Ollscoil Chathair
Bhaile Átha Cliath
Dublin City University

Water Institute

Marine

Mariabox: Marine Environmental In-Situ Assessment and Monitoring Toolbox

INTRODUCTION

The MARIABOX Project (MARINE environmental in-situ Assessment and monitoring tool BOX) was coordinated by the Cyprus research and Innovation Center (CyRIC).

The aim of the project was to develop a buoy-based platform which could monitor biological toxins (microcystin, saxitoxin, domoic acid and azaspiracid) and chemical pollutants (naphthalene, perfluorooctanoic acid, camphechlor and total heavy metals) in marine water.

This platform was deployed at EU pilot locations (Ireland, Spain, Norway, and Cyprus) taking account of local environmental conditions (monitoring also temperature, pH, conductivity and dissolved oxygen).

This unique sensor platform could then be used in providing a forecasting tool for the aquaculture industry across Europe.

WHAT DOES THIS PROJECT ENCOMPASS?

There are growing concerns about the health of our oceans and their capacity to continue to provide resources.

There is also a risk of declining water quality for the general population and therefore an increasing demand for real-time monitoring of the environmental status of marine water quality.

This project moves toward a vision of the provision of early warning systems.

RESEARCHERS

Dr. Caroline Murphy

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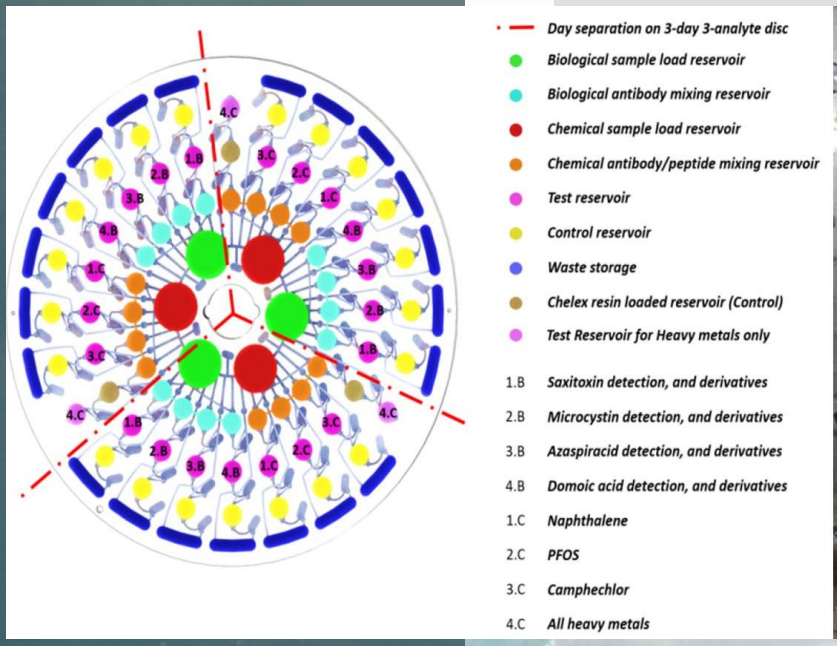
THE TECHNOLOGY

The MariaBox project uses lab on a disc (LOAD) technology integrated with antibody based biosensing to generate selective and sensitive sensors for marine pollutants including algal toxins.

The availability of 3D printing and materials engineering techniques enable the realisation of a sensor disc for monitoring 8 target analytes simultaneously. This type of approach is a demonstration of the potential for miniaturised microfluidic sensors for ocean monitoring.



WHAT IS THE GOAL OF THE PROJECT?

The aim of this project is to Provide a large increase in the temporal and geographic coverage from in-situ marine sensors to enhance the European contribution to Global Monitoring of the Oceans. Increase availability of standardised in-situ data that is suitable for integration within key marine observation, modelling and monitoring systems and reduce ocean modelling uncertainty and reduce cost of data collection system in support of fisheries management

HOW IS THE RESEARCH FUNDED?

MARINE Environmental In-Situ Assessment and Monitoring ToolBOX FP7 – OCEAN 2013. Project ID: 614008. Total Value: €7.1 Million [European Commission €5.2m]

Coordinated by: C.Y.R.I.C., CYPRUS RESEARCH AND INNOVATION CENTER LTD

PUBLICATIONS

Novel Microfluidic Analytical Sensing Platform for the Simultaneous Detection of Three Algal Toxins in Water. (https://pubs.acs.org/doi/abs/10.1021/acsomega.8b00240)

MariaBox: First prototype of a novel instrument to observe natural and chemical pollutants in seawater. (https://ieeexplore.ieee.org/abstract/document/8084860)

Detection of naphthalene in sea-water by a label-free plasmonic optical fiber biosensor. (https://www.sciencedirect.com/science/article/pii/S003991401831083X)

A centrifugal microfluidic-based approach for multi-toxin detection for real-time marine water-quality monitoring. (https://ieeexplore.ieee.org/abstract/document/8084975)

Convenient 'one-step' extraction method for autonomous sensing of marine algal toxins. (https://ieeexplore.ieee.org/abstract/document/8084971)

A High Sensitivity Biosensor to detect the presence of perfluorinated compounds in environment. (https://www.sciencedirect.com/science/article/pii/S003991401731069X)

SUSTAINABLE DEVELOPMENT GOALS

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