



BlueShellfish



August 2025

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Solutions to prevent and mitigate the impacts of HABs in Aquaculture and Fisheries, in the context of global warming

>>> **BlueShellfish** aims to bring together specialists from different areas of knowledge who will develop joint research activities, which will collectively contribute to bring innovative solutions to fisheries and aquaculture industries, to mitigate the impact of HABs.

In this Edition

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Project 101086234 — BlueShellfish

SECONDMENTS

➤➤➤ Avazbek (UNINA → IRTA)

During his secondment to IRTA (Spain), the PhD student Avazbek Abduvakhidov from UNINA (Italy) was working on the development of colorimetric aptamer-based assays and immunoassays, as well as electrochemical biosensors for the detection of marine toxins.



With the support from Mònica, Sandra and Jaume, Avazbek explored innovative approaches using both magnetic beads and electrode-based strategies, learning the differences between these methodologies in terms of sensitivity, efficiency, and practical applications.

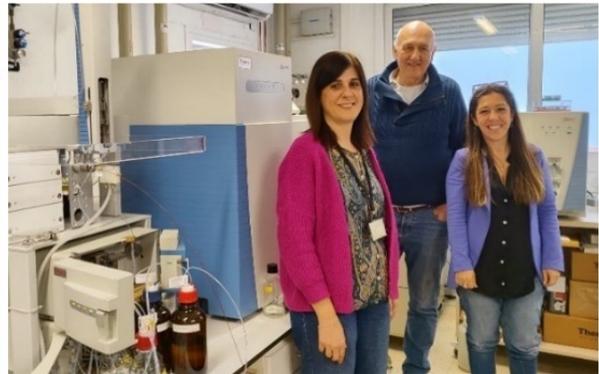


He also had time to eat the culinary delights of Catalonia during this time, the calçots!

This collaborative work between UNINA and IRTA has provided new insights into the use of aptamers for the detection of marine toxins, including saxitoxins and tetrodotoxins.



During her two-week secondment at IRTA, Luciana Tartaglione, from UNINA engaged in an intensive program combining seminars, laboratory work, field sampling training, and networking with leading experts in marine and freshwater toxins detection and environmental analysis.



Highlights included:

- Seminars at IRTA and Universitat Rovira i Virgili, presenting analytical and biological approaches for monitoring natural toxins and anthropogenic contaminants, with over 50 participants combined.
- Networking activities with IDAEA-CSIC and Universitat Rovira i Virgili, including visits to advanced LC-MS, GC-MS, and HRMS facilities.
- Laboratory work performing N2a cell-based assays on selected *Ostreopsis cf. ovata* extracts from the Mediterranean area, obtaining promising preliminary results.
- Scientific networking and brainstorming on future joint projects, covering biosensor development, cytotoxicity-toxin content correlations, and novel analytical approaches.



This secondment strengthened scientific ties between UNINA, IRTA, and other Spanish research institutions, paving the way for future collaborative research on marine toxins and environmental contaminants.



➤➤➤ **Donaida Lago** (CEAC → CIIMAR)
Gabriel Rojas (CEAC → CIIMAR)



Gabriel Rojas and Donaida Chamero from CEAC – Centro de Estudios Ambientales de Cienfuegos, Cuba, have been at CIIMAR and IPMA from April to early July 2025.

The goal of the scientific visit was to gather knowledge on benthic harmful algal species, including their diversity across tropical and temperate regions, and to enhance techniques for their environmental isolation, species-level identification using microscopy and molecular biology, and the optimization of culturing conditions.

The visit also aimed to transfer expertise in toxin extraction from seafood and their analysis using liquid chromatography coupled with mass spectrometry detection.

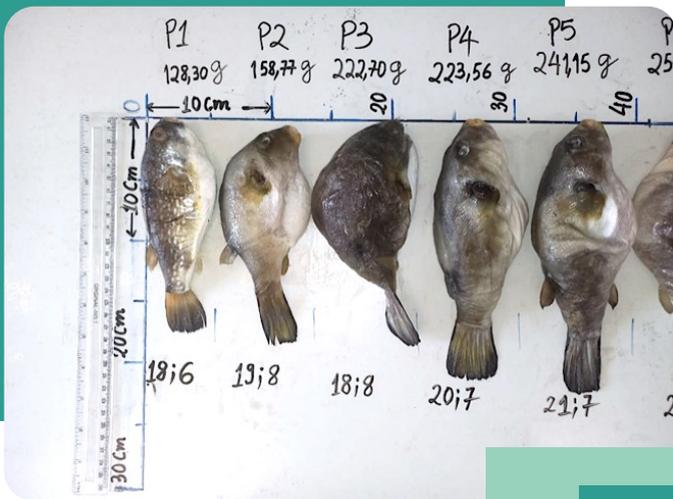
Intensive laboratory work was carried out during this period, but there was also time to network and visit some of Lisbon's attractions, including Sintra.



On June 5th, Dr Gabriel Rojas provided a talk at IPMA about *Gambierdiscus* distribution in the Caribbean Sea, with particular emphasis to Cuba, and the associated risk of Ciguatera.

