

FLAVONOIDS AND A DITERPENE FROM *CLUTIA ABYSSINICA*

B. ZERIHUN, G.B. LOCKWOOD,* and R.D. WAIGH

Department of Pharmacy, University of Manchester, M13 9PL, UK

Clutia abyssinica Juab and Spach var. *abyssinica* (Syn. *C. glaberescens* Knauf) (Euphorbiaceae) is a perennial shrub of African grasslands extending from the Nile to South Africa. In Ethiopia the wild plant has no commercial value but has popular medicinal use (1). No investigation of any member of the genus *Clutia* has previously been reported. We report here the presence (in the leaves) of two 6-C-glycosylflavones; spinosin and 2''-O-glycosylisovitexin; and a diterpene, *ent*-16 β , 17-dihydroxykaurane. The structures of these compounds were established by their spectral data.

EXPERIMENTAL

PLANT MATERIAL.—Leaves of *C. abyssinica* were collected from the southern highlands of Ethiopia in January 1983. Voucher specimens of leaves, floral parts, and fruit were deposited in the Addis Ababa University Herbarium and the University of Manchester Museum Herbarium.

EXTRACTION, ISOLATION, AND IDENTIFICATION.—Leaf material was air dried and ground using a hammer mill. The powder (1 kg) was cold percolated first with petroleum ether (40-60°) followed by CHCl₃ and then MeOH. Repeated chromatography of the CHCl₃ extract (30 g) over Si gel afforded 25 mg of *ent*-16 β , 17-dihydroxykaurane, mp 188-189° lit. 187-189(2). The mp, ir, ¹H- and ¹³C-nmr, eims, and [α]_D are in accord with published data (2-4). The MeOH extract (135 g) in H₂O (120 ml) was partitioned first with petroleum ether (40-60°) and then with CHCl₃. The H₂O soluble portion (95.03 g) was decolorized and dried in vacuo to give 10.2 g, which on hplc separation of 5 g yielded spinosin (135 mg) and 2''-O-glycosylisovitexin (150 mg). These were identified by comparison of the spectral data (ir, uv, eims, ¹H- and ¹³C-nmr) with those reported in the literature (5-8) and spinosin, in addition, by comparison with an authentic sample. The structure of 2''-O-glycosylisovitexin was further corroborated by its ¹³C-nmr (DMSO-*d*₆ at ambient temperature) δ 181.7 (C-4), 163.3 (C-2,7), 161.0 (C-4',5), 156.2 (C-9), 128.2 (C-2',6'), 121.0 (C-1'), 115.6 (C-3',5'), 108.6 (C-6), 104.8 (C-1'''), 103.2 (C-10), 102.8 (C-3), 93.3 (C-8), 81.3 (C-2''), 79.9 (C-5''), 78.5 (C-3''), 72.2 (C-3'''), 71.2 (C-5''',2'''), 70.3 (C-1-), 69.5 (C-4''), 66.6 (C-4'''), 64.1 (C-6''), 61.3 (C-6''').

Full details of the isolation and identification of the compounds are available on request from the authors.

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LITERATURE CITED

1. T. Gebre-Egziabihier, "Glossary of the Ethiopian Medicinal Plants," Addis Ababa University Press, Addis Ababa, 1980, p. 24.
2. E. Kitazawa and A. Ogiso, *Phytochemistry*, **20**, 287, (1981).
3. J. Kitajima, T. Komori, and T. Kalvasaki, *Chem. Pharm. Bull.*, **30**, 3912 (1982).
4. T. Satake, T. Murakami, Y. Saiki, C.M. Chen, and L.D. Gomez, *Chem. Pharm. Bull.*, **32**, 4620 (1984).
5. M. Goetz, K. Hostettmann, and A.J. Guillardmod, *Phytochemistry*, **15**, 2014 (1976).
6. W.S. Woo, S.S. Kang, S.H. Shim, V.M. Chari, O. Seligmann, and G. Obermeir, *Phytochemistry*, **18**, 353 (1979).
7. M.L. Bouillant, A. Besset, J. Favre-Bonvin, and J. Chopin, *Phytochemistry*, **17**, 527 (1978).
8. K.R. Markham and V.M. Chari, J.B. Harborne and T.J. Mabry eds. the *Flavonoids: Advances in Research*, London, Chapman and Hall, 1982, pp. 24-51.

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