

Antimicrobial activity of six *Lippia* species against opportunistic yeasts

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Introduction

The genus *Lippia*, is one of the largest of the family Verbenaceae, and includes many medicinal and aromatic species, being found in South America, Central and in tropical Africa. Some *Lippia* species have presented antimalarial, antiviral, sedative, hipotensor and anti-inflammatory activities. Essential oils have been the main target of chemical and biological studies on *Lippia* species. Additional interest has been driven to phenolic compounds, as phenylethanoids, flavonoids and iridoid glycosides.¹⁻³

Results and discussion

In this work, 16 ethanol extracts and 64 fractions obtained from six *Lippia* species, including *L. balansae*, *L. lasiocalycina*, *L. lupulina*, *L. salviaefolia*, *L. sidoides*, and *L. velutina* were screened for antifungal activity against *Candida albicans*, *C. krusei*, *C. parapsilosis* and *Cryptococcus neoformans*, by using broth microdilution method. Among these, potent activity was found for the hexane fraction of *L. lupulina* roots. This fraction was chromatographed over silica gel, eluted with hexane, hexane:ethyl acetate (75:25), ethyl acetate, and ethyl acetate:methanol (1:1), resulting in four fractions Fr. Hex, Fr. Hex-EtOAc, Fr. EtOAc, and Fr. EtOAc-MeOH, respectively.

Fraction Fr. Hex was washed with cold ethyl ether and afforded after recrystallization from methanol, compound **1**, which was identified as oleanonic acid by comparison with spectroscopic data, mainly ¹³C NMR δ values.⁴

To the best of our knowledge this is the first report about chemical and biological investigations of *L. lupulina*.

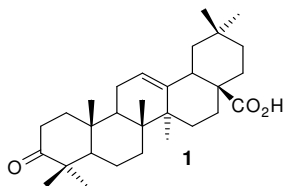


Figure 1: Structure of oleanonic acid (**1**)

Table 1. Antifungal activity of fractions and compounds expressed as Minimum Inhibitory Concentration (MIC in μ g/mL)

Samples	Ca	Ck	Cp	Cn
<i>L. lupulina</i> roots Hexane fraction	15.6	15.6	125	3.90
<i>L. sidoides</i> twigs EtOAc fraction	125	15.6	125	7.80
<i>L. velutina</i> leaves EtOAc fraction	15.6	15.6	125	3.90
<i>L. balansae</i> twigs EtOAc fraction	15.6	15.6	125	3.90
<i>L. lasiocalycina</i> leaves and twigs EtOAc fraction	15.6	7.80	125	3.90
<i>L. salviaefolia</i> leaves EtOAc fraction	125	62.5	125	31.25
oleanonic acid (1)	15.6	7.80	250	3.90
amphotericin B*	2.00	64.0	8.00	4.00
fluconazole*	2.00	2.00	1.00	0.06

Ca – *Candida albicans*; Ck – *Candida krusei*; Cp – *Candida parapsilosis*; Cn – *Cryptococcus neoformans*; * positive controls

Conclusions

Through the chemical study of the hexane extract of *L. lupulina* roots it was possible to isolate and identify oleanonic acid (**1**), which was probably responsible for the observed antifungal activity of the Hexane extract.

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