

Macrocyclic Trichothecene Production by the Fungus Epibiont of *Baccharis Coridifolia*

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Abstract: Cultures of the fungus epibiont from the herbaceous shrub *B. coridifolia* yielded four macrocyclic trichothecenes. As these toxins are the same as those found in *B. coridifolia*, the relationship between the plant and the epibiont must be considered as mutualistic.

Introduction

Baccharis coridifolia (Asteraceae) is a herbaceous shrub called “mio mio” o “romerillo”. It is one of the most poisonous plants to herbivorous mammals. Cattle deaths due to feeding on leaves of *B. coridifolia* are recorded in Brazil, Uruguay and Argentina. The toxins present in foliage, stems and seeds of the plant are macrocyclic trichothecenes. These metabolites are mycotoxins typically produced by cultures of *Myrothecium roridum* and *M. Verrucaria*.

Recently, we have reported the presence of a fungus epibiont on meristems in *Baccharis coridifolia* [3].

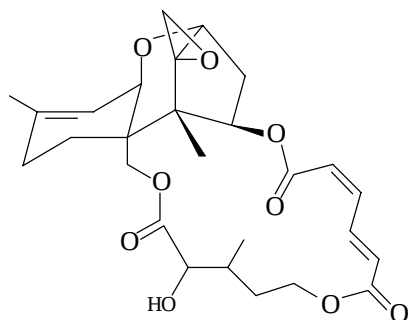
Experimental

The meristems were cultured in Petri dishes with 2% water-agar and incubated in the laboratory conditions for 30 days. The inoculum (blocks of mycelia) of *B. coridifolia* epibiont was first grown out into Erlenmeyer flasks containing a medium of glucose (15,6 g) and corn steep liquor (10 ml) in one liter of distilled water. After 30 days, 5 ml of medium were transferred to Erlenmeyer flasks containing a potato broth medium. The cultures were incubated for 30-60 days at room temperature. The mycelia were separated from the culture broth by filtration and the aqueous filtrates extracted with EtOAc. The EtOAc extract was purified by silica gel column chromatography and by preparative TLC.

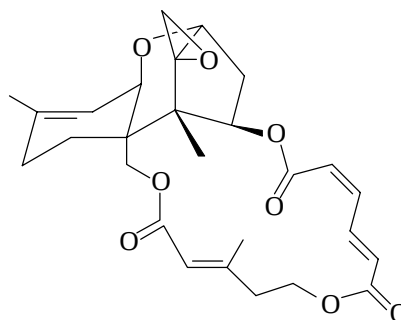
The pure compounds were identified by ¹H- and ¹³C-NMR spectroscopy.

Results and Discussion

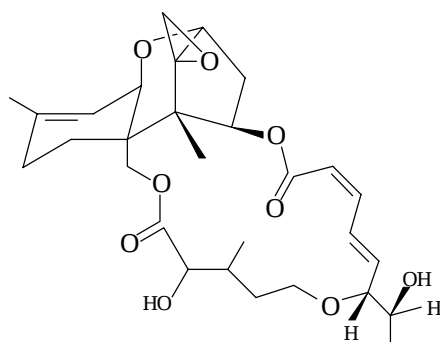
TLC analysis of the fractions obtained by purification of the AcOEt extract of the fungus epibiont of *B. coridifolia*, showed the presence of macrocyclic trichothecenes in two of these fractions. After chromatographic purifications, we isolated four macrocyclic trichothecenes whose structures were assigned by ^1H - and ^{13}C -NMR spectroscopy as verrucarina A, verrucarina J, roridina A and roridina E:



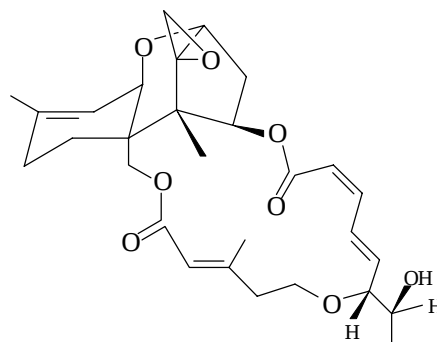
Verrucarina A



Verrucarina J



Roridina A



Roridina E

The fungus epibiont of *B. coridifolia* synthesizes the same macrocyclic trichothecenes as those found in the plant. The position of the epibiont on the meristems places it in an ideal location for colonizing all surfaces of the mature plant as foliage, stems and seeds, that are the parts of the plant where macrocyclic trichothecenes were detected. Taking into account these results, we suggest that the relationship between *B. coridifolia* and the epibiont must be considered to be mutualistic, being the epibiont responsible for the presence of trichothecenes in the plant and for its toxicity to herbivorous mammals.

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References and Notes

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3. Bertoni, M.D.; Romero, N.; Reddy, P.V.; White, J.F., Jr. *Mycol. Res.* **1997**, 89, 375.