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HOOKERIANIN: A FLAVONE FROM *TEPHROSIA HOOKERIANA*

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Key Word Index—*Tephrosia hookeriana*; Leguminosae; roots; flavones; hookerianin; semiglabrin; lanceolatin A.

Abstract—The chemical investigation of *Tephrosia hookeriana* root resulted in the isolation of the new flavone hookerianin characterized as 5,7-dimethoxy-8-[3″-(2″,5″-dihydro-5″,5″-dimethyl-2″-oxofuryl)]-flavone along with (−)semiglabrin and lanceolatin A. Copyright © 1996 Elsevier Science Ltd

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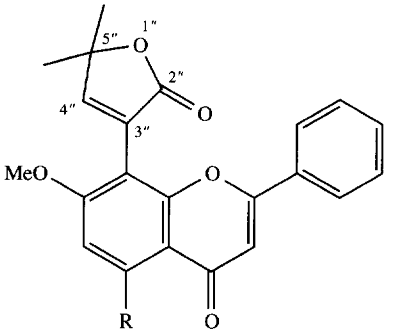
INTRODUCTION

Most *Tephrosia* species possess insecticidal, fish-poisoning and medicinal properties [1, 2]. Flavonoids, isoflavonoids and rotenoids have been identified as major secondary constituents in these plants [3, 4]. In the present work, an analysis of the hitherto phytochemically uninvestigated roots of *T. hookeriana* Wight & Arn. yielded a new flavone hookerianin, 5,7-dimethoxy-8-[3″-(2″,5″-dihydro-5″,5″-dimethyl-2″-oxofuryl)] - flavone (**1**) along with (−)semiglabrin [5] and lanceolatin A [6].

RESULTS AND DISCUSSION

Hookerianin (**1**) gave a negative ferric chloride test, but the positive shinoda test and UV absorption maxima at 265 and 317 nm suggested it was a flavone. The IR spectrum showed chromone carbonyl absorption at 1630 cm^{-1} and another carbonyl absorption at 1735 cm^{-1}. The ^{13}C NMR spectrum also showed two carbonyl carbon absorptions; one at 177.4 δ due to a chromone carbonyl carbon and another at 171.1 δ.

The ^1H NMR spectrum of **1** revealed the presence of an unsubstituted phenyl ring (7.39–7.70 δ, *m*, 5H) and two methoxy groups (3.91, 3.99 δ). The C-3 proton appeared as a singlet at 6.60 δ. The spectrum further revealed two more singlets at 6.43 and 7.48 δ, each integrating for one proton and a *gem*-dimethyl group (1.63 δ). The presence of an additional carbonyl group together with a *gem*-dimethyl group and a one proton singlet at 7.40 δ suggested the presence of an additional ring system as the third substituent. The ^1H NMR values of *gem*-dimethyl (1.63 δ), one proton singlet (7.40 δ) and the carbonyl absorption in IR (1735 cm^{-1}) and ^{13}C NMR (171.1 δ) are in agreement with the ring system 2″,5″-dihydro-5″,5″-dimethyl-2″-oxo-3″-furyl- as in apollinine (**2**); in which these values appeared at 1.67 δ, 7.35 δ, 1740 cm^{-1} and 170.5 δ, respectively [5]. This additional ring system was placed at the C-8 position by comparison with other flavonoids present in this species, and the two methoxy groups at the C-5 and C-7 positions. Therefore, the singlet at 6.43 δ was assigned to the C-6 proton. Thus the structure of hookerianin was established as 5,7-dimethoxy-8-[3″-(2″,5″-dihydro-5″,5″-dimethyl-2″-oxo-furyl)]-flavone. The ^{13}C NMR broad band, off-resonance and SEFT spectra, and also the mass spectrum, were all in accordance with the structure proposed for hookerianin.



1 R = OMe
2 R = H

EXPERIMENTAL

The plant material was collected from the Ayyalur Hills in Tamil Nadu (India) and identified at the Botanical Survey of India, Coimbatore. A voucher specimen has been deposited at the herbarium of the Plant Science Department of Madurai Kamaraj University. Mps are uncorr.

Extraction and isolation. Air-dried pieces of roots

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(1 kg) were extracted successively with hot petrol and $CHCl_3$. The $CHCl_3$ extract was evapd to dryness and a part of the residue (5 g) was subjected to CC over silica gel (60–120 mesh). C_6H_6–EtOAc (95:5) yielded (−)semiglabrin, C_6H_6–EtOAc (85:15) yielded lanceolatin A, and C_6H_6–EtOAc (3:2) yielded hookerianin.

Hookerianin (**1**). Crystals from $CHCl_3$–MeOH mixt. (83 mg), mp 238–40°, UV λ_{max}^{MeOH} nm: 265, 317. IR ν_{max}^{Nujol} cm^{-1}: 1735, 1630, 1582, 1200. ^1H NMR (400 MHz, $CDCl_3$): δ 1.63 (6H, *s*, *gem*-Me), 3.91, 3.99 (6H, 2*s*, MeO − 5, 7), 6.43 (1H, *s*, H-6), 6.60 (1H, *s*, H-3), 7.48 (1H, *s*, H-4″), 7.39–7.47 (3H, *m*, H-2′,4′,6′), 7.68–7.70 (2H, *m*, H-3′,5′). ^{13}C NMR (400 MHz, $CDCl_3$): δ 25.89 (*gem*-Me), 56.33, 56.56 (MeO-5,7), 84.75 (C-5″), 91.94 (C-6), 100.29 (C-8), 108.84 (C-3), 109.03 (C-10), 124.39 (C-3″), 126.01 (C-2′,6′), 128.90 (C-3′,5′), 131.28 (C-4′), 131.63 (C-1′), 156.63 (C-9), 159.56 (C-4″), 160.70 (C-2), 161.87 (C-7), 161.97 (C-5), 171.12 (C-2″), 177.39 (C-4).

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