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1,2-DIMETHOXY-11-HYDROXYAPORPHINE FROM *DISCARIA SERRATIFOLIA* VAR. *MONTANA*

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The alkaloid content in the genus *Discaria* of the family Rhamnaceae, has been widely studied. 1-Benzyltetrahydroisoquinoline and cyclopeptide alkaloids have been identified (1-7).

Discaria serratifolia (Miers) Reiche is endemic of central Chile; it shows a great degree of polymorphism and has been described in no fewer than eight varieties (8).

The chemosystematic study of *D. serratifolia* was initiated with *D. serratifolia* var. *discolor*. Only 1-benzyltetrahydroisoquinoline alkaloids were identified in this variety (7). In this paper, the isolation and characterization of 1,2-dimethoxy-11-hydroxyaporphine, the main alkaloid from *D. serratifolia* var. *montana* twigs, is presented.

Preparative tlc of the alkaloid mixture gave a pure compound that crystallized from EtOH, mp 230-231°, $[\alpha]^{20}D$ +244, M^+ *m/z* 311.1494 for $C_{19}H_{21}NO_3$. The uv spectrum was characteristic of an aporphine (9-11). The bathochromic shift, upon addition of base, indicated the phenolic nature of the alkaloid. The ^{1}H-nmr spectrum was characteristic of a 1,2,11-trisubstituted aporphine (9-11). Signals at δ 2.53 (3H), δ 3.65 (3H), and δ 3.88 (3H) were assigned to an *N*-methyl and two methoxy groups, respectively.

The multiplet at δ 6.8-7.2 was assigned to C-8, C-9, and C-10 protons, and the singlet at δ 6.66 (1H) to C-3 proton.

Isothebaine (1,11-dimethoxy-2-hydroxyaporphine), mp 164-166°, (9) did not show bathochromic shift upon the addition of base (12). The position of the hydroxyl group was then restricted to C-2 or C-11.

In order to establish the position of the hydroxyl group, high resolution ^{1}H-nmr spectra (300 MHz) in DMSO-d_6, and DMSO-d_6+NaOD were obtained. Results are shown in Table 1.

According to Pachler *et al.* (13), values of $\Delta\delta > 0.7$ may be assigned to ionization effects on phenols. Large shielding effects on C-8 and C-10 protons, and a smaller shielding on the C-3 proton were observed (Table 1). These results

TABLE 1. ^{1}H-nmr (300 MHz) Data for 1,2-Dimethoxy-11-hydroxy Aporphine in DMSO-d_6 and DMSO-d_6+NaOD and Values of Δδ after Ionization of Phenolic Hydroxyls

Assignments	Values of δ in DMSO-d_6	Values of δ in DMSO-d_6+NaOD	Δδ (δ inDMSO-d_6-δ in DMSO-d_6+NaOD)
N-CH_3	2.42 (s, 3H)	2.34 (s, 3H)	−0.9
OCH_3-C-1	3.58 (s, 3H)	3.52 (s, 3H)	−0.6
OCH_3-C-2	3.82 (s, 3H)	3.70 (s, 3H)	−0.12
H-C-3	6.84 (s, 1H)	6.43 (s, 1H)	−0.43
H-C-8	[a]6.85 (dd, 1H J=5.8 Hz, J=1.0 Hz)	[a]5.80 (dd, 1H J=6.0 Hz, J=1.0 Hz)	−1.05
H-C-9	[a]7.15 (dd, 1H J=7.5 Hz, J=5.8 Hz)	[a]6.58 (dd, 1H J=7.8 Hz, J=6.0 Hz)	−0.57
H-C-10	[a]6.97 (dd, 1H J=7.8 Hz, J=1.0 Hz)	[a]6.12 (dd, 1H J=7.8 Hz, J=1.0 Hz)	−0.86

[a]Assignments confirmed by irradiation experiments (at 2147 Hz and 2057 Hz) and measurements between δ 6.6-7.2 ppm and δ 5.6-6.8 ppm.

confirmed that the hydroxyl group is located at C-11.

Finally, the large dextrorotatory value of $[\alpha]^{20}D$ +244° is consistent with configuration S in C-6a (9).

This is the first report of the identification of an aporphine alkaloid in the genus *Discaria*. From a chemosystematic point of view the dramatic difference in the alkaloid composition of *D. serratifolia* var. *discolor* (7), and *D. serratifolia* var. *montana* supports the differentiation of these two varieties (8).

