



REGULAR ARTICLE

A NEW DITERPENE FROM THE STEM BARK OF *HOLARREHENA ANTIDYSENTERICA* (LINN.) WALL

Hamid Nawaz Khan^{1*}, M P Sharma², Mohd Ali¹, Humaira Farooqi⁴, Iram Rais¹ and
Parwaiz Akhtar³

¹Phytochemical Research Laboratory, Department of Pharmacognosy and Phytochemistry, Faculty of Pharmacy,
Jamia Hamdard (Hamdard University) Hamdard Nagar, New Delhi-110062, India

²Department of Botany, Faculty of Science, Jamia Hamdard (Hamdard University)
Hamdard Nagar, New Delhi-110062, India

³Drug Standardisation Research Unit (Central Council for Research in Unani Medicine),
Jamia Hamdard, Hamdard Nagar, New Delhi-110062, India

⁴Department of Biotechnology, Faculty of Science, Jamia Hamdard (Hamdard University)
Hamdard Nagar, New Delhi-110062, India

SUMMARY

A new diterpene (Holarkolavene), isolated from the stem bark of *Holarrehena antidysenterica*, has been characterised as kola-20(11) cyclo-1(2) - en on the basis of spectroscopic techniques and by chemical means.

Key words: *Holarrehena antidysenterica*, alkaloids, spectroscopic techniques, 3β dimethylamino-19β-5, 9 (H) dienine

Hamid Nawaz Khan et al. A New Diterpene from the Stem Bark of *Holarrehena antidysenterica* (Linn.) Wall. J Phytol 2/11 (2010) 50-51

*Corresponding Author, Email: hamidramzar@rediffmail.com, hamidrumi@gmail.com, Mob: -09311186432, Fax No- 91-26059663

1. Plant

Fresh sample of stem bark of *H. antidysenterica* was collected from Palampur, Himachal Pradesh, in March, 2000 and identified by Dr M.P. Sharma, Department of Botany, and Hamdard University. A voucher specimen has been deposited in the Herbarium of the department.

Uses in Indian systems of medicine

Stem bark is commonly used as a principal remedy in cases of various types of diarrhoea and dysentery and also as astringent, anthelmintic, stomachic, antipyretic tonic and is generally administered as extract or decoction in amoebic dysentery and diarrhoea. It is given either alone or with other astringent drugs in piles, colic, dyspepsia, chest affections and diuretics; also reported to be useful in skin diseases and spleen.

2. Result and Discussion

New isolated constituent

Kola-20(11) cyclo-1(2) - en, namely holarkolavene (1) Holarkolavene (1).

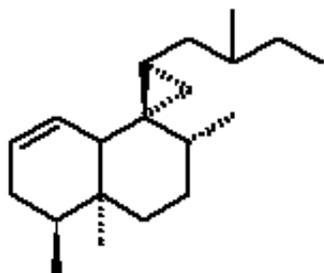
Neutral fraction on elution with CHCl₃ furnished colourless crystals of holarkolavene (1) crystallized from methanol. m.p.: 201-202°, UVλ max (MeOH) :235 (log ε 6.1) IRν max (KBr):3010, 1610, 1415, 1365, cm⁻¹ ¹H NMR (CDCl₃+TFA):5.97 (1H, brs, CH₂-3, CH-4, CH-7, CH-13), 2.06 (2H, m, CH-8, CH-10), 1.50 (2H, m, CH-6), 1.40 (2H, brs, CH₂-7), 1.33 (1H, m, CH-11), 1.20 (4H, brs, CH₂-12, CH₂-14), 1.10 (6H, brs, CH₃-16, CH₃-19), 0.97 (3H, brs, CH₃-17), 0.83 (3H, s, CH₃-18), 0.63 (3H, brs, CH₃-15), 0.36 (2H, brs, CH₂-20). EIMS m/z (rel. int):274 [M]⁺ (C₂₀H₃₄) (1.0), 259 (8.8), 243 (1.2), 230 (2.0), 172 (6.5), 158 (2.5), 150 (1.2), 135 (1.3), 122 (2.0), 121 (17.0), 108 (2.0), 97 (2.4), 95 (2.7), 90 (20.4), 84 (5.0), 83 (4.3), 82 (2.7), 71 (100), 68 (3.1), 57 (13.6), 43 (63.5).

