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COUMARINS OF *Ferula conocaula*

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The isolation of a number of terpenoid coumarins from the roots of *Ferula conocaula* Korov. has been reported [1, 2]. In a further study of the plant, from ethanolic and aqueous ethanolic extracts by chromatography on a column of silica gel we have isolated another five compounds of coumarin nature: (I), $C_{24}H_{30}O_3$, mp 61-63°C; (II), $C_{24}H_{30}O_4$, mp 114-116°C; (III), $C_9H_6O_3$, mp 230-232°C; (IV), $C_{26}H_{32}O_5$, mp 160-162°C; and (V), $C_{36}H_{50}O_{15}$, mp 161-162°C, $[\alpha]_D^{25}$ −90°C (c 1.0; ethanol).

From their physicochemical constants and spectral (IR, PMR) characteristics, substances (I-IV) were identified as umbelliprenin, fesolol, and feterin, respectively.

According to its UV spectrum, the new compound (V), which has been called cauloside, is an umbelliferone derivative. The low R_f value of the substance and its UV and IR spectra show that it is a glycosylated terpenoid coumarin.

On acid hydrolysis, the glycoside gave umbelliferone and D-glucose. The acetylation of (V) with acetic anhydride in pyridine led to an octaacetate, $C_{52}H_{66}O_{23}$, M^+ 1058. Consequently, the glycoside is a bioside.

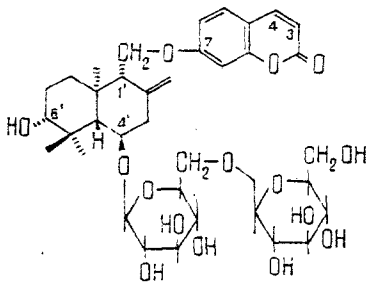
Enzymatic cleavage of the glycoside with β-glucosidase [3] yielded D-glucose and an aglycone with the composition $C_{24}H_{30}O_5$, M^+ 398. The latter, from a comparison of its PMR and IR spectra and also its physicochemical constants, was found to be identical with cauferin [1].

Since there are two secondary hydroxy groups in cauferin, the position of the sugar residue was established by comparing the PMR spectra of the aglycone, of the glycoside, and of its octaacetate. In the PMR spectrum of the octaacetate, as compared with the glycoside and the aglycone, the quartet signal of the hemihydroxylic proton at C_6' shifted downfield. Consequently, the hydroxy group in the glycoside at C_6' is free and the sugar residue consists of two glucose molecules and is located at C_4'.

The bond between the carbohydrates was established by the Hakomori methylation of (V) followed by the acid hydrolysis of the permethylate obtained. In the hydrolysate the methylated carbohydrates were identified on the basis of a combination of GLC and TLC methods as 2,3,4-tri-O-methyl-D-glucose and 2,3,4,6-tetra-O-methyl-D-glucose. Consequently, the sugars are linked by a (1 → 6) bond.

The presence in the IR spectrum of the glycoside of absorption bands at 1100, 1081, 1038, and 889 cm^{-1} shows that the glucose residues have the pyranose form and are linked by a β-glycosidic bond, as was confirmed by enzymatic hydrolysis [4-6].

On the basis of the facts presented above, it may be assumed that the glycoside is cauferin 4'-O-(O-β-D-glucopyranosyl-(1 → 6)-β-D-glucopyranoside).



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PHENOLIC COMPOUNDS OF *Artemisia xerophytica*

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The present communication gives the results of an investigation of the phenolic compounds isolated from the epigeal part of *Artemisia xerophytica* Krash. growing in the Mongolian Peoples' Republic. The plants were collected by the resource-prospecting division of the Combined Soviet–Mongolian Comprehensive Biological Expedition in the South Gobi aimak in August, 1974, during the budding period.

The dry ground epigeal mass was extracted with 96% ethanol. After the ethanol had been distilled off, the viscous extract was treated with hot water and the aqueous solution was extracted successively with chloroform and ethyl acetate. The chloroform fraction of the extract was separated by chromatography on a column of silica gel. On elution with chloroform and chloroform–ethanol (9:1), substances (I) with mp 206-208°C and (II) with mp 254-255°C were isolated. On the basis of the results of an analysis of UV, IR, and NMR spectra and a comparison of them with literature information [1, 2], compound (I) was identified as pectolinarigenin and (II) as cirsimaritin.

When the ethyl acetate fraction of the extract was separated on a column of polyamide, substances (II), (IV), and (V) were isolated.

On the basis of physical and chemical characteristics, substance (III) with mp 226-228°C was identified as 4',5,7-trihydroxy-3',6-dimethoxyflavone, which we have isolated previously from *A. frigida* [6].

Substance (IV) was identified as luteolin, and (V) as cynaroside.

By paper chromatography and chromatography on Silufol plates, tricin and esculetin were identified by comparison with authentic samples.

This is the first time that any of the compounds mentioned have been found in *Artemisia xerophytica*.

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