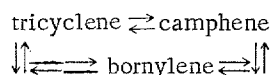


The analysis was carried out on a UKh-1 instrument at 115°C in a column (400 × 4 mm) containing Inza diatomite brick (grain size 0.25–0.50 mm) impregnated with tricresyl phosphate (25%).

It has not been established whether the tricyclene is present in the native turpentine or is formed during the isolation of the turpentine from the oleoresin as a result of the thermal action of acids on camphene in accordance with the scheme



In the latter case, in addition to camphene [2] and tricyclene, the turpentines should also contain a small amount of bornylene.

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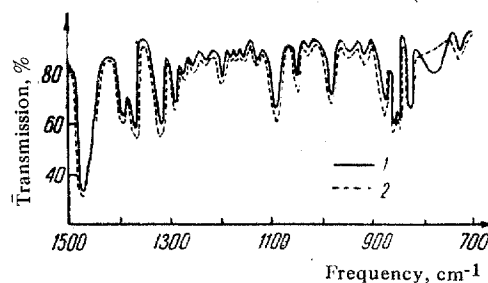


Fig. 2. IR spectra of the tricyclene isolated from turpentine (1) and a pure sample of tricyclene (2).

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#### SESQUITERPENE LACTONES OF *CYCLACHAENA XANTHIFOLIA*

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The sesquiterpene lactone coronopilin was isolated from *C. xanthifolia* Fresen. (*Iva xanthifolia* Nutt.) (rag sumpweed) some time ago [1], and its presence in the plant was confirmed later [2].

From the combined substances obtained from a chloroform extract of the racemes (collected at the end of the flowering period in the town of Zaporozh'e), after their detection by thin-layer chromatography, we have isolated three more substances by fractional crystallization: one with mp 164–166° C (from methanol),  $R_f$  0.14, 0.32, a second with mp 174–176° C (from chloroform),  $R_f$  0.25, 0.75, a third with mp 126–127° C (from benzene),  $R_f$  0.45, 0.80, and a fourth with mp 85–87° C (from benzene),  $R_f$  0.86 [in a thin layer of alumina (activity III) in the benzene–chloroform–methanol (20:20:2) system with iodine vapor as the revealing agent] and  $R_f$  0.90 [on silica gel G in the benzene–acetone (4:1) system with the spots revealed by  $H_2SO_4$  and heating].

The substance with mp 174–176° C was identified as coronopilin by its IR spectrum and elementary composition. The substance with mp 164–166° C [ $[\alpha]_D^{20} +47.7^\circ$  (c 6.5; chloroform) has the composition  $C_{15}H_{20}O_4$ . Its IR spectrum (KBr): 3520  $cm^{-1}$ , 3470 (OH group), 1760 ( $\gamma$ -lactone), 1660, 822 ( $>C=CH-$ )  $cm^{-1}$ . There are no maxima in the UV spectrum characteristic for conjugated double bonds. The presence of the lactone ring was confirmed by saponification with aqueous alkali.

After reacidification, the initial substance was re-formed, being identified by its IR spectrum and a mixed melting point. In the usual reactions, the substance does not show the properties of aldehydes, and its IR spectrum lacks absorption bands at 2720 and 2800  $cm^{-1}$ .

The substance with mp 126–127° C, [ $[\alpha]_D^{20} -122^\circ$  (c 8.7; chloroform), had the composition  $C_{17}H_{22}O_5$ . IR spectrum (KBr): 3500 (OH group), 1760 ( $\gamma$ -lactone) 820, 860, 940, 980, 1640, 1670  $cm^{-1}$  (double bonds); UV spectrum:  $\lambda_{max}$  219, 320. The compound was not acetylated with acetic anhydride in the presence of pyridine either on heating or in the cold, which shows the tertiary nature of the OH group.

The yellow crystalline substance with mp 85–87° C, [ $[\alpha]_D^{20} -2^\circ$  (c 6.5; ethanol) had the composition  $C_{15}H_{18}O_3$ ; IR spectrum (KBr): 1760 ( $\gamma$ -lactone): 1640, 820  $cm^{-1}$  ( $>C=CH-$ ). No acetyl derivative was obtained by acylation under either mild or severe conditions. The substance apparently has no OH group. The IR spectrum of the noncrystalline saponification product had no band at 1760  $cm^{-1}$ , which confirms the presence of a  $\gamma$ -lactone structure in the compound of the molecule.

The IR spectra of the substances isolated were identical with those of coronopilin in the region of skeletal vibrations. It is possible that their structures have a common basic skeleton.

On the basis of the results given above it may be assumed that the substances isolated are sesquiterpene lactones which have evidently not been studied previously.

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#### THE NEUTRAL SUBSTANCES OF THE OLEORESIN OF PINUS PALLASIANA

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We have separated the oleoresin collected in the middle of May in the Yalta Leshkoz [forestry farm] into an acidic and a neutral fraction. The latter (after removal of the monoterpene fraction by distillation) was saponified with an ethanolic solution of caustic potash and the unsaponifiable part, amounting to 6% of the initial oleoresin, was chromatographed on neutral alumina (activity III). Petroleum ether extracted a hydrocarbon fraction (23%) and a mixture of petroleum ether and benzene (95:5) an aldehyde fraction (30%). Benzene eluted a mixture of saturated aliphatic alcohols the main component of which was tetracosanol with mp 74-75° C (from acetone). A mixture of benzene and ether (95:5) eluted  $\beta$ -sitosterol (23%).

The aldehyde fraction was chromatographed on a column of silica gel impregnated with silver nitrate [1]. The process of separation was followed by thin-layer chromatography in the same adsorbent [2].

A mixture of petroleum ether and benzene (93:7) eluted a small fraction (0.15%) consisting of a mixture of dehydroabietinal and abietinal (identified by chromatographic comparison with authentic samples) and then pimarinal (72%), with mp 62.5-63.5° C (from methanol);  $[\alpha]_D^{20} +103^\circ$  (c 2.5; chloroform). Semicarbazone, mp 214.5-216° C (decomp, from ethanol); 2,4-DNPH, mp 198-199° C (from ethanol). The latter gave no depression of the melting point with an authentic sample of pimarinal 2,4-DNPH. A 92:8 mixture of the same solvents eluted liquid isopimarinal (25%)  $[\alpha]_D^{21} -12^\circ$  (c 5; chloroform). Semicarbazone, mp 223-224.5° C (decomp, from ethanol), 2,4-DNPH, mp 181.5-185.5° C (from ethanol). A mixture of the latter with an authentic sample of isopimarinal 2,4-DNPH melted without depression.

No diterpene alcohols corresponding to the resin acids were found.

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#### ALKALOIDS OF FUMARIA

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From Fumaria parviflora Lam. [1], collected on the 12th April 1966 in the vegetation period in the region of Shargun, Surkan-Dar'inskaya Oblast, by chloroform extraction we have obtained 0.49% of combined alkaloids. By