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Coumarins, furoquinoline alkaloids and terpenes from *Spiranthera odoratissima* (Rutaceae)

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1. Subject and source

The rhizome and leaves of *Spiranthera odoratissima* A. St.-Hil. (Rutaceae) were collected from Chapada Diamantina, Bahia, Brazil and identified by Prof. Maria Lenise Silva Guedes. A voucher specimen (no. 38109) was deposited in the Herbarium Alexandre Leal Costa of the Instituto de Biologia at the Universidade Federal da Bahia, Brazil (ALCB).

2. Previous work

No previous chemical studies on *Spiranthera* spp. were reported. However, previous studies show that the Galipeae tribe characteristically contain furoquinoline (Toro et al., 1997), pyranoquinoline (Vieira et al., 1980), acridone alkaloids (Santos et al., 1998), furo- (Guilhon et al., 1994) and pyranocoumarins (Velozo et al., 1997), limonoids (Dreyer, 1980), lignans (Müller et al., 1995); pyranochalcones and flavones (Passador et al., 1997); among others compounds.

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3. Present study

Powdered leaves (0.86 kg) were extracted with hexane. The hexanic extract (5.0 g) were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus. The volatile constituents identified by CG–MS analysis in essential oil (496 mg) were the monoterpenes pinene, camphene, limonene, myrcene, the sesquiterpenes copaene, germacrene B and D, caryophyllene, and small amounts of oxygenated compound spathulenol and caryophyllene oxide.

The dried and powered rhizomes (1.20 kg) were extracted with CH_2Cl_2 to provide 20.24 g of extract that was chromatographed over silica gel 60 using mixtures of CH_2Cl_2–MeOH as eluent, affording 17 fractions. The fr. 1 (5.03 g) was rechromatographed on silica gel column using hexane/CH_2Cl_2 gradient. This procedure allowed the isolation of coumarins auraptene (150 mg; Agrawal et al., 1989), osthol (60 mg; Ito and Furukawa, 1987), braylin (20 mg; Silva et al., 1971), furoquinoline alkaloids skimmianine (30 mg; Rouffiac et al., 1969) and γ-fagarine (10 mg; Tillequin et al., 1980), The compounds were identified by IR, ^1H and ^{13}C NMR spectroscopy and MS spectrometry as well as by comparison with literature data.

4. Chemotaxonomic significance

The biosynthesis of furoquinoline alkaloids, coumarins and pyranocoumarins in Rutaceae is well documented (Grundon, 1983). The terpenoids reported in this work also have been found in other genera of Galipeae tribe (Andrade-Neto et al., 2000). Thus, *S. odoratissima* is in agreement with the typical chemical profile of the Rutaceae family.

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