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Section:

PHYTOCHEMICAL PROFILING AND BIOLOGICAL POTENTIAL OF PIPER MARGINATUM AND ITS ENDOPHYTIC FUNGI: INSIGHTS FOR COSMETIC APPLICATIONS

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Biodiversity represents a valuable reservoir of bioactive compounds with therapeutic and cosmetic applications. *Piper marginatum*, a pantropical species traditionally used in folk medicine, is known for its diverse phytochemical profile, yet its potential remains underexplored, particularly regarding its associated endophytic fungi.[1,2] This study aimed to investigate the chemical profile and biological activities of *P. marginatum* extracts, as well as to report, for the first time, the isolation of its endophytic fungi, opening new opportunities for bioprospecting and the discovery of bioactive natural products aligned with the growing demand for sustainable and safe cosmetic ingredients. Supported by LiveAloe company and FINEP (0558/21), and carried out in collaboration with UFG, UFCat, and the universities of Berlin and Wuppertal (Germany), this study investigates the chemical profile and biological activities of *P. marginatum* extracts, aiming to evaluate their potential for application in cosmetic formulations. An in-house database of compounds reported for the plant was constructed and applied in dereplication strategies, submitting UHPLC-HRMS data to Bruker Target Analysis software and GNPS molecular networking. Chemical profiling revealed the presence of flavonoids, terpenes, alkaloids, and phenylpropanoids. In the antioxidant assay, the glycerinated extract showed the most promising performance, at 25 µM it significantly reduced reactive oxygen species levels, with fluorescence values comparable to resveratrol, confirming its strong antioxidant potential. Moreover, anti-inflammatory evaluation in THP-1 macrophages indicated that the ethanolic extract was able to reduce pro-inflammatory cytokine secretion at concentrations up to 10 µg/mL without compromising cell viability, suggesting selective immunomodulatory activity. Altogether, these findings highlight *P. marginatum* as a promising source of bioactive metabolites, with significant antioxidant and anti-inflammatory potential for cosmetic development. Moreover, the first isolation of 20 fungal endophytes from this species establishes an unprecedented platform for future studies, expanding chemodiversity and reinforcing the valorization of Brazilian biodiversity, as extracts obtained from these microorganisms are also being evaluated in antioxidant assays. This research was supported by CNPQ, FINEP (0558/21), FAPESP (2024/03978-6) and CAPES.

Keywords: *Piper marginatum, molecular dereplication, antioxidant, endophytic fungi*

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