

# Antimicrobial screening and chemical study of endophytic fungi from *Paepalanthus chiquitensis* (Eriocaulaceae).

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## Abstract

The screening for antimicrobial activity of twenty-five endophytic fungi isolated from the aerial parts of *P. chiquitensis* (*P. chiquitensis*) was assayed against *Staphylococcus aureus*, *Escherichia coli*, *Salmonella setubal* and *Candida albicans*. The results indicated that among all the ethyl acetate extracts studied, the best Minimum Inhibitory Concentration (MIC) values for the ethyl acetate extract (EtOAc) produced by *Fusarium* sp. The large-scale cultivation and the chemical study of the EtOAc extract of this endophytic fungus led to the isolation of Fusaric acid (1), 2-(1*H*-indol-3-yl) acetic acid (2) and terpestacin (3). The MIC value of the extract and of the compounds (1) and (2) ranged from 1000 to 125 µg/mL.

## Introduction

The *P. chiquitensis* Herzog (synonym *P. giganteus* Sano) represents one of the 1200 species belonging to the Eriocaulaceae. *Paepalanthus* is the largest genus of this family with approximately 500 species, of which more than 400 exist only in Brazil [1].

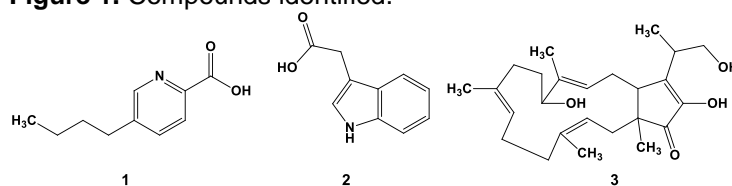
Endophytic fungi are defined as fungi that live asymptotically within the tissues of higher plants [2]. Among the endophytes that have been described so far which are interesting with regard to the production of bioactive secondary metabolites as well as a source of a variety of chemical structures, there are many *Fusarium* species [3]. Herein, we report the isolation of the Fusaric acid (1), the auxin 2-(1*H*-indol-3-yl) acetic acid (2) and the sesterterpene terpestacin (3) of the *Fusarium* sp. Isolated of the *P. chiquitensis*. Furthermore, antibacterial and antifungal activities of these major compounds (1 and 2) were evaluated.

## Results and Discussion

The screening for antimicrobial activity was used as a bioassay-guided strategy to select the most active among the twenty-five EtOAc extracts prepared from endophytic fungi isolated from the aerial parts of *P. chiquitensis*. The respective endophytic fungus was identified as *Fusarium* sp. (Fs 027 TNPB-L1), and grown in large-scale cultivation, affording the EtOAc extract used for the fractionation, isolation and

identification of the metabolites (Fig.1). The MIC of the extract and the compounds 1-2 were evaluated against four human pathogen microorganism (Table 1).

**Figure 1.** Compounds identified.



**Table 1.** Antimicrobial activity of the EtOAc extract and of the major compounds 1 and 2.

Samples	MIC (MBC) <sup>a</sup>			MIC (MFC) <sup>a</sup>
	<i>E.coli</i>	<i>S. setubal</i>	<i>S. aureus</i>	<i>C. albicans</i>
Ex <sup>b</sup>	500 (1000)	500 (1000)	250 (1000)	1000 (1000)
1	250 (>1000)	250 (>1000)	250 (>1000)	250 (>1000)
2	250 (500)	500 (1000)	250 (>1000)	125 (1000)
Amp.	6.25	12.5	0.15	-
Amp. B	-	-	-	8.0
Fluc.	-	-	-	N.D.

<sup>a</sup>Values in µg/mL; <sup>b</sup>EEtOAc = EtOAc extract; Amp = Ampicillin; Amp = Amphoterecin B; Fluc = Fluconazole; N.D. = not detected; MBC = Minimum Bactericidal Concentration and MFC = Minimum Fungicidal Concentration.

## Conclusions

The EtOAc extract, and the compounds 1-2 displayed moderate antimicrobial activity for all the bacterial strains evaluated. Furthermore, the compound 2 showed an interesting activity against the fluconazole-resistant *C. albicans*. This is the first ever report of endophytic fungi isolated from *P. chiquitensis*, a specie of Eriocaulaceae and their antimicrobial activity.

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