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A NEW PEPTIDE ALKALOID FROM *DISCARIA CRENATA*

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Key Word Index—*Discaria crenata*; Rhamnaceae; peptide alkaloids; crenatine A.

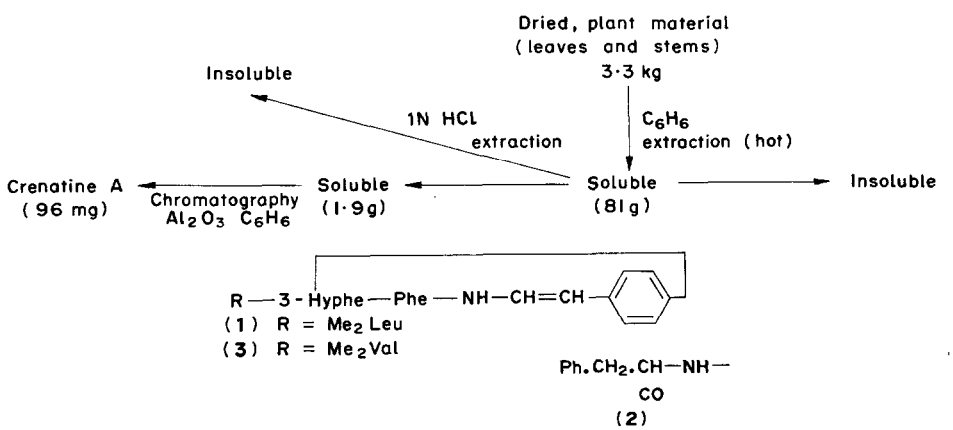
Abstract—The structure of a new peptide alkaloid, crenatine A isolated from *Discaria crenata*, has been elucidated.

INTRODUCTION

AS PART of a general screening programme of Chilean flora[1] the base and neutral fractions from *Discaria crenata* (Clos.) Regel. a member of the Rhamnaceae has been studied. In the previous report[2] the isolation of a new peptide alkaloid was described which had m.p. 223°; $[\alpha]_D$ − 292·58° ($CHCl_3$). The structure of this alkaloid, now referred to as crenatine A, has been elucidated.

RESULTS AND DISCUSSION

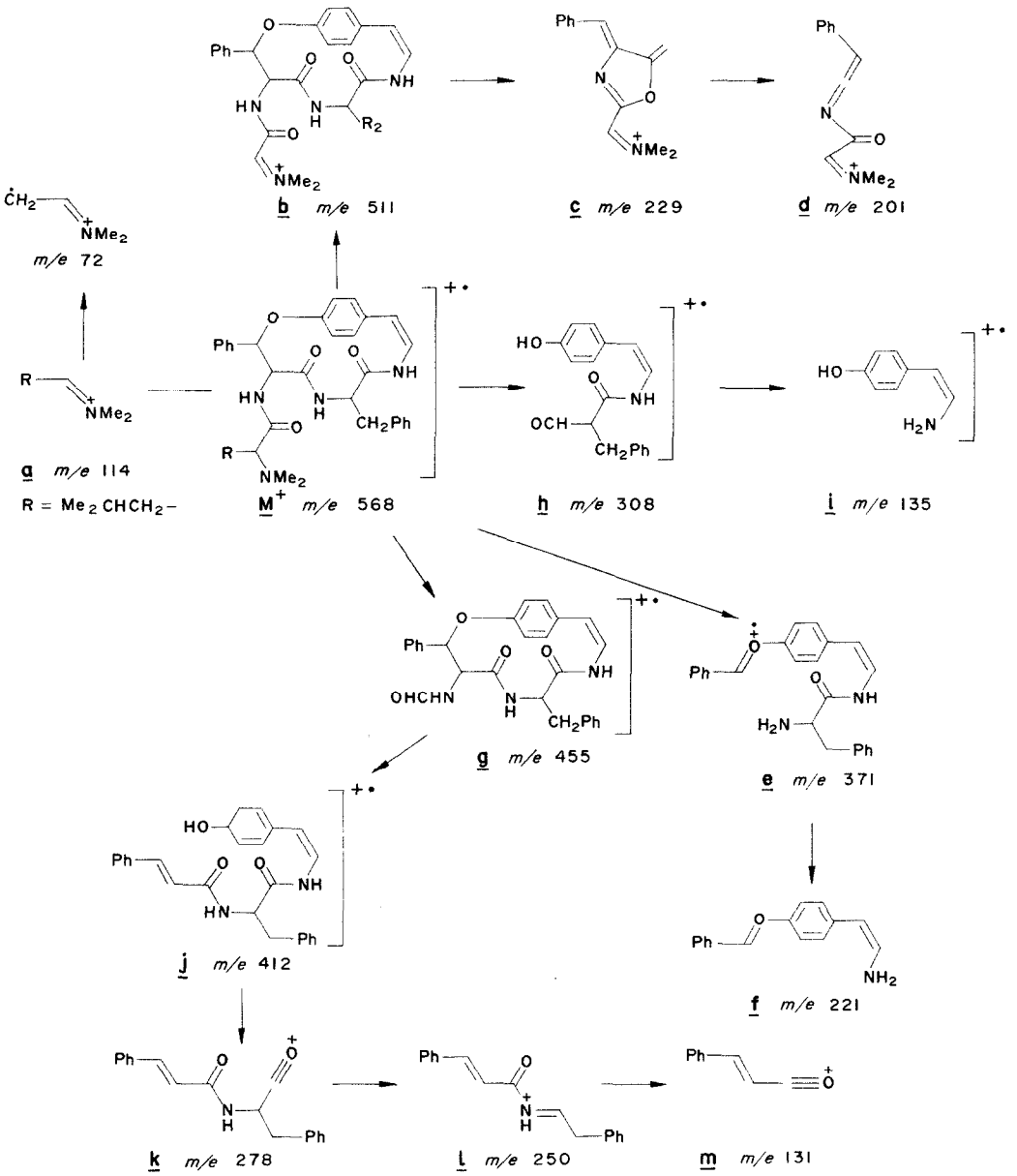
The alkaloid (96 mg from 3·3 kg dried plant material, see Scheme 1) showed M^+ 568·3022 (Calc. for $C_{34}H_{40}N_4O_4$ 568·3049). A detailed MS examination allowed a unique



SCHEME 1.

