Table 1. NMR and MS data for β-spathulene.

<table>
<thead>
<tr>
<th>δ</th>
<th>No. of protons</th>
<th>Type</th>
<th>Hz</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.423*</td>
<td>1</td>
<td>d × d</td>
<td>≈109</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>0.755*</td>
<td>1</td>
<td>m</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>1.02*</td>
<td>3</td>
<td>s</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>1.05*</td>
<td>3</td>
<td>s</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>1.59</td>
<td>3</td>
<td>s</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>4.49*</td>
<td>2</td>
<td>bs</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
<tr>
<td>5.15</td>
<td>1</td>
<td>bs</td>
<td>—</td>
<td><img src="https://example.com/structure.png" alt="Structure" /></td>
</tr>
</tbody>
</table>

m/e = 159, 131, 105, 91 and 202 m/u.
* These peaks are also found in NMR of spathulanol.

Isolation of β-spathulene. After AgNO₃-Al₂O₃ column chromatography on the sesquiterpene hydrocarbon fraction, β-spathulene was isolated from the appropriate fraction by preparative GC over Carbowax 6000.

Dehydration of spathulanol to β-spathulene was done with pyridine·SOCl₂ using a procedure described previously.⁷

Spectroscopy: IR spectrum was run as a thin film (0.05 mm spacer). μ = 3.25, 3.30, 6.13, 7.29, 8.49, 9.67, 9.90, 10.32, 11.30, 12.55, 13.02 and 15.70 μ. The NMR was run as a 15% solution in CDCl₃ on a Varian Acograph 220 MHz spectrometer.


N-METHYLTYRAMINE FROM OPUNTIA CLAVATA*

RANDALL L. VANDERVEEN, LESLIE G. WEST and JERRY L. McLAUGHLIN

Department of Medicinal Chemistry and Pharmacognosy, School of Pharmacy and Pharmacal Sciences, Purdue University, West Lafayette, IN 47907, U.S.A.

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Key Word Index—Opuntia clavata; Cactaceae; cactus alkaloids; N-methyltyramine; hordenine; tyramine.

Plant. Whole plants of Opuntia clavata Eng. Living specimens are being maintained in our greenhouse. Source. Collected near Albuquerque, New Mexico; identification confirmed by Dr. Harold A. Mackay.† Previous work. Unidentified alkaloids detected in

† Department of Biology, University of New Mexico, Albuquerque.
sister species from Argentina\(^1\) and hordenine identified (GC–MS) in sister species from Uruguay.\(^2\)

**Present work.** TLC screening\(^3\) detected alkaloids. Chloroform extraction of 1.04 kg of freeze-dried, pulverized, and defatted material yielded 5.278 g of N-methyltyramine HCl (m.p. 148–149°, m.m.p. 147–149°, reference m.p. 146–147°, IR, 0.51% yield) from fractions A and C without using the ion-exchange column.\(^4\) Traces of tyramine and hordenine were identified via two-dimensional cochromatography\(^5\) in the mother liquors. N-methyltyramine was, by far, the major alkaloid observed in three different collections of this species. This is the first report of the crystallization of an alkaloid from the *Opuntia* genus. A previous report\(^6\) regarding the isolation of mescaline from *O. cylindrica* erroneously utilized *Trichocereus pachanoi*.\(^7\)

**Acknowledgements**—The authors thank Mr. J. F. West for a large collection of the plant material. This work was supported by grants from the National Institutes of Health (GRS Grant No. RRO-5586) and the Cactus and Succulent Society of America. L. G. West acknowledges the support of the James F. Hoge Memorial Fellowship from the American Foundation for Pharmaceutical Education.


**ELLAGIC ACIDS FROM EUPHORBIA CORNIGERA AND E. WALLICHII**

S. F. Hussain

Drugs Research Division, P.C.S.I.R. Laboratories, Peshawar, Pakistan

(Received 4 August 1973. Accepted 27 September 1973)

**Key Word Index**—Euphorbia cornigera; E. wallichii; Euphorbiaceae; ellagic acid; 3,3′-di-O-methylellagic acid.

**Plants.** Euphorbia cornigera Boiss. (Peshawar Herbarium No. 4374) and Euphorbia wallichii Hook. f. (Herbarium No. 48) collected from Murree Hills, Rawalpindi. **Uses.** Medicinal properties have been reported from sister species.\(^1\) **Previous work.** Sister species.\(^2\)

Euphorbia cornigera. Alcoholic extract of the roots of *E. cornigera* deposited crystals of ellagic acid, m.p. 360° (dec) (Found: C, 55-92; H, 2-22. \(\text{C}_{14}\text{H}_{6}\text{O}_{8}\) requires: C, 55-64; H,