Chemistry of Natural Compounds, Vol. 37, No. 3, 2001

ALKALOIDS of *Thalictrum orientale*

F. Z. Erdemgil,[1] M. V. Telezhenetskaya,[2]
M. G. Levkovich,[2] N. D. Abdullaev,[2]
N. Kirimer,[1] and K. H. C. Baser[1]

UDC 547.944/945

We have investigated the alkaloid composition of *Thalictrum orientale* Boiss. (Ranunculaceae) which had not been studied previously. The plant material subjected to this study was collected at flowering stage in May 1995 around Nigde: Ulukisla in Turkey. It is a tiny plant, which grows out of crevices on rocky slopes and has a narrow distribution [1].

Extraction of the dried underground parts was carried out following the method described earlier [2] and the extract was fractionated to yield ether-soluble non-phenolics (A), ether-soluble phenolics (B), chloroform soluble bases (C), and quaternary alkaloids (D).

Ether-soluble non-phenolic bases (A) were separated on an Alumina column to isolate individual base 1. UV and MS data (EtOH, λ_{max} 284 nm, M^+ 608) suggested it to be a bisbenzylisoquinoline.

The PMR spectrum of I ($CDCl_3$, δ values) contained signals for two N-methyl groups at 2.32 and 2.62 ppm and three methoxyl groups at 3.92, 3.76, and 3.34 ppm. This allowed us to assign the structure to berbamine type bisbenzylisoquinolines. A positive optical rotation value indicated SS configuration of the asymmetric centers at C-l and C-1′ [5]. In the MS of base I, fragment ions at *m/z* 382 and 191 show the loss of phenol hydroxyl group in the isoquinoline part [4]. These data allowed us to consider that base 1 could be fangchinoline. However, due to lack of reference material for comparison and to the great difference in the melting points of base 1 and fangchinoline (154–156°C and 237°C [6]) we decided to undertake more detailed PMR studies on base 1.

The PMR spectrum of base I shows signals for ten aromatic protons between 6.00 and 7.40 ppm. Signals for twelve methylene and two methine protons are detected in the region 2.30–4.00 ppm as an unresolved spectra, covered partly by methyl signals. By double resonance techniques, it was possible to detect all aromatic and methyl protons. Three singlets of the aromatic protons at 6.06, 6.29, and 6.52 ppm correspond to protons at C-8′, 5, and 5′. The positions of two methoxyls at 6 and 6′ were confirmed by NOE experiments of signals at 3.34 and 3.76 ppm: 6-OCH_3-H-5=12% and 6′-OCH_3-H-5′=12%. Two proton singlet at 6.86 ppm corresponding to two *orto*-protons H-13 and H-14 was confirmed by Overhauser effect of 6%. These protons with the same chemical shift do not display a steady spin-spin interaction coupling and Overhauser effect is accounted only for half value of the signal for H-13 proton (12%).

In this experiment, greater Overhauser effect (16%) for singlet at 6.06 ppm (H-8′) was encountered. However, the 12-methoxyl signal covered by C-l′ methine proton signal also has Overhauser effect with C-8′ aromatic proton and therefore 16 % NOE is caused by the sum of their action. Since NOE of 16 % cannot be caused only by the methine proton, C-12 methoxyl group should, in all probability, contribute to this observed effect. Consequently, the confomation of the macrocycle indicates near space arrangement of C-12 methoxyl and C-8′ aromatic proton.

Third proton at C-10 of ring C appeared as a badly resolved doublet with $J \leq 1.2$ Hz at 6.57 ppm. Double resonance on the signal of the C-14 proton confirmed its position. By recording the PMR spectrum in chloroform: pyridine (1: 1), the ABC system of protons C-14, C-13, and C-10 with chemical shifts at 7.00, 6.78, and 6.73 ppm was proven. Spin-spin couplings of C-14-C-13 with ^3J = 8.2 Hz and H-14-H-10 with ^4J = 1.2 Hz were observed.

Protons of ring C′ were observed as four one proton doublet of doublets with well expressed CSSI at 6.32, 6.91, 7.13, and 7.34 ppm for H-14′, H-13′, H-11′, and H-10′, respectively. CSSI values for these protons were: ^3J = 8.2 Hz for H-10′-H-11′, ^4J = 2.4 Hz for H-11′-H-13′, ^3J = 8.4 Hz for H-13′-H-14′ and ^4J = 2.1 Hz for H-14′-H-10′. Methyl groups, resonating at 2.32 and 2.62 ppm, are connected to nitrogens at N-2 and N-2′.

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1) Anadolu University, Medicinal and Aromatic Plant and Drug Research Center, 26470, Eskisehir, Turkey; 2) Institute of the Chemistry of Plant Substances, Uzbekistan Academy of Sciences, Republic of Uzbekistan. Published in Khimiya Prirodnykh Soedinenii, No. 3, pp. 251-252, May-June, 2001. Original article submitted June, 1, 2001.

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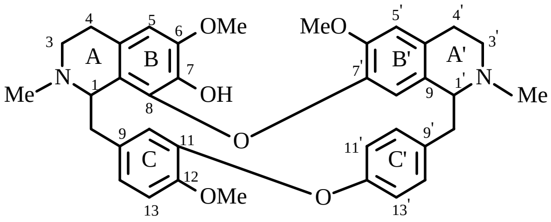

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Therefore, base 1 is assigned as fangchinoline (**1**). Fangchinoline was first isolated from the Chinese drug Han-fung-chi [7] and then, from some members of the family Menispermaceae such as *Stephania hernandifolia* [8], *S. tetrandra* [9], *Cyclea peltata* [10], *C. barbata* [11], *Cissampelos pereira* [12] and *Triclisia subcordata* [13] and from *Daphnandra* sp. (Monimiaceae) [11]. This is the first report of its occurence in the genus *Thalictrum*.

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