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Melting points were determined on a Kofler hot-stage microscope and are uncorrected. Uv spectra were obtained with a Carl Zeiss DMR-22 spectrophotometer. 60 MHz ^{1}H-nmr spectra were obtained with a Varian T-60 Spectrometer; 300 MHz ^{1}H-nmr spectra were obtained with a Nicolet NT 300 spectrometer; chemical shifts are reported in δ (ppm) values with TMS as internal standard. Hrms were obtained with a Kratos MS-30 mass spectrometer. Silicagel GF_{254} chromatofoils were used for analytical work and 2-mm silicagel 60 F_{254} chromatoplates for preparative separations, using $CHCl_3$-MeOH (9:1).

PLANT MATERIAL.—*D. serratifolia* var. *montana* twigs were collected near the river Peu-Peu (Lautaro, Temuco, Chile) in November (Spring) 1980. Voucher specimens have been deposited in the herbaria of the Natural History Museum in Santiago, Chile.

EXTRACTION AND FRACTIONATION.—Powdered, dried twigs (3 kg) of *D. serratifolia* var. *montana* were extracted successively with light petroleum and EtOH. Concentration of the EtOH extract in vacuo afforded a residue which was stirred with aqueous HCl. The resulting suspension was filtered and the filtrate washed with $CHCl_3$. The acid solution was subsequently basified with NH_4OH to pH 9.0 and extracted with $CHCl_3$ to afford the alkaloid mixture (3.7 g). This material showed by tlc two intense chromatographic spots.

1,2-DIMETHOXY-11-HYDROXYAPORPHINE.—Repeated preparative tlc of the alkaloid mixture (500 mg) afforded an amorphous material (150 mg), mp 230-231° from EtOH; $[\alpha]^{20}D$ +244 (0.037, $CHCl_3$); λ max (EtOH) 220 (log ε 4.42), 265 (4.12) and 270 nm (4.15); λ max (EtOH+NaOH) 307, and 337 nm; ^{1}H-nmr: δ (60 MHz, $CDCl_3$), 2.53 (S, 3H, N-CH_3), 3.55 (S, 3H, OCH_3), 3.88 (S, 3H, OCH_3), 6.66 (S, 1H, H-3), and 6.8-7.2 ppm (m, 3H, H-8, H-9 and H-10); high resolution ^{1}H-nmr [300 MHz, (DMSO-d_6 and DMSO-d_6+NaOD)] see Table 1; hrms [*m/z*; composition (%)] 311.1494, $C_{19}H_{21}NO_3$ (43%); 310.1402, $C_{19}H_{20}NO_3$ (30%); 296.1279, $C_{18}H_{18}NO_3$ (38%); 280.1351, $C_{18}H_{18}NO_2$ (48%).

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LITERATURE CITED

1. O.A. Mascaretti, V.M. Merkuza, G.F. Ferrano, E.A. Rúveda, C.J. Chang, and E. Wenkert, *Phytochemistry*, **11**, 1133 (1972).
2. V.M. Merkuza, M.G. Sierra, O.A. Mascaretti, E.A. Rúveda, C.J. Chang, and E. Wenkert, *Phytochemistry*, **13**, 1279 (1974).
3. P. Pacheco, S.M. Albónico, and M. Silva, *Phytochemistry*, **12**, 954 (1973).
4. M. Silva, D.S. Bahkuni, P.G. Sammes, M. Pais, and F.X. Jarreau, *Phytochemistry*, **13**, 861 (1974).
5. R. Tschesche, D. Hillebrand, and J.R.C. Bick, *Phytochemistry*, **19**, 1000 (1980).
6. S. Panichanum and I.R.C. Bick, *J. Nat. Prod.*, **45**, 777 (1982).
7. R. Torres, F. delle Monache, and G.B. Marini Bettolo, *J. Nat. Prod.*, **42**, 430 (1979).
8. M. Escalante, *Bol. Soc. Argentina Bot.*, **1**, 209 (1946).
9. H. Guinaudeau, M. Leboeuf, and A. Cavé, *Lloydia*, **38**, 275 (1975).
10. H. Guinaudeau, M. Leboeuf, and A. Cavé, *J. Nat. Prod.*, **42**, 325 (1979).
11. H. Guinaudeau, M. Leboeuf, and A. CAvé, *J. Nat. Prod.*, **46**, 761 (1983).
12. M. Shamma, S.Y. Yao, B.R. Pas, and R. Charubala, *J. Org. Chem.*, **36**, 3253 (1971).
13. K.G.R. Pachler, R.R. Arndt, and W.M. Baarschers, *Tetrahedron*, **21**, 2159 (1965).

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