ALKALOIDS FROM *DISCARIA SERRATIFOLIA*

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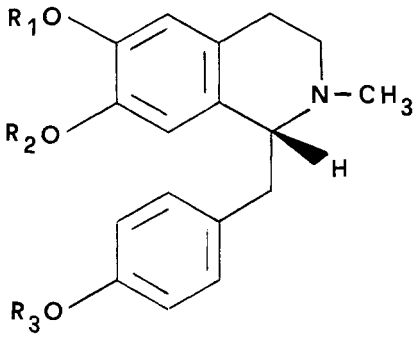
Some South American *Discarias* (Rhamnaceae) were investigated for their secondary metabolites, and the presence of alkaloids, triterpenes, flavonoids, fatty alcohols and organic acids was established (1–5). In the course of our research on Chilean plants, we examined the aerial parts of *Discaria serratifolia*, a shrub growing in the surroundings of Catillo (provincia de Conceptión, VII Región, Chile).

In this communication, we report the isolation and structure determination of four benzylisoquinoline bases. Two of these alkaloids are rather unusual as natural products, and this is the first time their isolation from this family has been reported.

The first, R(−)-*O*-methylarmepavine (**1**), had previously been obtained by synthesis (6) and as one of the components of bisbenzylisoquinoline alkaloids cleavage products (7). Moreover, only recently, it has been isolated as a secondary metabolite from *Xylopia pancheri* (Annonaceae) (8). The dextrotoratory isomer has been isolated from *Magnolia acuminata* (Magnoliaceae) (9).

The second, R(−)-*N*-demethylcollettine (**2**), was also isolated from *Xylopia pancheri*, although its quaternary derivative, colletine, was reported in 1967 from an Argentine Rhamnaceae, *Colletia spinosissima* (10).

The other two alkaloids, R(−)-armepavine (**3**) and R(−)-*N*-methylcoclaurine (**4**) are common bases described in many species, including Chilean Discarias (3).



1 $R_1=R_2=R_3=CH_3$
2 $R_1=R_3=CH_3$, $R_2=H$
3 $R_1=R_2=CH_3$, $R_3=H$
4 $R_1=CH_3$, $R_2=R_3=H$

EXPERIMENTAL[2]

PLANT MATERIAL.—*Discaria serratifolia* (Vent.) Benth et Hook. var. *discolor* (Hook.) Escalante was collected in December (summer), 1974, near Catillo (provincia de Concepción, vii Región, Chile). A voucher specimen was deposited in the herbarium of the Museo Nacional de Historia Natural, Santiago de Chile.

EXTRACTION AND ISOLATION.—Air-dried leaves and stems (4 kg) finely ground were extracted successively with petroleum ether and 95% ethanol. Upon concentration to dryness under vacuum, the ethanol extract yielded a brownish residue, which was suspended in 2N HCl. The acidic extract

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[2]Elemental analyses are consistent with the empirical formulas. Melting points were performed in a Kofler apparatus and are uncorrected; uv spectra were recorded on a Beckman model Acta III spectrophotometer; ir spectra were determined on a Perkin Elmer model 247 spectrophotometer; pmr spectra were determined on a Varian model EM 360 instrument, with TMS as internal standard; mass spectra were run on a LKH-9000 S mass spectrometer; optical rotations were measured on a Perkin-Elmer 141 automatic polarimeter.

was basified with ammonium hydroxide (25%) and extracted with chloroform. The chloroform solution afforded 2.8 g of alkaloidal mixture after concentration *in vacuo*. That mixture was separated through a column of silica gel (400 g) prepared in chloroform and eluted with chloroform and then chloroform-methanol (methanol, 0.5 to 5%). Four fractions, A, B, C and D were collected on the basis of tlc.

