



**HAL**  
open science

## Physiological and proteomic responses of a mediterranean strain of the marine toxic invasive dinoflagellate *Alexandrium catenella* exposed to a polymetallic stress

Cherif Chetouhi, Estelle Masseret, Amandine Caruana, M Zouher Amzil, Thierry Balliau, Mohamed Laabir, Natacha Jean

### ► To cite this version:

Cherif Chetouhi, Estelle Masseret, Amandine Caruana, M Zouher Amzil, Thierry Balliau, et al.. Physiological and proteomic responses of a mediterranean strain of the marine toxic invasive dinoflagellate *Alexandrium catenella* exposed to a polymetallic stress. Société d'écotoxicologie fondamentale et appliquée (SEFA), Jul 2019, lyon, France. 10.13140/RG.2.2.19179.80164 . hal-03467305

**HAL Id: hal-03467305**

**<https://hal.science/hal-03467305>**

Submitted on 6 Dec 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Physiological and proteomic responses of a mediterranean strain of the marine toxic invasive dinoflagellate *Alexandrium catenella* exposed to a polymetallic stress

C. CHETOUHI<sup>1</sup>; E. MASSERET<sup>2</sup>; T. BALLIAU<sup>3</sup>; Z. AMZIL<sup>4</sup>; A. CARUANA<sup>4</sup>; M. LAABIR<sup>2</sup>; N. JEAN<sup>1</sup>

<sup>1</sup> Université de Toulon, Mediterranean Institute of Oceanography (MIO), UM110 CNRS/IRD Université de Toulon, CS 60584, 83041 Toulon Cedex 9, France

<sup>2</sup> MARBEC UMR 9190, Université de Montpellier/IRD/IFREMER/CNRS, Place Eugène Bataillon, Montpellier Cedex 5, France

<sup>3</sup> Plateforme d'Analyse Protéomique Paris Sud-Ouest, INRA, UMR 320, Ferme du Moulon, 91190 Gif-sur-Yvette, France

<sup>4</sup> Laboratoire Phycotoxines, IFREMER - Centre de Nantes, rue de l'île d'Yeu, BP 21105, 44311 Nantes Cedex 3, France

