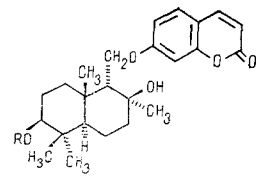
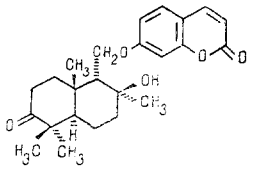


I. R = $(CH_3)_2CHCO$

II. R = H



III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# COUMARINS OF THE ROOTS OF *Heracleum aconitofolium* AND *H. grandiflorum*


N. F. Komissarenko and G. F. Fedorin



UDC 547.9:582.89


The fruit of *Heracleum aconitofolijm* Woronow and *H. grandiflorum* Stiven, has been investigated previously for the presence of coumarins [1, 2]. In the present communication we give the results of the isolation and quantitative determination of the main coumarins of the roots of these species.

On quantitative determination by a method developed previously [3] it was found that the roots of *H. aconitofolium* and *H. grandiflorum* contained 6.88% and 2.1%, respectively of total coumarins.

The coumarins were isolated by the following procedure. The comminuted raw material was extracted with ethanol, the extract was evaporated until the solvent had been driven off, and the residue was treated with chloroform. The coumarins of the chloroform fraction were separated on a column of acidic alumina [4] with elution by diethyl ether.

As a result, 10 substances of coumarin nature were isolated and identified and the amounts of the main representatives in the raw material were determined. From the roots of *H. aconitofolium* were obtained sphondin ($C_{12}H_8O_4$, mp 189-191°C, amount in the raw material 0.51%), bergapten ($C_{12}H_8O_4$, mp 189-190°C, 0.28%), xanthotoxin ($C_{12}H_8O_4$, mp 145-146°C), imperatorin ($C_{16}H_{14}O_4$, mp 102-103°C, 0.32%), biacangelicin ($C_{17}H_{18}O_7$, mp 117-118°C, [α] +24°C in absolute ethanol). From the roots of *H. grandiflorum* we isolated sphondin (0.35%), isobergapten ($C_{12}H_8O_4$, mp 223-224°C), pimpinellin ($C_{13}H_{10}O_5$, mp 116-117°C), psoralen ($C_{11}H_6O_3$, mp 161-163°C), bergapten (0.18%), xanthotoxin (0.27%), heraclesol [$C_{17}H_{18}O_7$, mp 117-118°C, [α] −30° (methanol)], and biacangelicin.

The substances isolated were identified from their physicochemical properties, IR spectra, and mixed melting points with authentic samples. In the quantitative determination of the coumarins, xanthotoxin was used as a standard.


All-Union Scientific-Research Institute of Drug Chemistry and Technology, Khar'kov.



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# POLYPHENOLS OF THE LEAVES OF *Salix pantosericea* AND *S. pentandroides*

V. A. Kompantsev

UDC 547.972

We have investigated two species of the genus *Salix* L., family *Salicaceae* Lindb. — *Salix pantosericea* Goerz. and *S. pentandroides* Askv. which grow widely in the mountain regions of Caucasus [1].

The dried leaves (1.2 kg of each species), collected in July in the Teberda state reservation, Karachaevo-Cherkesskaya Autonomous region, Stravopol krai were exhaustively extracted with 70% ethanol. The ethanolic extracts were dried in vacuum, diluted with water, and treated with chloroform.

The purified aqueous fraction was extracted with ethyl acetate. The ethyl acetate extract was evaporated and the polyphenolic compounds were precipitated with dry chloroform.

The total polyphenols obtained were deposited on a column of polyamide sorbent and eluted successively with water and ethanol of various concentrations. When the total polyphenols of *S. pantosericea* were eluted from the column containing polyamide sorbent, the aqueous fractions yielded in the pure state caffeic (2,4-dihydroxycinnamic) acid, $C_9H_8O_4$, mp 196-197°C (aqueous ethanol), $\lambda_{max}$ 325, 299, 235 nm [2].

The 25-30% ethanol fractions yielded in the crystalline form a flavonol glycoside — isoquercitrin (quercetin 3-O-βD-glucopyranoside), $C_{21}H_{20}O_{12}$, mp 238-240°C (aqueous ethanol), $[\alpha]_D^{20}$ −69.5° (c 0.106; methanol), $\lambda_{max}$ 362, 255 (265) nm [3].

The 60% ethanol eluted two substances of flavonoid nature simultaneously, and these were separated with the aid of preparative paper chromatography in the 1-butanol—acetic acid—water (4:1:5) system. One of the substances was myricetin (3,3',4',5,5',7-hexahydroxyflavone), $C_{15}H_{10}O_8$, mp 357-359°C (70% ethanol), $\lambda_{max}$ 374, 254 (272) nm [4]. The second substance was quercetin (3,3',4',5,7-pentahydroxyflavone), $C_{15}H_{10}O_7$, mp 306-308°C (96% ethanol), $\lambda_{max}$ 370, 255 (269) nm [4].

The aqueous fractions obtained on eluting the total polyphenols of *S. pentandroides* from a polyamide column were evaporated in vacuum and extracted with ethyl acetate, and the extract was evaporated. On prolonged standing of the concentrated ethyl acetate extract, chlorogenic (3-O-caffeoyl-D-quinic) acid, $C_{16}H_{18}O_9$, crystallized out with mp 203-205°C (aqueous ethanol), $[\alpha]_D^{20}$ −32.4° (c 0.108; ethanol), $\lambda_{max}$ 328, 240 nm [2].

From this species we have previously isolated and identified the polyphenolic compounds salicin (saligenin O-β-D-glucopyranoside), hyperoside (quercetin 3-O-β-D-galactopyranoside), and quercimeritrin (quercetin 7-O-β-D-glucopyranoside) [5].

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