➤➤➤ Isidro Tamele (UEM → CIIMAR & IPMA)

Isidro Tamele from Eduardo Mondlane University (UEM), Maputo, Mozambique, has been at IPMA from April to August 2025. Within the framework of the Blueshellfish project, there has been close collaboration between IPMA, CIIMAR, and UEM. Professor Tamele's visit took place in the context of this partnership, which focuses on assessing the occurrence of marine biotoxins in seafood and evaluating the associated risks for consumers. During his stay at IPMA, Professor Tamele enhanced his expertise in the extraction and analysis of biotoxins using liquid chromatography and investigated different organisms as potential toxin vectors.



During his secondment, he was also involved in the development of an informative flyer on seafood safety, to be distributed in schools across Mozambique.



Find the flyer [HERE!](#)

➤➤➤ **Pedro Reis Costa** (IPMA → CEAC)
Catarina Churro (UEM → CEAC)

Pedro Reis and Catarina Churro from the Portuguese Institute of the Sea and Atmosphere (IPMA) visited the Environmental Studies Center of Cienfuegos (CEAC), Cuba, as part of the BlueShellfish project, or a scientific exchange.



The visit included joint fieldwork along the Cienfuegos Bay and nearby reef areas, where toxic marine microalgae were collected. These samples were later cultured in the CEAC laboratory, and passive toxin detectors were installed in the bay to monitor harmful algal blooms. The team also collaborated on preparing scientific articles and delivered lectures on toxic microalgae, creating opportunities for knowledge sharing and training. impacts of harmful algal blooms.



This exchange further strengthened the collaboration between Cuban and Portuguese researchers, supporting ongoing efforts to better understand and mitigate the impacts of harmful algal blooms.

PUBLICATIONS

»»» “Analysis of ciguatoxins in fish with a single-step sandwich immunoassay”

Harmful Algae 146 (2025) 102869

Contents lists available at [ScienceDirect](#)

 **Harmful Algae** 

journal homepage: www.elsevier.com/locate/hal



Analysis of ciguatoxins in fish with a single-step sandwich immunoassay

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<p>ARTICLE INFO</p> <p>Keywords: Ciguatoxin (CTX) Ciguatera poisoning (CP) Single-step immunoassay Antibody Food safety</p>	<p>ABSTRACT</p> <p>Ciguatoxins (CTXs) are the primary cause of ciguatera poisoning (CP), one of the most prevalent non-bacterial seafood-borne illnesses worldwide. With no cure available beyond palliative treatments to alleviate symptoms, effective CP management relies on prevention. However, the detection of CTXs in seafood poses significant analytical challenges due to their typically low concentrations in specimens and the high variability among CTX congeners, many of which remain poorly characterized. These challenges have led to a growing demand for the development of rapid, sensitive, and user-friendly bioanalytical tools for CP surveillance. In this study, several simplified sandwich immunoassay strategies were evaluated for the detection of Pacific CTXs in fish. Among them, the single-step strategy was identified as the most promising, as it enables the detection of Pacific CTXs in complex fish matrices within only 40 min at levels as low as 0.01 µg CTX1B equivalents/kg of fish, aligned with the safety guidance level proposed by the United States Food and Drug Administration (FDA). Unlike traditional sandwich immunoassays, which require several sequential incubation steps, the single-step strategy involves a simultaneous incubation of all components with the sample, uniquely followed by a washing and substrate incubation step prior to signal measurement. This approach significantly reduces both the complexity and time required for analysis, positioning this immunoassay as a highly promising tool for CP risk assessment and management.</p>
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This scientific study has brought exciting news in the fight against **ciguatera poisoning**, a common illness caused by toxins found in some seafood.

The research focused on creating a **new testing method** that is faster, easier, and more sensitive than traditional ones used to detect these harmful toxins in fish.

The team explored several testing strategies and found that a **single-step approach could identify ciguatoxins in fish samples in just 40 minutes**, a big improvement over older, more complicated methods that take much longer. This new method also meets strict safety standards, making it a promising tool for better monitoring seafood and protecting public health.

This study is an important step forward because ciguatera poisoning currently has no cure, and preventing contaminated seafood from reaching consumers is essential. With this innovative test, scientists hope to improve early detection and reduce the risk of poisoning worldwide.

NEW FUNDING

»»» INNOVBIVALVES

A new project, born from the work developed in BlueShellfish, has just been funded to help solve a major problem in shellfish farming: contamination by marine toxins.

The project INNOVBIVALVES (COMPETE2030-FEDER-00750100 - nº 16339) aims to develop an innovative method - using natural compounds and molecular biology - to clean live bivalves, turning them into safe, high-quality food for consumers. The solution will also be sustainable, supporting the industry in dealing with the growing impacts of climate change and harmful algal blooms.



The knowledge generated within BlueShellfish, as well as the strong network of researchers and institutions, played a key role in making this new project possible — and will continue to support its success.

This project is one more step toward protecting both public health and the marine environment.

DID YOU KNOW?

Harmful Algal Blooms are increasing due to climate change - and they can make seafood unsafe. BlueShellfish is studying these toxins to find smarter ways to protect both people and the ocean.

EVENTS

»»» INNOVBIVALVES KICK OFF MEETING

CIIMAR, June 26th 2025

On June 26th, CIIMAR hosted the kick-off meeting of the INNOVBIVALVES project in Matosinhos.

The event brought together researchers and institutional partners to present the project's goals, discuss upcoming tasks, and strengthen collaborations.



The meeting was also an opportunity to reflect on how InnovBivalves builds upon the scientific foundations and network created by BlueShellfish — showing how impactful collaborations can lead to new solutions in seafood safety.