R(−)-*O*-methylarmepavine (**1**).—Fraction A (250 mg) was rechromatographed over a small column of silica gel (10 g). The chloroform eluates yielded an oil which crystallized from petroleum ether mp 65° [lit. (8) mp 65°]; $[\alpha]_D^{20}$ D−81° (c 1.2, $CHCl_3$); λmax (log ε) (EtOH), 227 and 282 nm (4.14 and 3.76); ir, ν max ($CHCl_3$), 2850 cm^{-1}; pmr ($CDCl_3$), δ 2.53 (s, 3H, NCH_3), 3.55 (s, 3H, OCH_3), 3.77 (s, 3H, OCH_3), 3.83 (s, 3H, OCH_3), 6.00 (s, 1H, aromatic), 6.56 (s, 1H, aromatic), 6.70–7.13 (m, A_2B_2 system, 4H, aromatics); ms, *m/e* 327 (M^+, $C_{20}H_{25}NO_3$, 207 (58), 206 (100), 191 (29), 190 (38), 162 (13), 132 (2), 121 (7). This compound showed physical and spectral data identical to the product obtained from *O*-methylation of authentic R-(−)-armepavine with ethereal diazomethane, and the pmr spectrum agreed with that reported by Tomita (11).

R-(−)-Demethylcolletine (**2**).—Fraction B (125 mg) was purified through a column of silica gel (15 g). Pure alkaloid was obtained as an oil (26 mg): $[\alpha]^{20}$D−74° (c 0.7, MeOH); λmax (log ε) (EtOH), 226 and 283 nm (4.03 and 3.74), bathochromic shift in basic solution to 299 nm; ν max ($CHCl_3$), 3550 and 2850 cm^{-1}; pmr ($CDCl_3$), δ 2.43 (s, 3H, NCH_3), 3.74 (s, 3H, OCH_3), 3.80 (s, 3H, OCH_3), 6.30 (s, 1H, aromatic), 6.50 (s, 1H, aromatic), 6.52–7.30 (m, A_2B_2 system, 4H, aromatics). Pmr data agreed with published data (8, 11); ms, *m/e* 313, (M^-, $C_{19}H_{23}NO_3$, 5), 193 (25), 192 (100), 177 (18), 176 (5), 148 (3), 121 (6). Reaction with ethereal diazomethane gave a compound identical with R-(−)-*O*-methylarmepavine (tlc, uv, ir, pmr and specific rotation).

R-(−)-Armepavine (**3**).—Reextraction of fraction C (850 mg) yielded 550 mg of a white product which was recrystallized from ethyl acetate, mp 145–146° [lit (3) mp 136°]; $[\alpha]^{20}$D−105° (c 0.9, MeOH); λmax (log ε) (EtOH), 229 and 284 nm (4.18 and 3.74), bathochromic shift to 290 nm in basic solution; ν max ($CHCl_3$), 3600 and 2850 cm^{-1}; pmr ($CDCl_3$), δ 2.53 (s, 3H, NCH_3), 3.56 (s, 3H, OCH_3), 3.80 (s, 3H, OCH_3), 5.93 (s, 1H, aromatic), 6.59 (s, 1H, aromatic), 6.60–6.97 (m, A_2B_2 system, 4H, aromatics), ms, *m/e* 313 (M^-, $C_{19}H_{23}NO_3$, 0.2), 207 (12), 206 (100), 191 (6), 190 (9), 162 (5), 132 (2), 107 (2). Comparison of **3** with authentic R-(−)-armepavine (tlc, uv, ir, pmr and specific rotation) established its identity.

R-(−)-*N*-Methylcoclaurine (**4**).—Fraction D (380 mg) crystallized from chloroform yielded 200 mg of white needles, mp 181–182° [lit (4) mp 181–183°]; $[\alpha]^{20}$D−92° (c 0.5, MeOH); λ max (log ε) EtOH), 227 and 284 nm (4.21 and 3.80), bathochromic shift in basic solution to 299 nm; ν max ($CHCl_3$), 3600 and 2850 cm^{-1}; pmr ($CDCl_3$), δ 2.46 (s, 3H, NCH_3), 3.80 (s, 3H, OCH_3), 5.90 (broad s, 2H, 2 OH), 6.50 (s, 1H, aromatic), 6.60–7.00 (m, A_2B_2, 4H, aromatics); ms, *m/e* 299 (M^-, $C_{18}H_{21}NO_3$, 0.2), 193 (4), 192 (100), 178 (4), 177 (6), 176 (0.4), 148 (2), 107 (2). Physical and spectral data were identical with those of authentic R-(−)-*N*-methylcoclaurine.

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