## INTRODUCTION

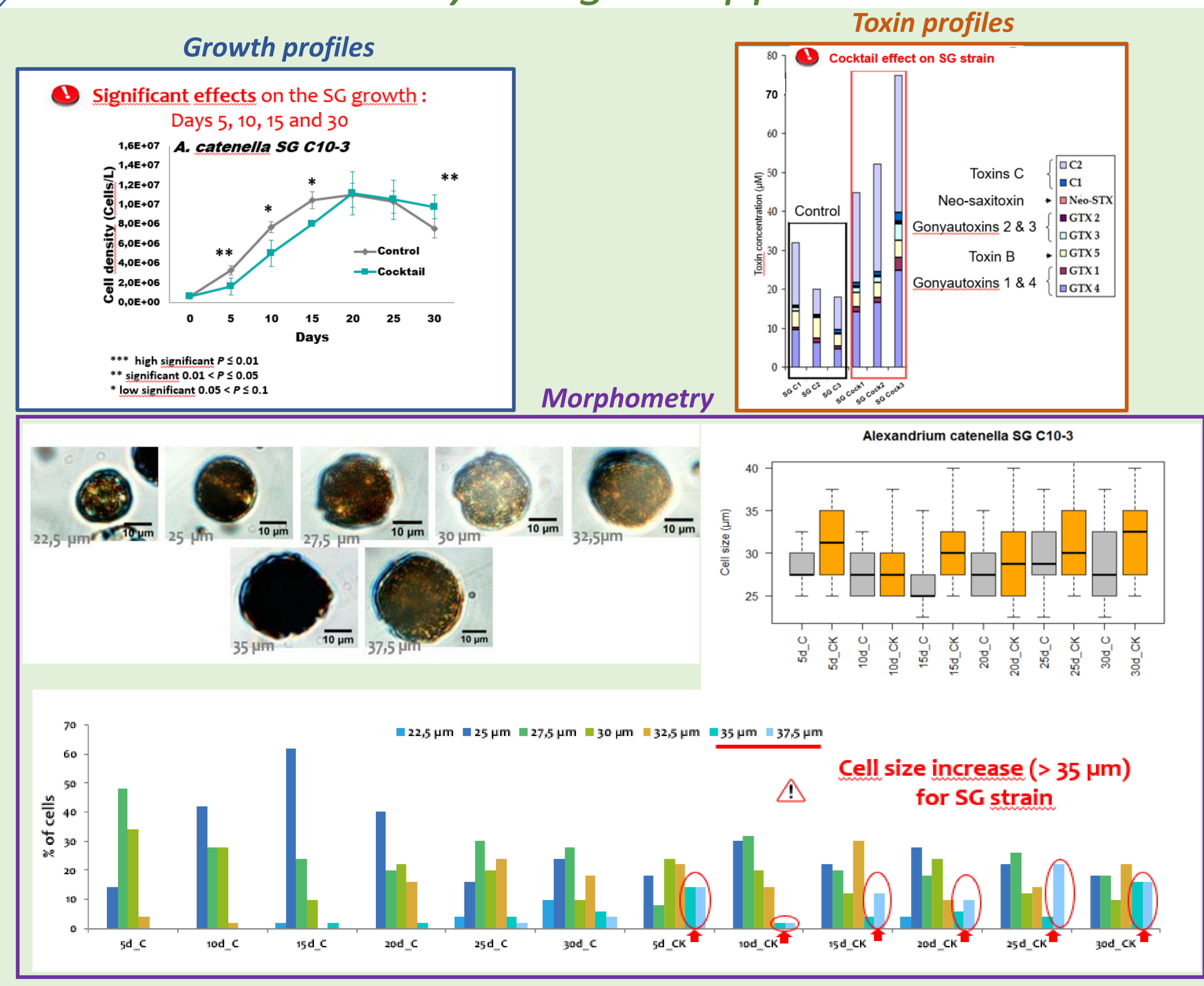
Harmful Algal Blooms (HABs) are increasingly observed in marine coastal ecosystems submitted to anthropogenic inputs. HABs may involve invasive dinoflagellates producing phycotoxins, such as *Alexandrium catenella*, responsible for the Paralytic Shellfish Poisoning (PSP) syndrome in humans after consumption of contaminated shellfishes. HAB dinoflagellates could be tolerant towards metallic contaminants, as suggested by their proliferation in some metal perturbed ecosystems. Generally, organisms acclimate to environmental changes thanks to modulation of their proteomes (total expressed proteins). The main objective of the present **ecotoxicoproteomic study** is to characterize the **proteomic response** of the mediterranean strain *A. catenella* SG C10-3 (coming from the Santa Giusta Lagoon, Western Sardinia, Italy) exposed to a polymetallic stress (Cd + Cu + Pb + Zn), in order to investigate its possible adaptation/resistance mechanisms in cocktail metallic contaminated conditions.

