Área: QPN

Annotation of azaphilones produced by Penicillium meliponae using LC-MS data and molecular networking.

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Palavras Chave: *Metabolomic, OSMAC, Penicillium, Azaphilones, Molecular Networking.*

Highlights

Endophytic fungi are important sources of diverse molecules. Changes in constitution and cultivation conditions have shown metabolic variability. *P. meliponae* is an excellent producer of azaphilones.

Abstract

Species of fungi belonging to the genus *Penicillium* are among the main microorganisms known for their ability to produce bioactive molecules with various biotechnological applications. Despite the large number of studies involving the chemical characterization of species within this genus, new species are continually being discovered capable of producing a wide variety of molecules. This study aimed to utilize a metabolomics approach through mass spectrometry and molecular networking for a comprehensive characterization of the secondary metabolites of *Penicillium meliponae* (MMSRG-058), an endophytic fungus isolated from the stem of the Amazonian plant *Duguetia stelechantha* (Annonaceae). To obtain extracts of *P. meliponae*, fermentative cultures were performed using the OSMAC (One Strain Many Compounds) method, which comprised four different culture media, potato-dextrose-yeast (PDY), Czapek, International *Streptomyces* Project 2 (ISP2), and meat medium (ME), under two conditions, static and shaken. Both the liquid fraction and the mycelium were used, and two extracting solvents, ethyl acetate and methanol, were employed. The extracts were analyzed using HPLC-HRMS/MS and molecular networking. The analysis of both the networks and manual interpretation of MS/MS spectra allowed for the annotation of over 30 molecules, including polyketides belonging to the subclass of azaphilones. Among them, notable compounds include esclerotioramine, isochromophilone I, II, VI, and IX, esclerotiorin, and ocrephilone, widely described in the literature for their important bioactivities such as antimicrobial[1], anti-inflammatory[2], antioxidante[3], and cytotoxic properties[4]. Additionally, *P. meliponae* showed a great adaptive and biosynthetic capacity in different media and conditions, producing distinct molecules and, in some cases, specific molecules. Chemical characterization through the metabolomics approach proved to be of great importance for understanding the extensive metabolic capacity of the fungal species, particularly for the production of polyketides with bioactive properties.

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