[1] For previous work see BHAKUNI, D. S., BITTNER, M., SILVA, M. and SAMMES, P. G. (1973) *Phytochemistry* **12**, 2777.

[2] PACHECO, P., ALBONICO, S. M. and SILVA, M. (1973) *Phytochemistry* **12**, 954.



SCHEME 2.

assignment to be made for crenatine A. The principal fragmentations observed are listed in Table 1, and the assignments are depicted in Scheme 2.[3] The base peak occurred at *m/e* 114, analysed as $C_7H_{16}N$. This gave a daughter ion at *m/e* 72, by loss of the elements of propene. This fragmentation pattern is encountered for *N*, *N*-dimethyl-leucine, but not for

[3] FEHLHABER, H. W. (1968) *Z. analyt. Chem.* **235**, 91.

TABLE 1. MASS SPECTRUM

Ion	%*	Formula	Ion	%*	Formula
568·3022	10	$C_{34}H_{40}N_4O_4$ (0·3049), parent ion.	229	10	$C_{13}H_{13}N_2O_2$
553·2817	15	$C_{33}H_{37}N_4O_4$ (0·2788)	224·1055	100	$C_{15}H_{14}NO$ (0·1075)
511·2373	20	$C_{30}H_{31}N_4O_4$ (0·2318)	201	10	$C_{12}H_{13}N_2O$
482	10	—	146·0607	150	C_9H_8NO (0·0606)
455	10	—	135	200	C_8H_9NO
412	15	$C_{26}H_{24}N_2O_3$	131†	—	C_9H_7O
371	15	$C_{24}H_{23}N_2O_2$	114·1286†	—	$C_7H_{10}N$ (0·1283), base peak
308	20	$C_{18}H_{16}N_2O_3$	72†	—	$C_4H_{10}N$
278	15	$C_{18}H_{16}NO_2$	71†	—	C_4H_9N
250	50	$C_{17}H_{16}NO$			

* Relative to the ion at *m/e* 224.

† Too strong for comparison with the ion at *m/e* 224; ratio of the base peak at 114 to 224:100:1. Spectrum obtained at 70 eV an AEI MS9 instrument.

isoleucine.[4] That the other aminoacids present in the structure were β-phenylserine and phenylalanine could be deduced from the presence of the ions *m* and Ph CH_2CH-NH_2 (*m/e* 120). The presence of the aryloxy unit in the alkaloid was indicated by the occurrence of the ion *m/e* 135. The exact structure of this unit, i.e. *p*-hydroxystyrylamine was confirmed by the chemical method previously described.[5] The mutual combination of the different units was elucidated using the other information from the MS (see the fragmentation sequence collated in Scheme 2); crenatine A therefore has structure (**1**). The NMR spectrum (100 M Hz) was fully consistent with this formula. The dimethylamino group showed up as a singlet ($CDCl_3$) at τ 8·43, showing appreciable shielding by the neighbouring phenyl group.[5] The geminal methyl groups of the *N,N*-dimethylleucine unit showed up as a double doublet (τ 9·17 and 9·22, *J* 7 Hz). An *ABX* system was detected at τ 7·4, 6·75 and 5·5 (J_{AB} 13·5 Hz, J_{AX} 9 Hz, J_{bx} 4 Hz), in agreement with the presence of the phenylalanyl residue (2); the methine proton was further coupled to the amide proton since deuterium exchange collapsed this proton to a double doublet (*J* 4, 9 Hz). One other α-amidoacid methine proton occurred in the region τ 5·5, which, with D_2O, collapsed to a doublet (*J* 6·5 Hz) and which was assigned to the β-phenylserine residue. A count of the aromatic and vinyl protons revealed the presence of 14–16 protons [required for (1), 16]. The IR spectrum of this compound showed ν_{max} ($CHCl_3$) 3400, 3300 (NH), 1685 and 1515 (amides), and 1615 and 1605 cm^{-1} (aromatic and C=C).

Crenatine A has not previously been described, but it is obviously closely related to the dimethylvaline analogue (3), integeressine.[6] The isolation of peptide alkaloids from a closely related plant, *Discaria longispina*, has recently been reported.[7]

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[4] For a review on peptide alkaloids and a discussion of their mass spectral behaviour see WARNHOFF, E. W. (1970) *Fort. Chem. Naturstoffe* **28**, 162; PAIS, M. and JARREAU, F. X. (1971) *Peptide Alkaloids in Chemistry and Biochemistry of Amino Acids, Peptides and Proteins* (WEINSTEIN, B., ed.), Vol. I, p. 157, Marcel Dekker, New York.

[5] TSCHESCHE, R., BEHRENDT, L. and FEHLHABER, H. W. (1969) *Chem. Ber.* **192**, 50.

[6] TSCHESCHE, R., RHEINGANS, J., FEHLHABER, H. W. and LEGLER, G. (1967) *Chem. Ber.* **100**, 3924.

[7] MASCARETTI, O. A., MERKUZA, V. M., FERRARO, G. E., RUVEDA, E. A., CHANG, C. J. and WENKERT, E. (1972) *Phytochemistry* **11**, 1133.