor Venturi

1 international patent->
Pink Salt + Dunaliella

More than 10 companies
private advised

More than 10
products / processes
developed
based on microalgae

2 orders from the
Government of the Canary
Islands

More than 25 participations
in European and
international cooperation
projects

More than € 6 M
investment in the last 5
years in equipment and
infrastructure for
experimental development
and industrial research

More than 30
participations in national
and international congress

More than 10
European and
cooperation projects
international led

About
50 scientific and informative
publications

Challenges

- **Incubation/Implementation** of new Blue Biotechnology companies in the Technological-Industrial Area of Pozo Izquierdo
- Development and technological transfer of new processes and products based on microalgae under the framework of **maximum water and energy efficiency, use of nutrients (circular economy) and environmental sustainability**
- Introduction of **new food** based on microalgae in the “Novel Food” list (EU 2015/2283)



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Biotechnology Departament



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