Journal of Natural Products
Vol. 48, No. 5, pp. 846-847, Sep-Oct 1985

(−)-NORFUMARITINE: A NEW SPIROBENZYLISOQUINOLINE ALKALOID FROM *FUMARIA KRALIKII*

MARC D. COLTON, HÉLÈNE GUINAUDEAU,[1] MAURICE SHAMMA,

Department of Chemistry, The Pennsylvania State University, University Park, Pennsylvania 16802

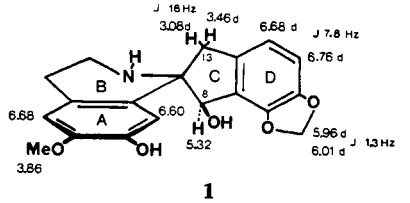
MUSTAFA A. ÖNÜR, and TEKANT GÖZLER

Faculty of Pharmacy, Ege University, Bornova, Izmir, Turkey

We have investigated the alkaloidal content of *Fumaria kralikii* Jordan (Fumariaceae) of Turkish origin (1), from which we have isolated the new phenolic spirobenzylisoquinoline (−)-norfumaritine (**1**), $C_{19}H_{19}NO_5$. Although more than thirty spirobenzylisoquinolines are known (2), (−)-norfumaritine (**1**) is only the second nor-alkaloid of this group to have been found. The first norspirobenzylisoquinoline characterized is actually (+)-lederine, which was obtained from *Corydalis ledebouriana* and *Dicentra peregrina* (Fumariaceae) and which bears two oxygenated substituents on ring C (3).

The 200 MHz nmr spectrum ($CDCl_3$) of (−)-norfumaritine is summarized in expression **1**. A one-proton singlet at δ 5.32 denotes H-8, while two doublets at δ 3.08 and 3.46, with a total area of two protons, represent the C-13 methylene group. The mass spectrum shows molecular ion *m/z* 341 (22%) and base peak *m/z* 178 representing rings A and B of the molecule.

These data suggested that the new alkaloid corresponded to norfumaritine, especially since the known (−)-fumaritine was also present in the plant. Indeed, Eschweiler-Clarke *N*-methylation of **1** provided (−)-fumaritine.



1

(−)-Norfumaritine (**1**) like all other known naturally occurring spirobenzylisoquinoline bears a methylenedioxy substituent on ring D.

EXPERIMENTAL

PLANT COLLECTION AND EXTRACTION.—*F. kralikii* (800 g, dry leaves) was collected in Burdur, near Bağsaray, Turkey, on April 15, 1981, with the assistance of Dr. M.A. Önür. A sample, No. 472, was deposited in the herbarium of the Faculty of Pharmacy, Ege University. The plant material was extracted with cold EtOH to give 135 g of ethanolic extracts. These extracts were stirred in 5% HCl. The aqueous solution was washed with $CHCl_3$ and then basified with NH_4OH. The basic solution was extracted with $CHCl_3$. The organic layer was separated and the solvent evaporated to furnish a residue of 2.2 g of crude alkaloids. This was chromatographed on silica gel, elution of the column being with $CHCl_3$-MeOH-NH_4OH (97:3:0.5 v/v). Final purification was by tlc on silica gel plates, using the system $CHCl_3$-cyclohexane-MeOH-NH_4OH (50:40:10:1 v/v). A total of 32 mg of (−)-norfumaritine (**1**) was thus obtained, together with 200 mg of (−)-fumaritine.

(−)-NORFUMARITINE (**1**).—$[\alpha]^{25}D$ −16° (c 0.12, $CHCl_3$); uv λ max (MeOH) 238, 240 sh, 287 nm (log ε 4.65, 3.89, 3.96) and λ max (MeOH+OH^-) 211, 245 sh, 293 nm (log ε 4.81, 3.99, 3.83); ms *m/z* 341 (M^+) (22), 322 (9), 312 (6), 294 (5), 282 (6), 191 (12), 178 (100); amorphous material.

N-METHYLATION OF **1**.—(−)-Norfumaritine (2 mg) was dissolved in aqueous formaldehyde (0.5 ml) and HCOOH (0.5 ml), and the solution refluxed for 4 h. Workup provided (−)-fumaritine, $[\delta]^{25}D$ −35° (c 0.12, MeOH), identical with an authentic sample.

ACKNOWLEDGMENTS

This research was supported by NSF International Cooperative Grant INT-8216876.

[1]Permanent address: Faculté de Médecine et de Pharmacie, Université de Limoges, 87025 Limoges Cedex, France; and UA 498, CNRS, Centre d'Etudes Pharmaceutiques, 99290 Chatenay-Malabry, France.

LITERATURE CITED

1. M. Popova, L. Dolejs, V. Šimanek, and V. Preininger, *Int. Conf. Chem. Biotechnol. Biol. Act. Nat. Prod., Proc., 1st*, **3**, 95 (1981); *Chem. Abstr.*, **97**: 52537c (1982).
2. R.M. Preisner and M. Shamma, *J. Nat. Prod.*, **43**, 305 (1980).
3. I.A. Israilov, F.M. Melikov, M.S. Yunusov, D.A. Muraveva, and S. Yu. Yunusov, *Khim. Prir. Soedin.*, 540 (1980); *Chem. Nat. Compds.*, **16**, 392 (1980); *Chem. Abstr.*, **94**: 47570s (1981).

Received 23 May 1985