lene group. A comparison of these substances showed their complete identity (mixed melting point, IR and NMR spectra).

Thus, the aryloxymethylene group has the axial orientation and therefore structure (I) for ferukrin is correct [8].

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STRUCTURE OF THE NEW COUMARIN FESHURIN

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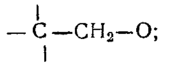
UDC 547.9:582.89

Continuing a study of the coumarins present in various representatives of the genus *Ferula* [1-3], from the roots of *Ferula schtschurowskiana* (Shurovskii's ferula), collected in the Kazakh SSR (Chimkent oblast) in the flowering stage, by chromatographing the neutral fraction of an ethanolic extract on a column of silica gel we have isolated gummosin [4] and a new terpenoid coumarin with the composition $C_{24}H_{32}O_5$ (I), M^+ 400, with mp 212-214°C $[\alpha]_D^{21}$ $-51°$ (c 0.51; pyridine), which we have called feshurin. Its UV spectrum has maxima at λ_{max} 220, 245, 254, 326 nm (log ε 4.10, 3.60, 3.51, 4.16), which are characteristic for umbelliferone drivatives. The IR spectrum of feshurin contains absorption bands at 3615-3580 cm^{-1} (hydroxy groups), 1720 cm^{-1} (α-pyrone carbonyl), and 1610, 1670, 1515 cm^{-1} (aromatic nucleus). The absence of absorption bands of keto and epoxy groups in the IR spectrum of (I) shows that the oxygen atoms present in the terpenoid moiety are included in hydroxy groups. The nature of the latter was determined by acetylation, oxidation, and dehydration reactions.

When (I) was oxidized with acetic anhydride in pyridine, an amorphous monoacetyl derivative with the composition $C_{26}H_{34}O_6$ (II) was obtained the IR spectrum of which contained, in addition to the absorption band of a hydroxy group, the maxima of an ester group at 1250 and 1735 cm^{-1}. The oxidation of feshurin with chromium trioxide in pyridine led to a monoketone with the composition $C_{24}H_{30}O_5$ (II), mp 195-196°C, identical with nevskone [5]. These facts permitted the conclusion that nevskin and feshurin are isomeric compounds.

To confirm the nature of the other hydroxy groups, we dehydrated feshurin with sulfuric acid in ethanol, which gave conferol (IV), with the composition $C_{24}H_{30}O_4$, mp 137-138°C. This was identified through its physicochemical constants and spectral (IR, PMR) characteristics [6].

The PMR spectrum of feshurin (JNM-4H-100/100 MHz, C_5D_5N, 0 — HMDS contains the signals at (ppm) 0.85, 1.13, 1.23, 1.28 (s, 3 H each), 3.51 (br. s, $\Sigma_{1/2}$ = 9 Hz, 1 H) 4.1 (q,  $-\overset{|}{\underset{|}{C}}-CH_2-O$; 1 H: J_{gem} = 10.0, J_{vic} = 3.0 Hz), and 4.41 (q, 1 H, J_{gem}=10, J_{vic}=6 Hz). In addi-

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Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 228-229, March-April, 1979. Original article submitted December 20, 1978.

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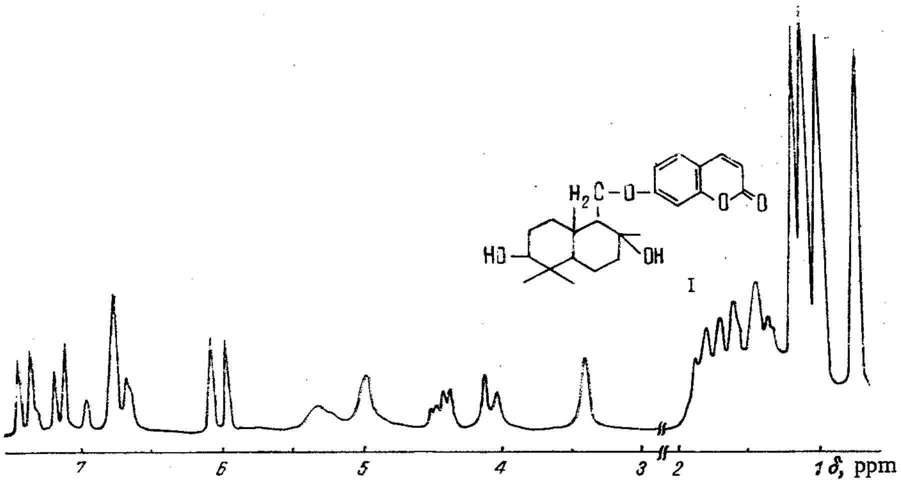

Fig. 1. NMR spectrum of feshurin (C_5D_5N).

tion, the signals from five protons of a coumarin nucleus appeared in the 6.17–7.51 region (Fig. 1).

On the basis of the facts given above, it may be concluded that feshurin is an isomer of nevskin at the $C_{6'}$-OH. Structure (I) is suggested for it.

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FLAVONOIDS OF *Bidens cernua*

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UDC 547.972

We have previously [1] isolated the chalcone butein and the aurones sulphuretin (I) and maritimetin (II) from the flowering herb *Bidens cernua* L. (nodding beggar-ticks) collected in the water meadows in the environs of the town of Miknov, Khmelnitskaya oblast. Continuing a study of the flavonoids of this plant, by preparative chromatography on columns of Kapron we have isolated another five compounds (substances III-VII).

Substance (III) with mp 165-167°C (ethanol) and substance (IV) with mp 236-239°C (ethanol) were identified on the basis of their chemical properties and UV, IR, and PMR spectra as butin 7-O-β-D-glucopyranoside ((R-2)isocoreopsin), and isookanin 7-O-β-D-glucopyranoside ((R-2)flavanomarein) obtained from *Bidens tripartita* L. [2-4].

Substance (V) had mp 179-181°C (aqueous ethanol). $[\alpha]_D^{20}$ −118.6° (c 0.87; methanol), λ_{max} 259, 268*,† 358 nm (in methanol). On hydrolysis (1% H_2SO_4, 40 min) an aglycone (mp 309-310°C) and rhamnose were formed. The PMR spectrum of the glycoside (DMSO, δ scale) showed the signals of the protons of hydroxy groups at C_5 (12.63 ppm, singlet), C_7 (10.8 ppm), $C_{4'}$ (9.63 ppm), and $C_{3'}$ (9.28 ppm) and also those of the aromatic protons H-2' (7.29 ppm, doublet,

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†Footnote omitted as in Russian original — Publisher.

Kharkov State Pharmaceutical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 229-230, March-April, 1979. Original article submitted October 26, 1978.

0009-3130/79/1502-0197$07.50 © 1979 Plenum Publishing Corporation