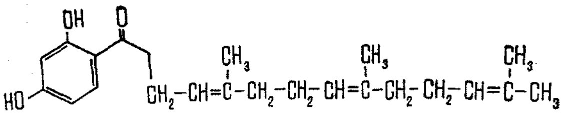
The mass spectrum of the substances had the peak of the molecular ion M^+ 356, m/e 287 ($M - C_5H_9$), 219 ($M - C_7H_5O_3$), 204 ($M - C_8H_8O_3$), 152 ($C_8H_8O_3$), 127 ($C_7H_5O_3$). The mass spectrum of the fragment corresponding to the terpenoid substituent of dzhamirone coincided completely with that of the coumarin umbelliprenin, which contains a farnesane residue. The NMR spectra of umbelliprenin and dzhamirone also coincided in the region from 5.00 to 1.0 ppm, which shows the presence of a farnesane residue in dzhamirone. In dzhamirone the aliphatic part substitutes the methyl group of acetophenone, while in umbelliprenin it substitutes the phenolic hydroxyl in position 7. To confirm what has been said above, we performed a comparative oxidation of umbelliprenin and dzhamirone under the same conditions with periodate-permanganate [2]. The same carboxylic acid was formed from the terpenoid part in the two cases.

On the basis of the facts presented, we propose the following structure for dzhamirone:



LITERATURE CITED

1. A. Haznagy and L. Toth, Planta Medica, 20, No. 2, 136 (1971).
2. S. D. Gusakova, A. L. Markman, and A. U. Umarov, Maslozhir. Prom., No. 2, 13 (1968).

CYNAROSIDE FROM THE LEAVES OF *Digitalis ciliata*

L. N. Gvazava

UDC 547.972

Luteolin, apigenin, and dracocephaloside have been obtained from the leaves of *Digitalis ciliata* Trautv. previously [1, 2]. When an ethanolic-chloroformic extract of the leaves of the plant was separated on a column of silica gel, in addition to cardenolides we isolated a yellow crystalline substance giving a reaction for flavonoids [3].

After recrystallization from dilute ethanol, this compound melted at 255-257°C and had the composition $C_{21}H_{20}O_{11}$, $[\alpha]_D^{20}$ −58° [c 0.53; methanol–pyridine (3:2)]. On PC in various solvent systems it appeared that the level of an authentic sample of cynaroside, $\lambda_{\max}^{C_2H_5OH}$ 355, 255 nm; $\lambda_{\max}^{+CH_3COONa}$ 355, 255 nm; $\lambda_{\max}^{+CH_3COONa+H_3BO_3}$ 370, 257 nm; $\lambda_{\max}^{+AlCl_3}$ 395, 280 nm [1].

Bryant's reaction [3], the results of acid hydrolysis, and a comparison of absorption intensities in the shortwave region of the UV spectrum of this glycoside and of dracocephaloside [2] indicated their monoside nature.

Acid hydrolysis of the flavone glycoside with Kiliani's mixture [4] yielded the aglycone (60%) with mp 325-328°C which was identified by UV and IR spectroscopy, a mixed melting point, and comparative PC as luteolin [5]. D-Glucose was found in the carbohydrate moiety of the glycoside. The flavone glycoside was also cleaved by 0.5% KOH.

The absence of a shift of the shortwave maximum in the UV spectrum of the glycoside and its appearance in the aglycone on the addition of fused sodium acetate showed that the carbohydrate substituent was attached to position 7 of the luteoline [5].

The β configuration of the glycosidic bond and the pyranose form of its oxide ring were established by comparing molecular rotations of the glycoside under investigation and simple phenyl glycosides [6].

I. G. Kutateladze Institute of Pharmacochemistry, Academy of Sciences of the Georgian SSR, Tbilisi. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 818-819, November-December, 1976. Original article submitted July 29, 1976.

On the basis of the results obtained, the flavone glycoside isolated from the leaves of *Digitalis ciliata* Trautv. has been characterized as 3',4',5,7-tetrahydroxyflavone 7-O-β-D-glucopyranoside, or cynaroside [5, 7].

LITERATURE CITED

1. E. P. Kemertelidze, Khim. Prirodn. Soedin., 440 (1969).
2. E. P. Kemertelidze, Khim. Prirodn. Soedin., 653 (1975).
3. E. T. Bryant, J. Am. Chem. Soc., 39, 481 (1950).
4. H. Kiliani, Ber., 63, 2866 (1930).
5. N. F. Gusev, G. A. Glumov, and S. V. Teslov, Khim. Prirodn. Soedin., 253 (1975).
6. I. P. Kovalev and V. I. Litvinenko, Khim. Prirodn. Soedin., 233 (1965).
7. Kh. S. Umarov, Z. P. Pakudina, and M. K. Yusupov, Khim. Prirodn. Soedin., 95 (1975).

SESQUITERPENE LACTONES OF *Saussurea elegans*

I. D. Sham'yanov, A. Mallabaev,
U. Rakhmankulov, and G. P. Sidyakin

UDC 547.913

To isolate the sesquiterpene lactones from the epigeal part of *Saussurea elegans* Ldb. collected in July at Chon-Kemin (Kirghizia), we first used chloroform. The extract was chromatographed on a column of alumina, giving two chlorine-containing sesquiterpene lactones.

In order to convince ourselves of the native nature of the substances isolated, extraction was repeated with the exclusion of all chlorine-containing agents. As solvent we used ethanol (in a ratio of 1:5). The concentrated extract was treated with 60% ethanol, the precipitate that deposited was filtered off, and the filtrate was shaken with ether, and the ethereal solution was evaporated. The residual mixture of lactones (resin) was chromatographed on a column (250 × 5 cm) of type KSK silica gel. The eluent was a mixture of benzene and ether. This gave the same two chlorine-containing lactones as on the fractional extraction of the plant with chloroform.

In the small number of chlorine-containing lactones described in the literature [1, 2] we found no compounds similar to ours and they are apparently new. One of them we have called elegin.

Elegin (I) has the composition $C_{19}H_{23}O_6Cl$, mp 158-159°C (hexane–acetone), $[\alpha]_D^{25}$ +82.5° (c 2.125; ethanol), R_f 0.51 [TLC, fixed layer of silica gel, hexane–acetone (7:3) here and below], dissolves readily in acetone, dioxane, and methanol and sparingly in benzene, and is insoluble in water. Its IR spectrum showed absorption bands in the following regions (cm^{-1}): 3380 (OH group), 1745 (γ-lactone), 1715 (C=O), 1660, 1635 (C=C bond), and 745 (C–Cl).

Analysis of the NMR spectrum showed the presence of one methyl group on a double bond, two hydroxyls, and two exomethylene groups.

The action of acetyl chloride on (I) formed diacetylelegin (II), with the composition $C_{23}H_{27}O_8Cl$, mp 194-195°C (from ethanol), the IR spectrum of which lacked absorption bands of OH groups, while its NMR spectrum showed the signals of two acetyl groups. The second lactone had mp 176-178°C (hexane–acetone) and R_f 0.22 in the system given above.

The study of the lactones isolated is continuing.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from Khimiya Prirodnykh Soedinenii, No. 6, p. 819, November-December, 1976. Original article submitted May 19, 1976.