



Abstract

# Monitoring Cyanobacteria and Phycocyanin: A Case Study in the Albufera of Valencia †

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† Presented at the 7th Iberian Congress on Cyanotoxins/3rd Iberoamerican Congress on Cyanotoxins, Ponta Delgada, Portugal, 18–20 July 2022.

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**Abstract:** Some cyanobacteria are considered beneficial to humans, while others are considered harmful due to their ability to synthesize and release cyanotoxins. Cyanobacterial blooms are proliferations of cyanobacteria due to the high concentration of nutrients such as nitrogen and phosphorus, as well as the intervention of other physicochemical parameters such as solar radiation and temperature, worsening the trophic state of the water body. Cyanobacterial bloom can produce cyanotoxins, which directly decrease water quality for human use. Since the 1980s, urban and agricultural intensification, together with the effects of climate change, produced the current poor trophic state of the Albufera of Valencia. It is a coastal lagoon located in the east of the Iberian Peninsula, which requires continuous monitoring in order to monitor its ecological quality. The objective of this study is to monitor the concentration of phycocyanin and its relationship with the density of cyanobacteria during the winter–spring of 2022. For this, physicochemical variables were measured, and phytoplankton communities were determined; finally, the presence of phycocyanin was measured in situ and by remote sensing using Sentinel-2 imagery. The lagoon presents a state of permanent turbidity with an average transparency of 30 cm according to the Secchi Disk. The results obtained show an increasing concentration of phycocyanin from winter to summer related to higher phosphorus concentrations, reaching values of 561.3 µg/L for phycocyanin and 8.7 mg P/L of total phosphorus. According to the trophic state reference values of the Water Framework Directive, the concentration of total phosphorus is excessive, indicating a hypertrophic state. According to the World Health Organization, the concentration of phycocyanin found would indicate a state of high alert. Remote sensing serves as a suitable tool for monitoring and tracking the status of the lagoon.

**Keywords:** coastal lagoon; cyanobacteria; phycocyanin; toxicity; remote sensing; eutrophication



**Citation:** Soms, P.; Pérez-González, R.; Sòria-Perpinyà, X.; Soria, J.; Vicente, E. Monitoring Cyanobacteria and Phycocyanin: A Case Study in the Albufera of Valencia. *Biol. Life Sci. Forum* **2022**, *14*, 31. <https://doi.org/10.3390/blsf2022014031>

Academic Editor: Vitor Gonçalves

Published: 25 July 2022

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**Author Contributions:** Conceptualization, J.S., P.S., and R.P.-G.; methodology, P.S., R.P.-G., J.S., and X.S.-P.; software, P.S., R.P.-G., X.S.-P., and J.S.; validation, J.S. and X.S.-P.; formal analysis, P.S., R.P.-G., J.S., and X.S.-P.; investigation, P.S., R.P.-G., J.S., and X.S.-P.; resources, J.S. and P.S.; data curation, J.S. and P.S.; writing—original draft preparation, P.S., R.P.-G., and J.S.; writing—review and editing, P.S., R.P.-G., X.S.-P., and J.S.; visualization, J.S., X.S.-P., and E.V.; supervision, J.S. and E.V.; project administration, E.V.; funding acquisition, E.V. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Image satellite available on ESA Copernicus Hub. Field data are available upon request from authors.

**Conflicts of Interest:** The authors declare no conflict of interest.