## MATERIAL AND METHODS

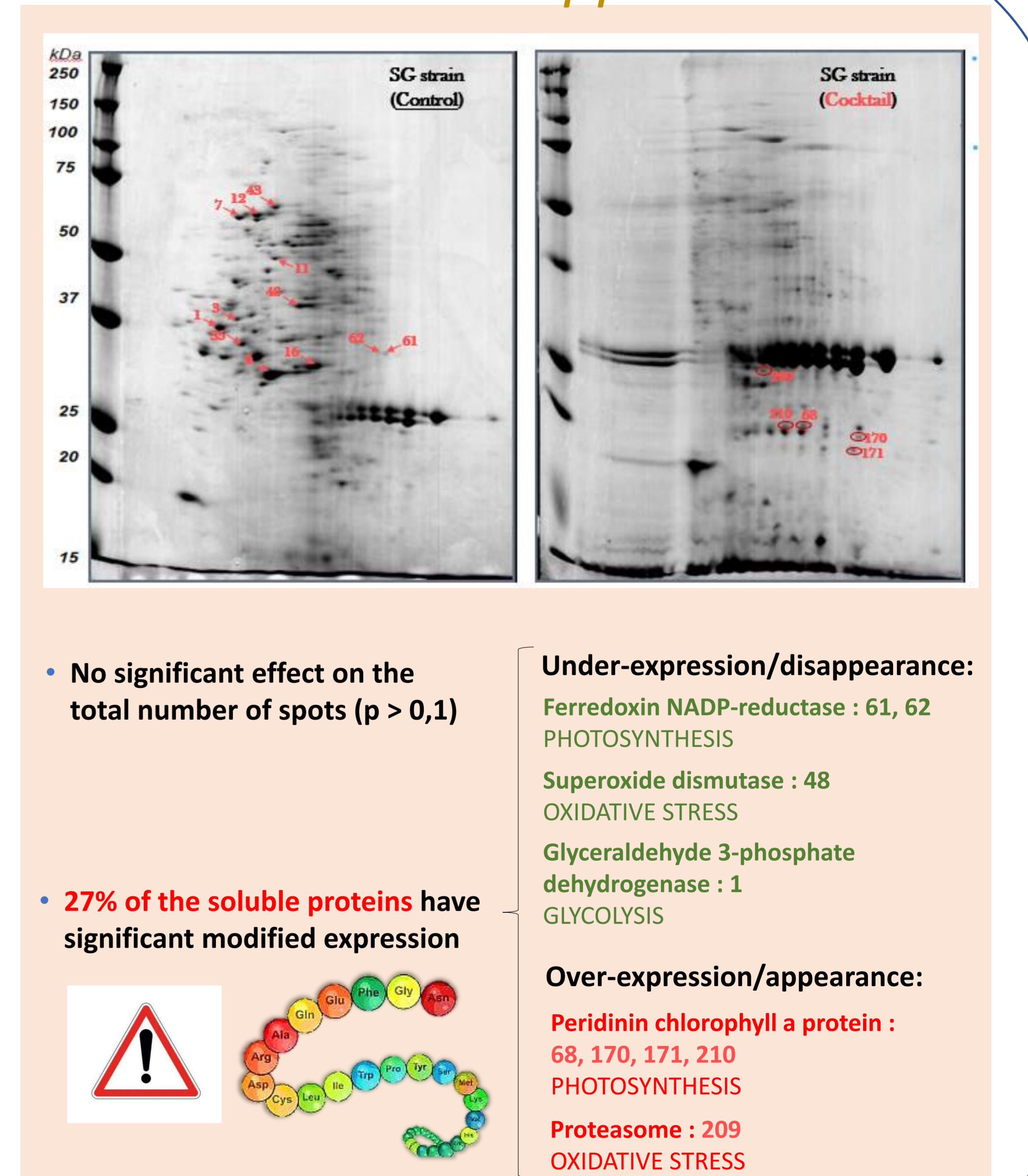


## RESULTS

### Physiological approach



### Proteomic approach



## DISCUSSION

- Significant physiological effects of the polymetallic stress on *A. catenella*: decrease in cell growth and increase in cell size suggest an **inhibition of cell division by metals**.
- Significant effects of the polymetallic stress on the *A. catenella* toxin production: **stimulated production of saxitoxin derivatives (toxins C and gonyautoxins)**.
- Significant effects of the polymetallic stress on the *A. catenella* soluble proteome: **many metabolic pathways** are affected (*photosynthesis, oxidative stress, glycolysis*).
- Proteins of interest can be used as **biomarkers** of the *A. catenella* proliferation in metal contaminated ecosystems.