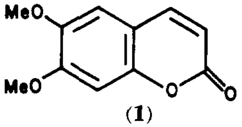
Journal of Natural Products
Vol. 47, No. 1, pp. 170-171, Jan-Feb 1984

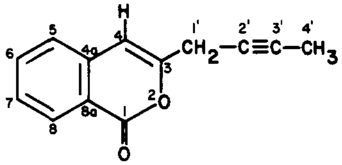
CAPILLARIN AND SCAPORONE FROM *ARTEMISIA LAMPROCAULOS*

AYHAN ULUBELEN, SEVIL ÖKSÜZ,
Faculty of Pharmacy, University of Istanbul, Istanbul, Turkey
YAGOUP AYNEHCHI, M.H. SALEHI SORMAGHI, A. SOURI,
Faculty of Pharmacy, University of Tehran, Tehran, Iran
and TOM J. MABRY*
Department of Botany, University of Texas at Austin, Austin, TX 78712

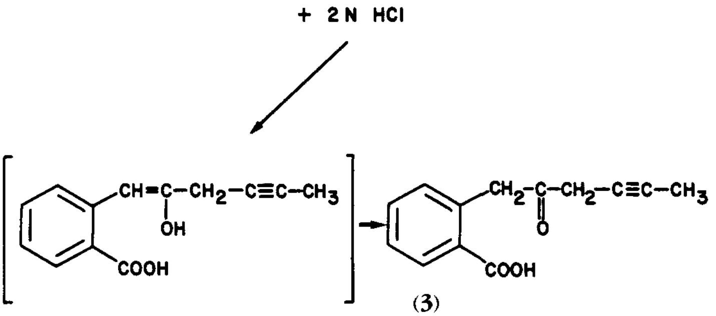
In this first chemical investigation of *Artemisia lamprocaulos* Rechinger (Compositae), we report the isolation of scaporone (**1**) as well as the rare aromatic acetylenic compound capillarin (**2**), a substance previously isolated from *Chrysanthemum frutescens* L. and *Artemisia dracunculus* L. (1, 2) and later found in *Anthemis fuscata* Brot. (3). Because little spectral information was presented previously, we discuss here the ^{1}H-nmr data for capillarin and provide unreported ^{13}C-nmr data.



(**1**)



(**2**)



(**3**)

EXPERIMENTAL[1]

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded on the following instruments: ^{1}H-nmr in NT-200 MHz instrument; ^{13}C-nmr, Brücker WH-90; ms, DuPont-490; uv, Varian Techtron 635; and ir, Nicolet 7000 FT-IR.

PLANT MATERIAL.—*Artemisia lamprocaulos* was collected near Polur, 70 km east of Tehran, Iran, in September 1980, by Y. Aynehchi. A voucher specimen (No. 117) is deposited in the Herbarium of Faculty of Pharmacy, University of Tehran.

ISOLATION OF THE COMPOUNDS.—Air-dried, powdered leaf material (2.7 kg) was extracted with MeOH. Upon evaporation of the MeOH, 240 g of residue were obtained. A 75-g aliquot was chromatographed over a silica gel column.

Scoparone (**1**).—Yield 700 mg, mp 145° [Lit. 144-146°; (4)]. ^{1}H-nmr ($CDCl_3$, TMS): δ 3.90 (3H, s) and 3.94 (3H, s) for the OCH_3 groups; 7.65 (1H, d, J=9 Hz, H-4); 6.3 (1H, d, J=9

---

[1] Full details of the extraction and isolation of the compounds are available from the senior author on request.

Hz, H-3); and 6.85 (2H, s, H-5 and H-8). Ms, *m/z*: M^+, 206 (100%); M-15, 191 (50%); M-28, 178 (18%).

