FLAVONE C-GLYCOSIDES OF *AELUROPUS LAGOPOIDES*

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In the present study, seven C-glycosides were isolated and identified in *Aeluropus lagopoides* (L.) Trin ex. Thwaites (Graminae). They were identified as vitexin, isovitexin, orientin, isoorientin, 6,8-di-C-glucosyl-apigenin, 6,8-di-C-glucosyl-luteolin, and 6,8-di-C-glucosyl-chrysoeriol. No information has been published before on the flavonoids of any *Aeluropus* species.

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Spectra were recorded with UV Beckman model 26. Whatman No. 1 and 3MM paper were used for paper chromatography.

PLANT MATERIAL.—*A. lagopoides* was collected from the Eastern Desert, on the Cairo-Suez road (45 km from Cairo) and identified by Prof. Dr. Nabil El Hadidi, the Herbarium, Cairo University.

EXTRACTION AND SEPARATION.—Extraction of the leaves and stems was carried out with 70% EtOH, and the extract was evaporated under reduced pressure. The extract was then fractionated by column chromatography using polyamide as an adsorbent and H_2O, followed by increasing concentrations of EtOH as a solvent. The fractions obtained were further separated into single components using elution techniques on Whatman 3MM paper. Pure compounds were investigated and their structures determined according to standard methods (1,2). The paper chromatographic properties of the pure isolated fractions indicated that they were C-mono- and C-di-glycosides. This was confirmed by acid hydrolysis (2 N HCl), whereby no effect on 6,8-di-C-glucosyl-apigenin, 6,8-di-C-glucosyl-luteolin (lucenin-1), and 6,8-di-C-glucosyl chrysoriol were observed. On the other hand, isomerization appeared in the case of vitexin, isovitexin, orientin, and isoorientin. Co-chromatography with authentic samples in the case of vitexin, isovitexin, orientin, isoorientin, and lucenin-1 were carried out. 6,8-Di-C-glycosyl apigenin was co-chromatographed with an authentic sample, separated from *Salvia triloba* L. (3). The spectral data of all the separated compounds were identical with those reported in the literature (2).

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WAXES, TRITERPENES, STEROIDS, AND FREE AND BOUND ACIDS IN LEAVES AND STEMS OF *CENTAUREA ASPERA*

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Centaurea aspera L. spp. *stenophylla* (DuFour) Nyman is a plant of the family of Compositae, endemic and used in folk medicine in Valencia. From this plant Viguera *et al.* have reported some wax esters (1) and the isolation of a sesquiterpene lactone, named stenophyllolide (2). We now report on the compounds isolated and identified from the hexane extract of leaves and stems of this plant, collected at Saler, Valencia (Spain), in June 1981, and authenticated by Dr. Mansanet, Professor of Botany of Valencia University.

The dried leaves and stems of *C. aspera* ssp. *stenophylla* (3.7 kg) were extracted exhaustively in a Soxhlet apparatus with hexane. The hexane extract (103.73 g) was separated into neutral and acidic fractions. Column chromatography of the neutral fraction and of methyl esters of the acidic fraction on silica gel allowed us to separate and identify the compounds shown in Table 1. Identification and quantitative es-

TABLE 1. Compounds Separated and Identified from Hexane Extract of *Centaurea aspera* ssp. *stenophylla*

Class of compound	Percentage hexane extract	Main components (%)	Identified by
Straight-chain saturated hydrocarbons	11.50	C_{27}(19.3), C_{29}(50.0), C_{31}(20.9)	ir,gc
High esters	1.94	1-alkanols: C_{22}(33.2), C_{24}(20.8), C_{26}(20.8), C_{28}(9.8)	hydrolysis: ir,gc of acetates
		saturated alkanoic acids: C_{20}(10.4), C_{22}(49.8), C_{24}(7.4)	ir,gc of methyl esters
Free 1-alkanols	1.43	C_{24}(3.4), C_{26}(42.9), C_{28}(39.6), C_{30}(9.8)	ir,gc of acetates
Free alkanoic acids	1.13	palmitic (49.4), stearic (5.6), oleic (2.9), linoleic (15.8), linolenic (12.1)	ir,gc of methyl esters
β-Hydroxyacids	0.37	β-hydroxyhexadecanoic (1.9) β-hydroxyoctadecanoic (69.5) β-hydroxyeicosanoic (26.7) β-hydroxydocosanoic (1.9)	ir, ^{1}H-nmr,gc/ms of β-ketoesters and acetates
Triterpenols	4.78	α-amyrin	ir,gc/ms
		β-amyrin (401 mg)	[α]D,mmp,ir, ^{1}H-nmr,ms
		taraxasterol (1.356 mg)	[α]D,mmp,ir, ^{1}H-nmr,ms
		lupeol (384 mg)	[α]D,mmp,ir, ^{1}H-nmr,ms
Phytosterols	1.18	β-sitosterol (66.84)	ir, ^{1}H-nmr, gc/ms
		stigmasterol (33.16)	ir, ^{1}H-nmr, gc/ms

timation of β-hydroxyacids were made by gc of acetates of their mehyl esters and by combined gc/ms of their β-keto methyl esters. These β-hydroxyacids are very unusual in higher plants; they have only been reported from *Cistus ladaniferus* (3), *Eupatorium hyssopifolium* (4), and in floral glands from *Krameria* species (5). They may be considered as missing links in the biogenetic route to alkanoic acids (6). Triterpenols are free in the plant, and to separate their individual components, the whole group was transformed in triterpenyl acetates, which were separated on silica gel-$AgNO_3$ (100:25) column (7) with hexane-Et_2O (94:6). Interesting amounts of pure acetates (gc) were separated and identified not only by the properties of acetates (mp, [α], ^{1}H-nmr, ir, ms) but by the properties of the triterpenols obtained from hydrolysis (mp, mmp, [α], ^{1}H-nmr, ir, ms). Full details of the isolation and identification of the compounds are available on request to the senior author.

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