

# IMPACT OF POLYCYCLIC AROMATIC HYDROCARBON (PAHS) MIXTURE ON *PSEUDO-NITZSCHIA MANNII*

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## Abstract

The impact of PAHs cocktail on *Pseudo-nitzschia mannii*, isolated from Tunisian northern waters, was assessed during 144 h exposure to increasing concentrations of pollutants. Physiological measurements were performed daily on *Pseudo-nitzschia* cells using fluorescent probes. Biomass and cell density were determined daily. The responses of the Chl *a* and cell concentrations as well as the Fv/Fm to PAHs cocktail were dose-dependent. The efficiency of PSII was more sensitive to PAHs than the biomass.

**Keywords:** *Diatoms, Pah, Mediterranean Sea*

## Introduction

Coastal marine ecosystems are often contaminated by PAHs and the biota is affected by this pollution. The toxicity and lethality of PAHs have been assessed for a variety of marine organisms such as fish, zooplankton and amphipods [1]. Several works have also shown the toxicity of these pollutants on primary producers, as they can affect algal biomass, physiology and specific composition [2]. However, the effect of PAHs on harmful and toxic phytoplankton species, are scarce, despite the fact that these algae have high occurrence in coastal waters, where chemical contamination was confirmed. The objective of this study was to elucidate the potential toxic effects of complex mixtures of PAHs on the growth and the physiology of a potentially toxic *Pseudo-nitzschia mannii*, isolated from the lagoon of Bizerte, which received several pollutant, as PAHs.

## Materials and Methods

Strains of *P. mannii*, isolated from Bizerte Lagoon, were grown in f/2 medium, at 20°C, 100 μmol photons m<sup>-2</sup> s<sup>-1</sup> and 12:12 h light:dark cycle. Exponential cultures were used to perform six treatments during 144 h: a control without DMSO (C), control with DMSO (0.05 % v/v) (C<sub>DMSO</sub>) and four contaminated treatments, which received respectively 0.1% (C1), 0.5% (C2), 1% (C3) and 4% (C4) of a PAHs cocktail. This later was prepared by dissolving into DMSO (0.05%, v/v) 15 pure PAH molecules that were present in the Bizerte Lagoon (Ben Othmen Raboudi, 2014). In each treatment, dissolved and particulate PAHs, Chl *a* levels, growth kinetic and physiology (Fv/Fm: the maximum quantum yield of photochemistry) were measured on each day of incubation.

## Results and discussion

Daily measurement of dissolved PAHs in treatments C3 (i.e. 1%) showed a gradual decline in concentrations from the beginning (28.5 μg l<sup>-1</sup>) to the end (5.1 μg l<sup>-1</sup>) of incubation. Despite this decrease in PAHs cocktail, the growth of *P. mannii* was maintained in this treatment until the end of the experiments. In contrast, particulate PAH showed an increase from the beginning (0.5 μg l<sup>-1</sup>) to the end (15.5 μg l<sup>-1</sup>) of incubation. This indicates the ability of species to accumulate the PAHs. Chl *a* and cell concentrations were not significantly (p>0.05) different between C and C<sub>DMSO</sub> during the entire of incubation, indicating that DMSO used at 0.05% v/v was no toxic for cells. In short term (after 48 h exposure), the decreased of Chl *a* was more pronounced when the level of the contamination increased. Similarly, growth rates were low, relatively to the control, in the C1 and C2 treatments, but the lowest was observed at high contamination (i.e. C3 and C4 treatments). This suggest that the PAH effect on biomass and growth of *P. mannii* was dose-dependent. The Fv/Fm variable was unaffected by all treatments, except the C4 contamination. In this treatment, its value decreased by 20% relatively to control after 48 h and then it sharply fall to zero. The results revealed the negative impact of PAHs on the growth of *P. mannii*, as was previously shown for other algal species [3]. However, the species was able to accumulate the pollutants. It appeared that the physiology of the *P. mannii* was more sensitive to pollutants than its biomass.

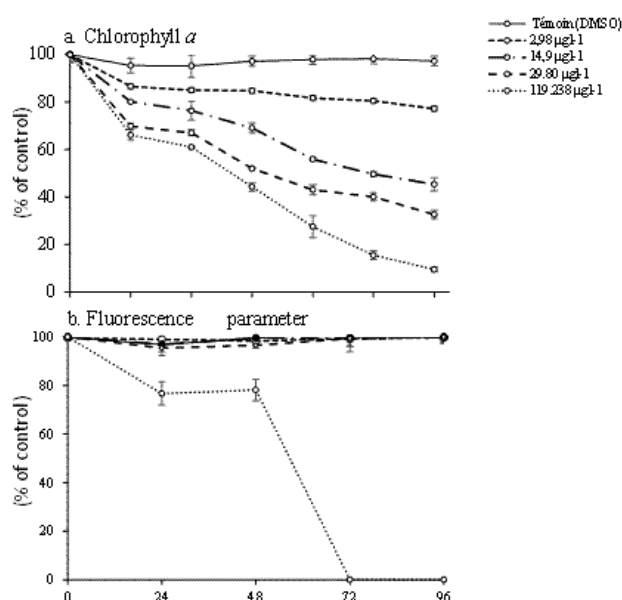


Fig. 1. Evolution of chlorophyll a concentrations (μg Chl a l<sup>-1</sup>) and the efficacy of PSII (Fv/Fm) in different treatment along the day of the experiment (mean ± SD)

## References

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