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LITERATURE CITED

1. S.M. Kupchan, A.S. Dessertine, B.T. Blaylock, and R.F. Bryan, *J. Org. Chem.*, **39**, 2477 (1974).
2. H. Wagner, J. Bladt, D.J. Abraham, and H. Lotter, *Tetrahedron Lett.*, 3807 (1974).
3. H. Wagner and S. Bladt, *Phytochemistry*, **14**, 2061 (1975).

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CHEMICAL CONSTITUENTS OF THE ROOTS OF *ACANTHUS ILLICIFOLIUS*

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In our search for biologically active substances from mangrove plants that grow in Thailand, we report here the isolation of octacosyl alcohol, stigmasterol, benzoxazoline-2-one, and stigmasteryl-β-D-glucopyranoside from the roots of *Acanthus illicifolius* L. (Acanthaceae). The roots have been shown (1) to have activity against Friend leukemia virus in erythroleukemic Swiss mice. Benzoxazoline-2-one has been extensively investigated (2) for medicinal value as a central nervous system depressant, exhibiting analgesic, antipyretic, anticonvulsant, hypnotic, and muscle relaxant activity. Benzoxazoline-2-one is also reported (2) to be a resistance factor for fungi. Furthermore, there are reports (3) that ribose derivatives of this compound are active as anticancer and antiviral agents. Stigmasterol has been shown (4) to have a slight hypercholesterolemic effect while exhibiting no obvious effect on the heart or liver.

There have been a number of phytochemical investigations (5-7) with *A. illicifolius*; however, this is the first report of the presence of octacosyl alcohol, benzoxazoline-2-one, and stigmasteryl-β-D-glucopyranoside in this species.

EXPERIMENTAL

PLANT MATERIAL.—The plant used in this study was identified as *A. illicifolius* by Dr. Pipat Patanapongpaiboon, Department of Botany, Chulalongkorn University, and representative specimens are being maintained in the Department of Botany at Chulalongkorn University.

EXTRACTION.—The roots of *A. illicifolius* were collected in Samuthsakorn, Thailand, in April 1982, (6 kg), dried, and extracted with petroleum ether. The solvent was removed in vacuo and subsequently chromatographed on silica gel using the quick column technique (8) to obtain octacosyl alcohol (253 mg) and stigmasterol (400 mg).

The plant material remaining after extraction with petroleum ether was extracted with 70% EtOH at room temperature. Using standard solvent, solvent and chromatographic procedures (9-11), benzoxazoline-2-one (472 mg) and stigmasteryl-β-D-glucopyranoside (400 mg) were obtained.

All compounds were identified by standard spectral means, by the formation of derivatives, and by ir, uv, and nmr ^{1}H nmr comparison with an authentic sample.

Full details of the isolation and identification of the compounds are available on request to the senior author.

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LITERATURE CITED

1. Y. Jungsuvat, M.S. Thesis, Chulalongkorn University, Bangkok, Thailand, 1981.
2. J. Sam and J.N. Plampin, *J. Pharm. Sci.*, **53**, 538 (1964).
3. J.B. Advani and J. Sam, *J. Heterocycl. Chem.*, **5**, 119 (1968).
4. R.F. Chandler, S.N. Hooper, and H.A. Ismail, *J. Pharm. Sci.*, **68**, 245 (1979).

5. P.K. Minocha and K.P. Tiwari, *Phytochemistry*, **20**, 135 (1981).
6. K.P. Tiwari, P.K. Minocha, and M. Masood, *Pol. J. Chem.*, **54**, 857 (1980).
7. P.K. Minocha and K.P. Tiwari, *Pol. J. Chem.*, **54**, 2089 (1980).
8. C. John, "Quick Column Chromatography," James Cook University of North Queensland, Townsville, Australia, 1979, pp. 10-74.
9. J. Sam and J.L. Valentine, *J. Pharm. Sci.*, **58**, 1043 (1969).
10. S.J. Angyall, *Angew. Chem.*, **8**, 157 (1969).
11. K. Onodera, S. Hirano, F. Masuda, and N. Kashimura, *J. Org. Chem.*, **31**, 2403 (1966).

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THE FLAVONOIDS OF *ALKANNA ORIENTALIS*

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Alkanna orientalis (L.) Boiss. (Boraginaceae) is endemic to the southern part of the Sinai peninsula. Little is reported on the flavonoids of the Boraginaceae. The flavonoids of *A. orientalis* were identified by pc, uv, and ms as: kaempferol-3-glucoside, kaempferol-3-rutinoside, quercetin-3-glucoside, quercetin-3-rutinoside, kaempferol-3,6-dimethyl ether, and small amounts of its 7-glucoside. Kaempferol-3,6-dimethyl ether represents the major flavonoid. The 7-glucoside of kaempferol 3,6-dimethyl ether was first reported in *Centaurea jacea* (1) and later in *Tetragonotheca ludoviciana* (2). The chromatographic and uv data are in agreement with those reported in the literature for the 7-glucoside (1,2). The chromatographic, uv, and ms data of kaempferol 3,6-dimethyl ether are also in agreement with those reported in the literature (1,3,4).

EXPERIMENTAL

GENERAL PROCEDURES.—Uv spectra were recorded with a Beckman model 26. Whatman No. 1 and 3MM paper was used for pc.

PLANT MATERIAL.—The aerial parts of the plant were collected in April 1983, from the area around St. Catherine in the Sinai peninsula. It was identified by Prof. Dr. M.N. El-Hadidi, the Herbarium, Cairo University. Voucher specimens are deposited at the Herbarium, NRC.

EXTRACTION AND ISOLATION.—The plant material was extracted with 70% EtOH. The extract was subjected to column chromatography on polyamide (6S from Riedel), eluting with H_2O followed by increasing concentrations of EtOH. The fractions were further purified using small columns of Sephadex LH-20. Identification of the flavonoids was carried out according to standard methods including acid hydrolysis, enzymic hydrolysis (5,7), hydrogen peroxide oxidation (7,8), and uv analysis (6,7).

Full details of the isolation and identification of the compounds are available on request to the senior author.

LITERATURE CITED

1. H. Rosler, A.L. Star, and T.J. Mabry, *Phytochemistry*, **10**, 450 (1971).
2. J.D. Bacon, L.E. Urbatsch, L.H. Bragg, T.J. Mabry, P. Neuman, and D.W. Jackson, *Phytochemistry*, **17**, 1939 (1978).
3. A. Ulubelen, K.M. Kerr, and T.J. Mabry, *Phytochemistry*, **19**, 1761 (1980).
4. E. Wollenweber, P. Lebreton, and M. Chadenson, *Z. Naturforsch.*, **27b**, 567 (1972).
5. J.B. Harborne, "Comparative Biochemistry of the Flavonoids," Academic Press, London, 1967, p. 66.
6. T.J. Mabry, K.R. Markham, and M.B. Thomas, "The Systematic Identification of Flavonoids," Springer-Verlag, New York, 1970, p. 41.
7. K.R. Markham, "Techniques of Flavonoid Identification," Academic Press, London, 1982, p. 52.
8. B.V. Chandler and K.A. Harper, *Aust. J. Chem.*, **14**, 586 (1961).

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