10th Brazilian Conference on Natural Products
XXXVI RESEM
4-7 November 2025, Belo Horizonte, MG, Brazil

Section: 02

Pombalia atropurpurea as a source of cyclotides with larvicidal activity

Ana Letícia P. Santos (Post-Doc)[1], Meri Emili F. Pinto (Post-Doc)[1], Suzana A. S. Queiroz (PhD)[1], Juliana P. Souza (Professor)[2], Lorena Carneiro Albernaz (Post-Doc)[3], Laila Salmen Espindola (Professor)[3] and Vanderlan Bolzani (Professor)[1].

alp.santos@unesp.br

[1]*Institute of Chemistry, São Paulo State University-UNESP-IQ, Araraquara, SP, Brazil,* [2] *Department of Biological Sciences, Federal University of Santa Catarina-UFSC, Santa Catarina, SC, Brazil,* [3] *Faculty of Health Sciences/Medicine, University of Brasilia-UnB, Brasília, DF, Brazil.*

Cyclotides are disulfide-rich mini proteins found in some plant families: Violaceae, Rubiaceae, Fabaceae, Solanaceae and Poaceae.[1] They have a distinct circular backbone with 28-37 amino acid residues, a head-to-tail cyclization, and a knotted arrangement of three conserved disulfide bonds named CCK (**C**yclic **C**ystine **K**not). Currently, around 720 cyclotides have been discovered, according to Cybase: a database of cyclic protein sequences and structures.[2] These stable structures are resistant to proteolytic degradation[1] and are involved in plant defense. A wide range of biological activities and/or therapeutic applications have been reported for these peptides, including insecticidal, nematocidal, molluscicidal, antimicrobial, anti-HIV, and antitumor activities.[3] Aiming to contribute even more in the area of cyclotides, our research group is dedicated to studying this class of natural products present in plants. Cyclotides from stems of *Pombalia atropurpurea*, Violaceae family, were extracted, defatted, and lyophilized, resulting in the crude extract, which was submitted to SPE-C18 cartridges and eluted with a mixture of 20%, 40%, 60%, 80%, and 100% buffer B (100% CH_3CN, 0.1% CF_3COOH) in A (H_2O, 0.1% CF_3COOH). The 40%, 60%, and 80% fractions, considered rich in cyclotides, were tested with *Aedes aegypti* larvae, resulting in 87%, 53%, and 100% larval mortality within 72 h, respectively. From the 40% fraction, four peptides were isolated, and three of them showed excellent larvicidal potential in 72 h. From the 60% fraction, three cyclotides were isolated, but only one exhibited larvicidal activity in 48 h. Five cyclotides were extracted from the stems, and three of them are new in the literature.

Keywords: *Circular miniproteins, cyclotides, cyclic peptides,Pombalia atropurpurea, Violaceae.*

[1] Craik, D. J., Lee, M. H., Rehm, F. B., et al. Bioorg. Med. Chem. **2018**, 26, 2727-2737.

[2] Cybase http://www.cybase.org.au/ (accessed 2024 -06 -24).

[3] Costa, L., Sousa, E., & Fernandes, C. Pharmaceuticals **2023**, 16, 996