Capillarin (**2**).—Yield 237 mg, mp 120°, uv (MeOH) 322, 268, 259, 250 (sh), 237, 227, 200 nm [Lit. (2) recorded in ether: 321, 275, 264, 255, 239, 227 nm]. Ir (in KBr) 2950, 1725, 1680, 1600, 1570, 1480, 1360, 1320, 1170, 1050, 1020, 750, and 680 cm^{-1}. Although very low intensity bands for the acetylenic function were previously reported (2), even with Fourier transform ir, no absorption could be observed in the 2250 cm^{-1} region of the spectrum in accord with the almost symmetrical nature of the triple bond. ^{1}H-nmr (in $CDCl_3$, TMS): δ 1.82 (3H, t, J=3 Hz, 4'-CH_3); 3.38 (2H, m, 1'-CH_2); 6.55 (1H, d, J=1 Hz, H-4); 8.18 (1H, brd, J=8 Hz, H-8); 7.62 (1H, dt, J=8 Hz and 2 Hz, H-6); 7.40 (1H, brt, J=8 Hz, H-7); and 7.34 (1H, brd, J=8 Hz, H-5). The assignments for the aromatic proton signals were based on spin-decoupling experiments in $CDCl_3$ as well as benzene-d_6; in the latter solvent, slightly better resolution of the signals was achieved. The relationship between the methyl and methylene group was also established by spin-decoupling experiments. When the methylene signal at δ 3.38 was irradiated, the methyl triplet (J=3 Hz) collapsed to a sharp singlet. This is a typical interaction between a methyl and methylene over one acetylenic bond (5). The same irradiation also caused the H-4 doublet (J=1 Hz) at δ 6.55 to collapse to a singlet. Reciprocal irradiation of the signal at δ 6.55 simplified the methylene multiplet to a quartet (J=3 Hz). ^{13}C-nmr ($CDCl_3$, TMS): 162.6 (s) lactone carbonyl; 153.9 (s) C_3; 137.4 (s) C_{8a}; 134.9 (d) C_8; 129.7 (d) C_7; 128.05 (d) C_6; 125.5 (d) C_5; 120.2 (s) C_{4a}; 103.2 (d) C_4; 79.9 (s) $C_{3'}$; 71.8 (s) $C_{2'}$; 23.8 (t) $C_{1'}$; 3.67 (q) $C_{4'}$. Ms, M^+, *m/z* 198 (100%); M-15, 183 (2%); M-28, 170 (10%); M-29, 169 (10%); M-C_4H_5, 145 (40%); $C_4H_5{}^+$, 89 (84%); $C_4H_5{}^+$, 63 (24%).

ACID TREATMENT OF CAPILLARIN.—The ring opening of capillarin was performed with 2 N HCl in order to distinguish its isocoumarin skeleton from that of a coumarin. The reaction afforded the expected keto-acid (**3**). The ir of **3** showed a small OH peak at 3420 cm^{-1} and bands for two carbonyl groups at 1725 and 1705 cm^{-1} for the free acid and the ketone group. The nmr showed an extra CH_2 group at δ 3.65 ppm, while the original CH_2 quartet shifted to δ 2.6 ppm; ms gave an M^+ peak at *m/z* 216.

ACKNOWLEDGMENTS

The work at the University of Texas was supported by NIH (grant HDO 4488) and by the Robert A. Welch Foundation (grant F-130). The work in Turkey was supported by the Faculty of Pharmacy, University of Istanbul.

LITERATURE CITED

1. F. Bohlmann and K.M. Kleine, *Chem. Ber.*. **95**, 39 (1962).
2. F. Bohlmann, H. Bornowski, and C. Arndt, *Fortschr. Chem. Forsch.*. **4**, 138 (1962).
3. F. Bohlmann and C. Zdero, *Chem. Ber.*. **104**, 1375 (1971).
4. F.E. King, J.R. Housley, and T.J. King, *J. Chem. Soc.*. 1392 (1954).
5. F. Bohlmann, T. Burkhardt, and C. Zdero, "Naturally Occurring Acetylenes," Academic Press, London, 1973, p. 23.

Received 7 January 1983