5000 × 8 mm column.

The solid support was deactivated Inza diatomite brick (grain size 0.3–0.5 mm), the liquid phase was poly (ethylene glycol adipate) (30% of the weight of the solid support), and the carrier gas was nitrogen. After purification the γ-terpinene had d_D^{20} 0.8483, n_D^{20} 1.4745, MR_D 45.17 (calc. for $C_{10}H_{16}F_2$ 45.24). Literature data d_4^{20} 0.8495, n_D^{20} 1.4747, MR_D 45.13 [4].

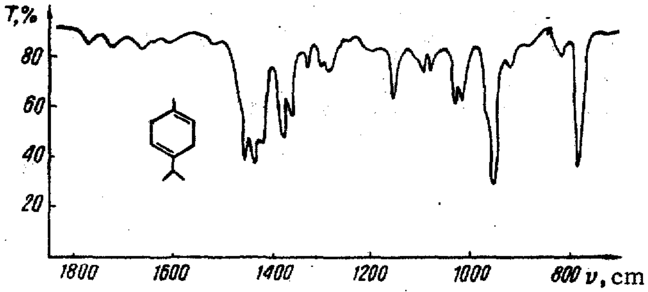

Fig. 2. IR spectra of a sample of γ-terpinene isolated from turpentine.

The melting points of the derivatives of the γ-terpinene were [2]: tetrabromide 128°–128.5° C; nitrosochloride 110.5°–111.0° C; nitrosate 116° C; and erythritol 234°–237° C. The IR spectrum of the sample of γ-terpinene (Fig. 2) was completely identical with the published IR spectrum of this substance [2].

By adding pure γ-terpinene in the GLC of industrial samples of turpentines from *Pincus silvestris*, we have shown that they all contain small amounts of γ-terpinene: resin turpentines, 0.2%; extraction turpentines, 0.5%; and dry-distillation turpentines, about 1%.

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COMPOSITION OF THE ESSENTIAL OILS OF THE FRUITS OF *BIOTA ORIENTALIS* AND *CUPRESSUS SEMPERVIRENS*

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We have studied the essential oils of the fruits of Biota orientalis Endl. (oriental arborvitae) and *Cupressus sempervirens* L., var. pyramidalis Targ-Tozz. (pyramidal cupressus) collected in October 1965 in the Botanical Gardens, Baku. The oils had the following constants: oriental arbovitae d_{20}^{20} 0.8861, n_D^{20} 1.4730, $[\alpha]_D^{20}$ + 20.5°, A. No. 0.38, E. No. 14.81, Sap. No. 15.19, yield 1.34%; pyramidal cupressus: d_{20}^{20} 0.8835, n_D^{20} 1.4740, $[\alpha]_D^{20}$ + 34.5°, A. No. 1.35, E. No. 25.04, Sap. No. 26.39, yield 1.07%.

Vacuum fractionation with subsequent percolation through active alumina separated the essential oils into hydrocarbon fractions, monoterpene and sesquiterpene fractions, and an oxygen-compound fraction. The yields of these fractions were, respectively: for the essential oil of oriental arbovitae 64.6%, 8.2%, and 10.3%; and for the essential oil of pyramidal cupressus 73.2%, 10.2%, and 9.8%.

By gas-liquid chromatography (GLC) using four stationary phases (polyethylene glycol-400, poly (ethylene glycol adipate), silicon grease, and diethylene glycol succinate) it was found that the monoterpene fraction of the oil of oriental arbovitae contained α-pinene, β-pinene, and myrcene, and the same fraction of the essential oil of pyramidal cupressus contained the same terpenes, as well as limonene [1]. The presence of α-pinene and limonene was confirmed by the method of adding the authentic compounds in GLC, and also by the results of spectroscopy. The presence of myrcene was shown conclusively by the IR spectrum and the production from an adduct of myrcene of an acid with mp 121°–122° C [2, 3]. In both fractions, the α-pinene was the main constituent.

According to the results of GLC, the sesquiterpene hydrocarbon fraction of the oil of oriental arbovitae contained four components, three of which were identified after chromatographic separation from elemental analysis, physicochemical constants, and IR spectra as caryophyllene, β-bisabolene, and farnesene [2, 3]. According to GLC, there were five sesquiterpene hydrocarbons in the oil of pyramidal cupressus. Elemental analysis, the physicochemical constants, the relative retention volumes calculated with respect to caryophyllene, and the IR spectra of the substances isolated by means of adsorption chromatography corresponded to δ-cadinene, caryophyllene, β-bisabolene, and farnesene [2, 3]. One sesquiterpene could not be identified.

From the oxygen-compound fractions of the two essential oils we isolated cedrol $C_{15}H_{26}O$, with mp 85°–86° C, identified on the basis of the elemental analysis, IR spectrum, and the melting points of derivatives (phenylurethane with mp 106° C, chromate with mp 113°–114° C). Bisabolol $C_{15}H_{26}O$ was identified in the essential oil of oriental arbovitae from the elemental analysis, physicochemical constants, and IR spectrum [2, 3]. From the essential oil of pyramidal cupressus was isolated a compound with mp 65° C having strong absorption in the 1745 cm^{-1} region (C=O group). It was impossible to identify the substance because of its low concentration in the oil.

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LACTONES OF THE FRUIT OF ARCTIUM LEIOSPERMUM

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It has been established that the leaves, flowers, and roots of Arctium leiospermum Juz. et Serg., family Compositae, which grows in Uzbekistan, contain 0.006–0.04% of a sesquiterpene lactone. From the fruit of the same plant by three extractions with hot water (45 min each) with heating, followed by treatment with chloroform and precipitation with ethanol, up to 3.4% of the lactone was isolated. After appropriate purification, a white substance was obtained with the composition $C_{15}H_{18}O_6$, mp 98°–100° C, mol. wt. (Rast) about 300. The chromatography of the substance confirmed its individuality, R_f 0.85 in the 1-butanol–acetic–water (4:1:5) system.

The IR spectrum of the sesquiterpene lactone had adsorption bands in the following regions: 3400 cm^{-1} (OH group), 2925, 2850, 1465 (CH_2), 1760 (carbonyl group of a γ-lactone, which is characteristic for sesquiterpene lactones), 1595 and 1520 (presence of a conjugated system), 1000–1300 cm^{-1} (bands corresponding to the vibrations of ordinary carbon-oxygen bonds). The presence of a lactone ring in the substance obtained was shown by its solubility in alkalis on heating.

The lactone formed an acetyl derivative with mp 65°–67° C. No information on this sesquiterpene lactone, which we have called arctin, has been found in the literature.

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