



Abstract

Discovery of a Novel Potent Cytotoxic Compound from *Leptothoe* sp. †

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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: One of the top causes of worldwide mortality is cancer. In many cases, the effectiveness of traditional chemotherapy is hampered given the emergence of drug resistance alongside a wide range of unwanted side effects. To overcome this, it is essential to search for new drugs that can lead to a more successful cancer treatment. Cyanobacteria are a diverse group of photosynthetic prokaryotes known to produce bioactive metabolites, with various interesting biotechnological applications. Currently, four FDA (food and drug administration)-approved anticancer drugs derived from a cyanobacterial metabolite are used in the clinical setting. CIIMAR (Interdisciplinary Centre of Marine and Environmental Research) hosts LEGE-CC (Blue Biotechnology and Ecotoxicology Culture Collection), a collection of over 700 strains of cyanobacteria with underexplored biotechnological potential. To uncover it, a new method to quicken the discovery of bioactive metabolites was recently developed, leading to the creation of a library of cyanobacterial fractions, readily available for bioactivity assays. In this work, we will present the results of the cytotoxic screening that led to the selection of one strain that decreased cell viability to 10%. This strain, isolated from an environmental sample collected at Cape Verde and identified as *Leptothoe* sp., was then selected for bioactivity-guided fractionation aided by LC–MS (liquid chromatography-mass spectroscopy). Using numerous chromatography techniques, two macrolide-type compounds were isolated: the previously reported phormidolide as well as a new derivative. The structure of the new compound was elucidated by 1D and 2D NMR (nuclear magnetic resonance) and the cytotoxicity was measured against HCT 116 human colon carcinoma cells. A potent cytotoxic activity was observed for the new compound. These interesting results are important for developing new anticancer drugs from cyanobacteria, so more work is being developed to isolate new derivatives.

Keywords: cancer; cyanobacteria; cytotoxicity; library screening; phormidolide



Citation: Ferreira, L.; Morais, J.; Vasconcelos, V.; Reis, M. Discovery of a Novel Potent Cytotoxic Compound from *Leptothoe* sp. *Biol. Life Sci. Forum* **2022**, *14*, 46. <https://doi.org/10.3390/blsf2022014046>

Academic Editor: Vitor Gonçalves

Published: 1 August 2022

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Author Contributions: Conceptualization M.R.; methodology—strain isolation and identification J.M.; compound isolation and bioactivity assays L.F.; funding M.R. and V.V. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by CYANCAN project PTDC/MED-QUI/30944/2017, co-financed by NORTE 2020, Portugal 2020, and the European Union through the ERDF, and by FCT through national funds and was additionally supported by the FCT and strategic funds UIDB/04423/2020 and UIDP/04423/2020 and EMERTOX project funded by the European Union's Horizon 2020 research and innovation staff exchange programme under the Marie Skłodowska-Curie Grant agreement No. 778069.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

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