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SCIADENINE, A NEW BISBENZYLISOQUINOLINE ALKALOID FROM SCIADOTENIA TOXIFERA

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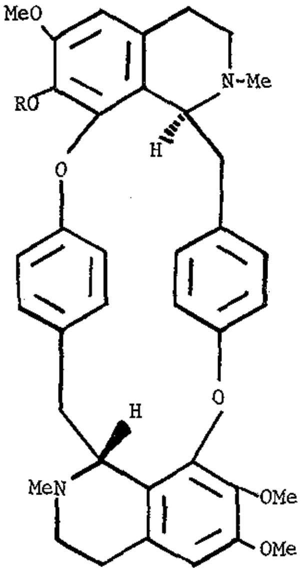
Sciadenine, a new alkaloid from Sciadotenia toxifera Krukoff and A. C. Smith (Menispermaceae), has been assigned the head-to-tail bisbenzylisoquinoline structure I.

The genus Sciadotenia (Menispermaceae) has not hitherto been the subject of any phytochemical investigation. As part of a broad study of the alkaloids of the South American Menispermaceae, we now report the isolation and structure determination of the new bisbenzylisoquinoline alkaloid sciadenine (I) from Sciadotenia toxifera Krukoff and A. C. Smith.

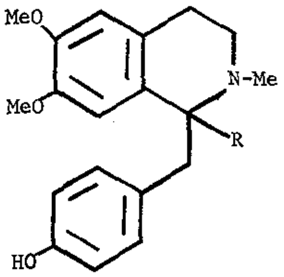
Countercurrent fractionation of the bases from S. toxifera followed by recrystallization from chloroform-acetone, gave colorless needles of sciadenine (I), mp 254-256° (decomp.), $[\alpha]_D^{30} = -43^\circ$ (c = 1.22 pyridine), $[\alpha]_D^{25} = +15^\circ$ (c = 1.185, $CHCl_3$), uv λ_{max}^{EtOH} (log ϵ) 283 nm (3.47), and 277 (3.48). The mass spectrum of I indicates the composition $C_{37}H_{40}N_2O_6$, showing a molecular ion peak at m/e 608, and fragment ions at m/e 607, 312 (base peak), 298, 204, 191 and 190. The fragmentation pattern indicates that I is derived from coclaurine units joined head to tail 1). The nmr spectrum of I ($CDCl_3$) showed three methoxyls at δ 3.40 (3 H), 3.80 (3 H), and 3.82 (3 H), two N-methyls at δ 2.23 (3 H), and 2.47 (3 H) and ten aromatic protons in the range δ 5.70 ~ 6.85. Treatment of I with diazomethane afforded the optically inactive O-methyl derivative (II), mp 262-263° (decomp.), which showed the molecular ion peak at m/e 622 and a strong cleavage ion at m/e 312 (base peak) in the mass spectrum; four methoxy groups at δ 3.41 (6 H) and 3.83 (6 H) and two N-methyl groups at δ 2.50 (6 H) were observed in its nmr spectrum.

Reductive cleavage of II with sodium in liquid ammonia gave only *dl*-armepavine (IV), which was identical with an authentic sample 2). Treatment of I with diazoethane afforded the O-ethyl derivative (III), mp 233-234° (decomp.), the nmr spectrum of which showed an O-ethyl group at δ 0.83 (3 H, t, J = 7 Hz) and 3.66 (2 H, q, J = 7 Hz), three methoxy groups at δ 3.41 (3 H) and 3.80 (6 H), and two N-methyl groups at δ 2.47 (6 H). The mass spectrum showed the expected molecular ion peak at m/e 636 and major fragment ions at m/e 326, 312, 204 and 190.

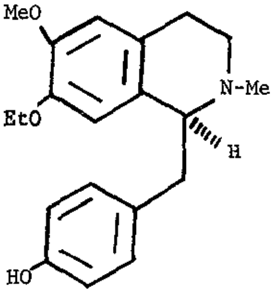
Reductive cleavage of III with sodium in liquid ammonia gave a mixture of R-armepavine (V) and S-7-ethoxy-1,2,3,4-tetrahydro-1-(4-hydroxybenzyl)-6-methoxy-2-methylisoquinoline (VI), which could not be separated by tlc or recrystallization. Treatment of the above mixture with *l*-(-)-mandelic acid gave colorless needles, mp 172-174° (EtOH), $[\alpha]_D^{25} = +48°$ (c = 0.9, MeOH). Basification of an aqueous solution of the above salt afforded VI, mp 129-130° (acetone-Et_2O-hexane) [Ref. 3) mp 130-131°], $[\alpha]_D^{30} = +71°$ (c = 0.62, $CHCl_3$) [Ref. 3) $[\alpha]_D^{17} = +83°$ (c = 0.72, $CHCl_3$)]. The nmr spectrum showed the O-ethyl group at δ 1.32 (3 H, t, J = 7 Hz), 3.77 (2 H, q, J = 7 Hz), N-methyl group at δ 2.51 (3 H), methoxy group at δ 3.82 (3 H), C_8-proton at δ 6.08, C_5-proton at δ 6.56, $C_{3'}$ and $C_{5'}$-protons at 6.60 (d, J = 8 Hz), and $C_{2'}$ and $C_{6'}$-protons at δ 6.90 (d, J = 8 Hz). The above nmr values indicate that VI is a 7-ethoxy-6-methoxy substituted isoquinoline derivative4). The mother liquor was treated with d-(+)-mandelic acid in the usual way to give a salt which afforded crystalline R-armepavine (V), which was identical with an authentic sample.5)



(I) R = H
(II) R = Me
(III) R = Et



(IV) R = ∿ H
(V) R = ◀ H



(VI)

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The plant material (stem of the lower part of the vine with bark on) used in this investigation was collected by Sr. Jose Schunke in Peru (San Martin: Mariscal Cáceres, Tocáche Nuevo) in 1971. The vouchers have been deposited in New York Botanical Garden, Field Museum of Natural History, Chicago, and many other institutions. This collection was cited in Phytologia 25:35. 1972.

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