CHEMICAL CONSTITUENTS OF *ASPLENIUM INDICUM*

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Asplenium indicum Sledge (Aspleniaceae), a fern, is a member of the group of advanced cryptograms. Some of the *Asplenium* species are known to possess medicinal and bioactive properties (1, 2). In continuation of our earlier work (3), we report here the components for *A. indicum*, obtained from M/s. Mukherjee and Co., Darjeeling, West Bengal, India. The Me_2CO and C_6H_6 extract of the whole plant *A. indicum* was found to contain octatriacontane, stearic acid, vitamin K_3, phthiocol, β-sitosterol, and β-sitosterol-β-D-glucoside. This is the second report of the occurrence of vitamin K_3 in the genus *Asplenium*. The identity of these compounds was established on the basis of their chemical and spectral data and by direct comparison with the respective authentic samples. The detailed procedure of isolation and identification is available from the senior author on request.

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IRIDOID AND PHENYLPROPANOID GLYCOSIDES FROM NEW SOURCES

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We examined the glycosidic composition of the plants listed in Table 1 (1-6). These plants are typical of the indigenous flora of Italy and are widespread in different habitats. The charcoal method (7) was employed for the isolation of the glycosidic fraction, which was successively analyzed by the usual chromatographic procedures (Si gel and cellulose columns, hplc on reversed phase).

TABLE 1. Flora Investigated for Iridoid and Phenylpropanoid Glycosides

Plants[a]	Part examined (kg)	Compounds (mg)	Reference
Verbascum sinuatum L. (Scrophulariaceae)	leaves (5.0)	6-O-β-glucosyl-aucubin (240)	(1)
Verbascum thapsus L. (Scrophulariaceae)	whole plant (2.0)	catalpol (100)	(2)
		harpagide (140)	(2)
		aucubin (300)	(2)
		ajugol (150)	(3)
Vinca major L.	leaves (0.5)	loganic acid (180)	(2)
Vinca minor L. (Apocynaceae)	leaves (0.5)	loganic acid (150)	
Plantago major L.	flowers (0.8)	asperuloside (180)	(2)
Plantago lanceolata L. (Plantaginaceae)	flowers (0.8)	asperuloside (130)	
Verbena officinalis L. (Verbenaceae)	whole plant (0.6)	verbascoside (190)	(4,5)
		eukovoside (35)	(6)

[a]Identified by comparison with authentic samples from the Herbarium of the Dipartimento di Biologia Vegetale, University of Rome.

The known iridoids and phenylpropanoid compounds were identified by comparison with authentic samples (pmr and ir spectra superimposable, α_D identical).

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

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6-METHOXYLATED AND *C*-GLYCOSYL FLAVONOIDS FROM *CENTAUREA* SPECIES

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In a previous study, we described the sesquiterpene lactones from *Centaurea behen* (1), *Centaurea kotschyi* (2), and the cytotoxic flavones from *Centaurea urvillei* (3).

As a part of our continuing investigation, we now report the isolation, identification, and antibacterial activity of the flavonoids obtained from *Centaurea virgata* Lam., *Centaurea kilea* Boiss., and *Centaurea inermis* Velen.

A total of ten flavonoids were obtained from the samples of the above-mentioned species. Apigenin, the major compound, and jaceosidin were isolated from all of the species. In addition, isoschaftoside and isovitexin were isolated from *C. virgata*; hispidulin, eupatorin, nepetin, kaempferol 3-*O*-glucoside, and kaempferol 3-methyl ether from *C. virgata* and *C. inermis*; but only 6-methoxyluteolin 3′,4′,7-trimethyl ether from *C. kilea*.

All compounds were tested for their antibacterial activity by disc-diffusion methods (4, 5). None of them showed inhibitory effect on *Staphylococcus aureus* and *Staphylococcus epidermidis*. Only five of the flavonoids showed activity against the bacterial species given in Table 1, and this was at a low level with the most active being apigenin.

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded with the following instruments: uv, Varian Techtron model 635; pmr, Varian 90 MHz; ms, Dupont 21-491 Instrument. Adsorbants for tlc and cc were from Merck. Sephadex was from Pharmacia. Nutrient broth and agar were from Difco.

PLANT MATERIALS.—The plant materials were collected from several parts of Turkey. Voucher specimens for *C. virgata* (no. 45511, from Eskişehir), *C. kilea* (no. 45854, from Kırklareli), and *C. inermis* (no. 48868, from Istanbul) are deposited in the Herbarium of the Faculty of Pharmacy, University of Istanbul.