

PhD project
University of Cote d'Azur and Plan Bleu

Title: Linking benthic ecosystem health, algal toxins, and seafood safety: a “One Health” approach to harmful algal blooms (QUALIMER).

Description

In the Mediterranean basin, harmful algal blooms threaten the safety of fishery products, which form an important part of the diet and a source of income for the population. Over the last 3 decades these blooms have escalated, and those associated with the toxin-producing microalgae genera *Ostreopsis* and *Gambierdiscus* in coastal bottom system are of particular concern.

In the Mediterranean Sea the abrupt changes associated with multiple stressors resulting from climate change and/or human activities such as coastal urbanization, overfishing, and poor water quality, are leading to a significant deterioration of coastal bottom habitats (known as "regime shifts"). Thus, despite the considerable efforts that have been made to reduce pollution linked to urban and industrial discharges (UNEP Barcelona Convention), the state of the Mediterranean continues to deteriorate. As such, *Cystoseira sensu lato* marine forests, hosting multitude of organisms and considered as indicators of good coastal health, are declining in the Mediterranean Sea and these habitats are being replaced by less complex benthic assemblages of filamentous algae or even deserts dominated by encrusting algae and sea urchins.

In these degraded habitats, toxic benthic microalgae appear to thrive, and are suspected of playing an important role in the occurrence and toxicity of toxic microalgae, and thus in the contamination of seafood and the risk of human poisoning (Montsera et al, 2022, Fricke et al 2018, Gianni et al, 2018). Though, the mechanisms that promote their proliferation and potential toxicity in these alternative habitats are yet to be fully understood.

The main gaps are the lack of data linking the conservation status of ecosystems (including the complexity of food webs) with the proliferation of these microalgae and the production of their toxins, as well as the limited comprehension of the kinetics of biotoxins and their metabolites transfer throughout the food chain.

In this context, the thesis project proposes, through a 'One health' approach involving field and laboratory studies, as well as large datasets analysis and sharing, to better understand, in a changing world, what are the ecological conditions (substrate and coastal communities) conducive to the production and transfer of biotoxins and contribute to better illustrate and characterize the relationships between the state of the environment and human health.

This project will thus provide elements to better understand and preserve marine ecosystems and to develop expertise for coastal and fisheries managers to improve monitoring and contribute to the development of early warning systems of harmful algal blooms and ultimately promote sustainable development

This transdisciplinary project will have 3 components involving ecology, ecotoxicology and socioeconomy to improve scientific knowledge and inform governments and the general public.

Key words: ecotoxicology, biotoxins, seafood safety, marine environment, harmful algal bloom, trophic transfer, sustainable development

Profile: The candidate must have a previous experience (or extensive knowledge) in ecotoxicology, ecology, toxicology, marine biology or biochemistry, a good knowledge of harmful algal bloom. and a deep interest in interdisciplinary and transdisciplinary approaches. An experience in economics or social sciences would be a plus. Other expected skills include:

- writing skills
- mastery of statistical analysis
- great rigour, care, and organization
- Driving license A,
- Diving or a taste for sea/field work

Funding:

The position is fully funded for 3 years with benefits (annual leave, social security coverage and more).

Both hosting institution (at Université cote d'azur and Plan Bleu) will provide infrastructures (premises, equipment and support) necessary for the candidate.

Starting date: October 2023, for a period of 3 years

Hosting institution:

The PhD project will be carried out at ECOSEAS, University of Cote d'Azur in Nice (France) and at Plan bleu in Marseille (France).

The successful candidate will benefit from opportunities to attend international conferences and collaborate with research groups at the international level.

Contact:

Application including a CV and a cover letter should be sent to Yasmine Bottein and Antoine Lafitte, with the contact of 2 references

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