

increase in the amount of d-limonene and a fall in the amounts of neral and geranial.

LITERATURE CITED

1. T. Kh. Samoladas, The Culture of the Lemon in the USSR [in Russian], Tbilisi (1978), p. 51.
2. N. A. Kekelidze and M. I. Dzhanikashvili, in: The Study and Use of the Genes of Useful Plants of the Tropics and Subtropics, Prague (1981), p. 55.
3. M. I. Goryaev, A. D. Dembitskii, G. L. Krotova, G. L. Topadze, Izv. Akad. Nauk Kaz. SSR, Ser. Khim., No. 4, 47 (1979).
4. I. Calvarano, Essenze Derivat. Agrumari, 37, 27 (1967).
5. J. W. Kesterson and A. P. Pieringer, Proc. Am. Soc. Hortic. Sci., 84, 199 (1964).
6. S. Kamiyama, Agric. Biol. Chem., 31, 1091 (1967).
7. N. A. Kekelidze and M. I. Dzhanikashvili, Khim. Prir. Soedin., 803 (1981).

A STUDY OF *Cymbochasma borysthenica*

A. V. Degot', N. S. Furca, and
E. A. Chaika

UDC 547.972

We have investigated the epigeal part of the endemic relict plant *Cymbochasma borysthenica* (Pall.) Klok. et Zoz. (Dnepr cymbochasma), family Scrophulariaceae [1, 2] collected in the phase of mass-flowering in the environs of the town of Zaporozh'e. By one- and two-dimensional chromatography we established the presence of not less than five iridoids, eight flavonoids, and five hydroxycinnamic acids. With the aid of a known procedure [3], we obtained five substances (I-V) in the individual state.

Substance (I), composition $C_{15}H_{22}O_{10}$, mp 204–206°C, formed with the Bacon–Edelman reagent [4] a brown-colored solution with a bright yellow fluorescence in UV light. On paper chromatograms, it was detected after treatment with the reagent mentioned in visible light by its yellow-orange color and in UV light by its lemon-yellow color but it was not revealed by Trim and Hill's [5] and Stahl's [6] reagents. The results of an investigation of the products of acid, alkaline, and enzymatic (emulsin) hydrolyses, and also features of the IR region of the spectrum permitted the substance isolated to be identified as catalpol. We did not detect aucubin-like iridoids by paper chromatography after visualization with specific reagents [5, 6].

Substance (II), composition $C_{21}H_{20}O_{10}$, mp 253–256°C, and substance (III), composition $C_{21}H_{18}O_{11} \cdot H_2O$, mp 334–340°C, were subjected to acid and enzymatic (emulsin) hydrolyses, and in the corresponding products apigenin, D-glucose and glucuronic acid were detected by paper chromatography. An investigation in the UV region of the spectrum using diagnostic reagents enabled these substances to be characterized as apigenin 7-O- β -D-glucoside (II) and apigenin 7-O- β -D-glucuronide (III). In addition to apigenin glycosides, the epigeal part of the plant also contained luteolin glycosides.

Substances (IV) and (V) were assigned to the hydroxycinnamic acids and by a direct comparison with authentic samples they were identified as caffeic and chlorogenic acids.

LITERATURE CITED

1. Flora of the Ukrainian Soviet Socialist Republic [in Ukrainian], Kiev, Vol. 9 (1960), p. 626.
2. V. I. Cholik, Rare Plants of the Ukraine [in Ukrainian], Kiev (1970), p. 125.
3. A. V. Degot', The Phytochemical Study of Some Representatives of the Family Scrophulariaceae [in Russian], Author's Abstract of Candidate's Dissertation, Khar'kov (1971).

Zaporozh'e Medical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 4, p. 524, July–August, 1982. Original article submitted March 29, 1982.

4. A. R. Trim and R. Hill, *Biochem. J.*, 50, 310 (1952).
5. R. B. Duff, J. S. D. Bacon, C. M. Mundie, V. C. Farmer, I. D. Russell, and A. R. Forrester, *Biochem. J.*, 96, 1 (1965).
6. E. Stahl, *Dtsch. Apoth.-Ztg.*, 103, No. 12, 197 (1963).

A SESQUITERPENE LACTONE FROM *Saussurea salicifolia*

V. V. Dudko and K. S. Rybalko

UDC 547.314+543.422

From the epigeal part of willow-leaved saussurea (*Saussurea salicifolia* (L) DC.), collected in August in Khakassia, by extraction with water and treatment of the aqueous extract with chloroform followed by the chromatography of the evaporated chloroform extracts on silica gel with elution by chloroform, we have isolated with a yield of 0.3% an individual substance in the form of a colorless viscous liquid with the composition $C_{19}H_{22}O_6 \cdot H_2O$ $[\alpha]_D^{20} +100^\circ$ (c 4.0; ethanol). Its IR spectrum contains bands at (cm^{-1}) 3492 (OH), 3470–3350 (H_2O), 1760 (γ -lactone), 1716 ($\text{OCO}-\text{C}=\text{C}$), and 1662 and 1645 ($\text{C}=\text{C}$). The NMR spectrum (in CDCl_3 , ppm) has the following proton signals: two multiplets of 1 H each at 6.18 and 5.91; two doublets of 1 H each at 6.01 and 5.51; broadened doublets of 1 H each at 5.06 and 4.81; a broadened singlet of 1 H at 5.20; a multiplet of 2 H at 5.15; and a broadened triplet of 1 H at 4.34.

When the substance was hydrolyzed (4% solution of KOH at room temperature for 2 days), a dihydroxylactone with the composition $C_{15}H_{18}O_4$ was obtained in the form of a viscous liquid, which readily formed a diacetate with the composition $C_{19}H_{22}O_6$, likewise in the form of a viscous liquid. On comparing the results obtained with literature information, we found that the substance isolated was identical with cynaropicrin – a sesquiterpene lactone isolated previously from *Cynara scolymus* L. [1] and *Centaurea americana* [2].

LITERATURE CITED

1. A. Corbella, P. Gariboldi, G. Jommi, Z. Samek, M. Holub, B. Drożdż, and E. Błoszyk, *J. Chem. Soc. Chem. Commun.*, 286 (1972).
2. N. Ohno, H. Hirai, H. Yosioka, X. D. Dominguez, and T. J. Mabry, *Phytochemistry*, 12, No. 1, 221 (1973).

Tomsk Medical Institute. All-Union Institute of Medicinal Plants, Moscow. Translated from *Khimiya Prirodykh Soedinenii*, No. 4, pp. 524–525, July–August, 1982. Original article submitted March 17, 1982.