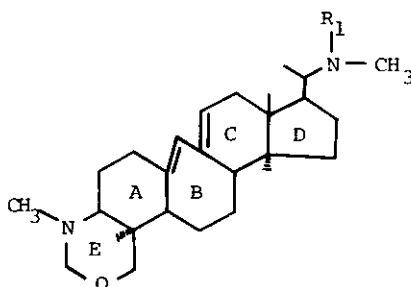


THE ISOLATION AND STRUCTURE OF "HARAPPAMINE"—A NEW ALKALOID FROM  
*BUXUS PAPILOSA*

Atta-ur-Rahman\* and Mehrun Nisa  
H.E.J. Research Institute of Chemistry  
University of Karachi, Karachi-32/Pakistan

**ABSTRACT**— A new alkaloid "harappamine" has been isolated from the leaves of *Buxus papilosa* which has been assigned structure (1).

*Buxus papilosa* (Buxaceae) is a plant which grows abundantly in the northern regions of Pakistan. A number of alkaloids have previously been reported from this plant.<sup>1-5</sup> In the previous communication we have reported the isolation of "moenjodaramine" (2) from the leaves of this plant which was found to have a novel pentacyclic skeleton bearing both a tetrahydrooxazine ring and a 9(10→19) *abeo*-diene system.<sup>6</sup> We now report the structure of a new and closely related alkaloid "harappamine" (1) from the leaves of the same plant.



- (1)  $R_1 = H$   
(2)  $R_1 = CH_3$

"Harappamine" was isolated by chromatography of the crude mixture of alkaloids on a neutral alumina column. A number of alkaloidal fractions were obtained, the "harappamine" containing fraction being eluted with 50% petroleum/60%  $CHCl_3$ .

The infra-red spectrum of the substance showed bands at  $3400\text{ cm}^{-1}$  (N-H),  $2840\text{ cm}^{-1}$  (C-H) and  $1650\text{ cm}^{-1}$  (C=C). The U.V. spectrum showed maxima at 238 and 246 nm and shoulders at 205 and 253 nm, characteristic of the presence of a 9(10→19) *abeo*-diene system.<sup>3</sup> The proton NMR spectrum ( $CDCl_3$ ) showed three singlets, corresponding to the three tertiary methyl groups at  $\delta$  1.03,  $\delta$  1.06 and  $\delta$  1.12. The secondary (C-21) methyl group resonated as a doublet at  $\delta$  0.72 ( $J=7.7\text{ Hz}$ ). Two singlets at  $\delta$  2.10 and  $\delta$  2.41 were assigned to the two  $N(CH_3)$  groups at C-20 and C-3 respectively. A set of AB doublets resonating at  $\delta$  3.24 and  $\delta$  3.82 were assigned to the C-29

methylene protons ( $J_{AB} = 10.6$  Hz), while another set of AB doublets centred at  $\delta$  3.57 and  $\delta$  4.42 ( $J_{AB} = 7.4$  Hz) were attributed to the methylene protons  $\alpha$ -to the C-3 nitrogen. The isolated olefinic proton at C-19 resonated as a singlet at  $\delta$  5.98, while a multiplet centred at  $\delta$  5.56 was ascribed to the C-11 olefinic proton. A comparison of the NMR spectrum of "harappamine" with that of "moenjodaramine" which has also been reported as a synthetic derivative by the French group,<sup>8</sup> showed the NMR spectra of the two substance were virtually identical, with "harappamine" containing one less N-methyl group than (2).

The mass spectrum of "harappamine" showed a molecular ion peak at  $m/z$  412.3454 corresponding to the formula  $C_{27}H_{44}N_2O$  (calcd. 412.3453). The substance showed a base peak at  $m/z$  58.0660 corresponding to the composition  $C_3H_8N^+$ . This may be attributed to the ion  $CH_3CH = \overset{+}{N}(H)-CH_3$  commonly encountered in alkaloids bearing a- $CH(CH_3)-NHCH_3$  grouping on ring D,<sup>7</sup> or to the ion  $CH_2 = \overset{+}{N}(CH_3)_2$  found in alkaloids bearing a- $N(CH_3)_2$  grouping on ring A.<sup>7</sup> Another peak at  $m/z$  57.0625 corresponded to the fragment  $CH_2 = \overset{+}{N}(CH_3)CH_2$ . A peak at  $m/z$  85.0887 was in accordance with the composition  $C_5H_{11}N$  (calcd. 85.0891) corresponding to the fragment  $CH_2-CH_2-CH = \overset{+}{N}(CH_3)_2$  formed by the cleavage of ring A along with the side chain. A peak at  $m/z$  71.0734 ( $C_4H_9N$ ) was consistent with the fragment  $CH_2-CH = \overset{+}{N}(CH_3)_2$  formed by cleavage of ring A accompanied by an intramolecular proton transfer.

In the light of above studies structure (1) is proposed for "harappamine".

#### REFERENCES

1. M. Ikram, G.A. Miana and F. Mahmud, Pak. J. Sci. & Ind. Res., 11(3), 253 (1968).
2. M. Shamma, V. St. Georgiev, G.A. Miana and F. S. Khan, Phytochemistry, 12, 2051 (1973).
3. F. Khuong-Huu, D. H. Genlier, M. M. Q. K. Huu, E. Stanislas and R. Goutarel, Tetrahedron, 22(10), 3321 (1966).
4. M. Ikram, G.A. Miana, F. Sultana and F. Mahmud, Pak. J. Sci. & Ind. Res., 11(4), 488 (1968).
5. Atta-ur-Rahman, S. Farhi, G.A. Miana, Mehrun Nisa and W. Voelter, (submitted for publication).
6. Atta-ur-Rahman, Mehrun Nisa & S. Farhi, Tetrahedron Letters (in press).
7. "Biochemical Applications of Mass Spectrometry" edited by G. R. Waller and O. C. Dermer, John Wiley and Sons, 783 (1980).
8. F. Khuong-Huu, M. M. Rene, R. Razafindrambao, A. Cave and R. Goutarel, C. R. Acad. Sc. Paris, (Series C), 558 (1971).

Received, 14th October, 1982