

## AT A GLANCE

### TITLE:

Development of SMART nanostructured layers for sensing corrosion in AQUATIC structures

### DURATION:

1st March 2018 – 28 February 2021

### TOTAL COST:

€738,000

### CONSORTIUM:

3 partners

### EU CONTRIBUTION:

€721,000

### COORDINATOR:

University of Aveiro, Portugal

## SMARTAQUA

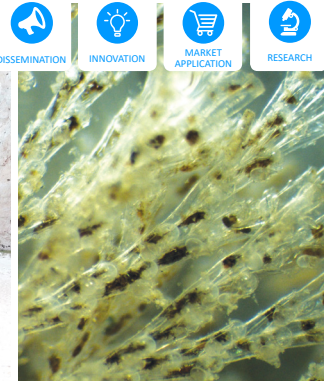
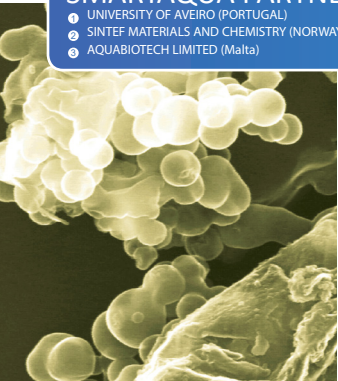
DEVELOPMENT OF SMART  
NANOSTRUCTURED LAYERS  
FOR SENSING CORROSION  
IN AQUATIC STRUCTURES

This project has received funding from Research Council of Norway (through the program of Petromaks II, project 284002), Foundation of Science and Technology in Portugal, and Malta Council for Science and Technology via the MarTERA – ERA NET co-fund scheme of H2020 of the European Commission.



### SMARTAQUA PARTNERS

- UNIVERSITY OF AVEIRO (PORTUGAL)
- SINTEF MATERIALS AND CHEMISTRY (NORWAY)
- AQUABIOTECH LIMITED (Malta)



## SMARTAQUA

SMARTAQUA aims to develop a sensing nanolayer applied directly on steel structures, to provide cost-effective, reliable means of detecting corrosion degradation. The sensing properties will be achieved by the incorporation of smart additives which are responsive to the local conditions verified close to the metal substrate, combining colorimetric with magnetic detection, thus monitoring the overall integrity of the structure. The additives to be developed are based upon inorganic hosting structures for controlled release of optically active species such as pH indicators and magnetic nanoparticles. Application scenarios for this technology include aquaculture structures, offshore wind foundations, oil and gas structures and ship hulls.

- Cost Effective Nanolayer
- Environmentally Friendly Functional Nanolayer
- Reliable Detection of Corrosion Degradation
- New Generation of Sensing Nanostructured



## Objectives of SMARTAQUA

- Develop nanoparticles with magnetic properties
- Develop a compatible coating matrix for the additives
- Undergo ecotoxicological and antifouling assessment and field testing of the developed materials
- Correlate the corrosion degradation of steel substrates with the optical/magnetic signal detected
- Immobilize the additives in thin layers without risking the sensing ability and integrity of the layer
- Develop nanostructured additives with ability to release sensing species for colorimetric detection

## AT A GLANCE

**TYPE:**

Research SME

**LOCATION:**

Mosta, MALTA G. C.

**CAPABILITIES:**

R&D / Consultancy / Engineering

**EXPERTISE:**

Aquaculture / Marine Research  
Blue Growth / Aquatic Environment



## Who we Are

**AquaBioTech Group** is an international aquaculture and fisheries consulting company strategically located in the Mediterranean, on the island of Malta. It operates globally, with clients and projects in over fifty-five countries. Staff are recruited from across the globe, enabling communication with clients in thirteen languages.

**AquaBioTech Group** undertakes a variety of aquaculture, fisheries, marine surveying, aquatic environmental, financial, and technical projects, performed with its selected, worldwide partners.



## Our role in the SMARTAQUA project

**AquaBioTech Group's** tasks within the SMARTAQUA project include:

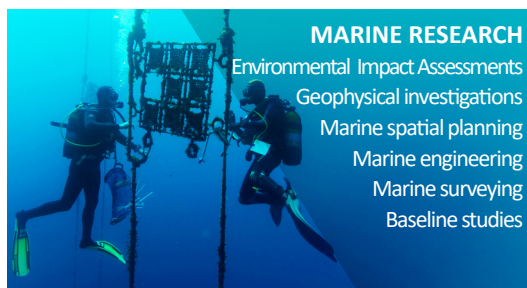
- Eco-toxicity research of the nanostructured layers for sensing corrosion
- Research related to the antifouling performance properties of the nanostructured layers for sensing corrosion
- Field testing of the developed treatments in terms of antifouling effect
- Field testing and validation of treatments and sensors
- Co-ordination of the exploitation plan of the project results
- Dissemination of project results and participation in networking activities

## Our Research Activities



**AQUACULTURE R&D**

Fish & shellfish hatchery technology  
Health & disease prevention  
Nutraceutical development  
New species development  
Aquatic nutrition research  
Production techniques



**MARINE RESEARCH**

Environmental Impact Assessments  
Geophysical investigations  
Marine spatial planning  
Marine engineering  
Marine surveying  
Baseline studies



**WATER TECHNOLOGIES R&D**

Recirculation Aquaculture Systems  
Aquaponics  
Wastewater treatment  
Energy efficiency  
Sustainability  
Innovation

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