October 24 - 27/2023

9TH BCNP
Brazilian Conference On Natural Products
XXXV RESEM

Federal University of Bahia
Salvador/Bahia - Brasil
OCTOBER 24 - 27/2023

Antiproliferative, anti-leshmanial and metabolomics prospecting of Brazilian cyanobacteria

Francisco Henrique Santana da Silva,[1] Leonardo Santos de Jesus,[1] Márcio Barczyszyn Weiss,[1] Sandra Regina Castro Soares,[2] Camila Mariano Comin Gonçalves,[2] Helori Vanni Domingos,[3], Leticia Veras Costa-Lotufo,[3] José Angelo Lauletta Lindoso,[2] Roberto Gomes de Souza Berlinck,[3] Camila Manoel Crnkovic[1]

[1]Department of Biochemical-Pharmaceutical Technology, FCF/USP, [2]Institute of Tropical Medicine, FMUSP, [3]Department of Pharmacology ICB/USP, [4]Department of Physical Chemistry, IQSC/USP

franciscosantana@usp.br

Keywords: Bioassays, Cyanobacteria, Dereplication, Natural products

Highlights
We report on the integration of bioassays and metabolomics as a strategy to prioritize metabolites from Brazilian cyanobacteria in natural product prospecting.

Abstract
Cyanobacteria represent a promising group of microorganisms in the search for new bioactive natural products.[1] Estimates from the National Cancer Institute indicate more than 300,000 new cases of breast cancer in 2023, in the United States alone, justifying the pursuit of new antiproliferative agents for this condition.[2] Furthermore, leishmaniasis continues to be a public health issue in various countries, as it is considered one of the top ten neglected tropical diseases, affecting more than 12 million people in over 80 countries.[3] Our aim was to explore metabolomics tools to prioritize potentially novel bioactive natural products from Brazilian cyanobacterial fractions that were active against cancer cell lines and *Leishmania*. The cyanobacterium strain *Calothrix* sp. was cultivated, extracted, and fractionated. Extract and fractions were analyzed by UPLC-MS/MS, and the obtained data were processed using MZMine. Their biological activities[4] were evaluated against MCF-7 (breast cancer) cells and promastigotes of *L. amazonensis* (MHOM/BR/1972/LD). GNPS platform (Global Natural Products Social Molecular Networking) was used to create a molecular network and Features correlated with observed bioactivity were highlighted using NP analyst.[5] The combination of bioassay data and metabolomics results assisted the dereplication of groups of metabolites that were associated with the bioactive fractions.

References
[1] KHALIFA et al. Cyanobacteria—From the oceans to the potential biotechnological and biomedical applications. Marine Drugs, v. 19, n. 5, p. 241, 2021.
[2] SIEGEL et al. Cancer statistics, 2023. CA: A Cancer Journal for Clinicians 2023; 73(1):17-48.
[3] COSTA et al. From Infection to Death: An Overview of the Pathogenesis of Visceral Leishmaniasis. Pathogens, v. 12, n. 7, p. 969, 2023
[4] MOSMANN, T. Rapid colorimetric assay for cellular growth and survival: application to proliferation and cytotoxicity assays. Journal of immunological methods, v. 65, n. 1-2, p. 55-63, 1983.
[5] LEE, S. et al. NP analyst: an open online platform for compound activity mapping. ACS Central Science, v. 8, n. 2, p. 223-234, 2022.