Holarkolavene (1), had molecule ion peak at m/z 274 corresponding to a diterpenie formula. C₂₀H₃₄. It indicated four double bond equivalents, three of which adjusted in three rings and remaining one to an olefinic bond. Its IR spectrum showed the existence of a double bond (1610 Cm⁻¹). ¹H NMR of (1) displayed a two-proton broad signal at δ 0.36 assigned to a cyclopropane

ring. From these informations it was concluded that the molecule was a kolavene-type diterpene containing C-20 cyclopropane ring. Two downfield signals at δ 5.97 and 5.03, integrated one-proton each were ascribed to H-1 and H-2, respectively. A six proton broad signal at δ 1.10 was assigned to C-16 and C-19 methyls. Three protons each singlet at δ 0.97, 0.83 and 0.63 were associated with C-17, C-18 and C-15 methyls, respectively. The remaining methylene and methine protons resonated in between δ 2.43-1.20. The appearance of an intensified peak at m/z 71, generated due to cleavage of C-11/12 bond, supported the presence of C-11 (20) linkage of cyclopropane ring.

The ion fragments at m/z 68 [C₁/C₂-C₄/C₅ fission]⁺, 107, 96 [C₅/C₆-C₉/C₁₀ fission, 167-71]⁺, 121, 82 [C₆/C₇-C₉/C₁₀ fission, 153-71]⁺, 135 [C₇/C₈-C₉/C₁₀ fission]⁺, 69 [C₂/C₃-C₅/C₁₀-C₅/C₆ fission]⁺, 83 [C₂/C₃-C₅/C₁₀-C₆/C₇ fission]⁺ and 97 [C₂/C₃-C₅/C₁₀-C₇/C₈ fission]⁺ supported to the presence of β $\square_{1/2}$ -olefinic linkage in the molecule (Scheme-7). The compound is resistant to any oxidizing or acetylating reagent reflecting the presence of primary or secondary hydroxyl group in the molecule. These evidences led to the identification of holarkolavene (1) as kolav-20 (11) cyclo-1 (2)-en.

Holarkolavene (1)



Acknowledgement

The authors are thankful to the Head, Instrumentation Centre, RSIC, CDRI, Lucknow, for screening NMR and mass spectra, and to the Director, Central Council for Research in Unani Medicine, New Delhi for necessary facilities.

References

- Ali M, Gupta J. A new triterpene from leaves of *Holarrhena antidysenterica*, *Pharmaceutike*, 1994; 7 (3): 140-142.
- Anonymous. *Wealth of India*, Vol. V, PID, CSIR, Hillside Road, New Delhi, 1959; p.103.
- Anonymous. *Bibliography of Holarrhena antidysenterica, Med. And Aromat. Abstract* 1982; 4: 352, PID, CSIR, Hillside Road, New Delhi.
- Bertho A, Von schuckmann G, Schonberger W. 'kurchi' alkaloids, I. *Ber.* 66B: 786-790, *Chem. Abstr.* 1933; 27: 3715.
- Bhutani K K, Ali M, Sharma S R, Vaid R M, Gupta D K. Three new alkaloids from the bark of *Holarrhena antidysenterica*, *Phytochemistry*, 1988; 27: 925-928.
- Bhutani K K, Vaid R M, Ali M, Kapoor R, Soodan S R, Kumar D. Steroidal alkaloids from *Holarrhena antidysenterica*, *Phytochemistry*, 1990; 29: 969-972.
- Budzinkioewicz H, Dserassir C, Willams D H. *Interpretation of mass spectra of organic compounds*, 1964; San Francisco, Holiden-Day, USA.
- Kirtikar K R, Basu B D. *Indian Medicinal Plants* (Periodical Experts book Agency, Delhi); Vol. II, 1992;1569-1574.
- Nadkarni A K, Dr K M. *Nadkarni's Indian Materia Medical*, 1st edition, 1955; Popular Book House, Bombay, India.
- Tschesche R, Petersen R. Separation of alkaloids from the bark of *Holarrhena antidysenterica*, *Chem. Ber*; 1954: 87 (11): 1719-1725.