

250 × 0.3 cm, rate of flow of nitrogen 29 ml/min, of hydrogen 26 ml/min, and of air 400 ml/min, column temperature programmed from 194 to 270°C at a rate of heating of 5 deg/min.

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METHOD OF INVESTIGATING THE QUALITATIVE COMPOSITION OF THE VOLATILE EMANATIONS OF WOODY PLANTS

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UDC 581.573.4:543.544

By means of a method we have developed, we have studied the qualitative composition of the volatile emanations of the pine, the spruce, and the cedar, which were concentrated in chambers with a volume of 30-70 m³ fitted with dismountable windows. To vary the temperature and the humidity of the air, the value of which increases during the period of an experiment, an air-conditioner and a fan forming a closed cyclic system were connected to the chamber.

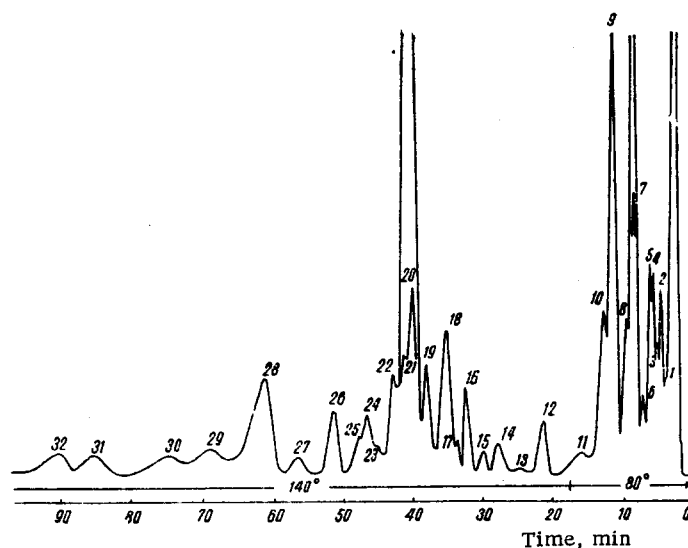


Fig. 1

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The organic fraction being pumped in the air system was trapped by adsorbent (silica gel and activated carbon). The volatile products were isolated from the adsorbent by elution with diethyl ether in Soxhlet apparatuses. After concentration, the eluates were analyzed by gas-liquid chromatography and the adsorbents were regenerated.

The components of the samples isolated were separated on a KhROM-3 chromatograph with a flame-ionization detector on a column (3.6 m × 6 mm) containing 20% of tris(2-cyanoethoxy)-propane on Celite 545 (30-60 mesh). The mobile phase was helium (50 ml/min). Chromatography was performed in two isothermal regimes: the first was at 80°C for 18 min after the introduction of the sample, and the remainder at 140°C. The components of the samples analyzed were identified by the introduction of pure substances and from their retention times.

Figure 1 shows a chromatogram of volatile products collected in the aerial atmosphere of the pine. The composition of the phytoorganic emanations investigated includes not less than 30 compounds, mainly terpene products, as is confirmed by the correspondence of the UV and IR absorptions of the samples analyzed and of the essential oil. The correctness of this conclusion also follows from their genetic connection with the terpenes of coniferous plants.

A considerable position among the volatile products of the pine is occupied by volatile hydrocarbons, which include more than half the products trapped. We identified the following 12 compounds: santene, α - and β -pinenes, α - and β -fenchenes, camphene, Δ^3 -carene, β -myrcene, limonene, β -phellandrene, γ -terpinene, and terpinolene. Other components of the volatile emanations are borneol, bornyl acetate, and camphor.

TANAPSIN FROM *Tanacetum pseudoachillea*

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UDC 547.913

From the flower heads of *Tanacetum pseudoachillea* C. Winkl., collected in the flowering phase (July, 1974) in the Tashkent oblast, we have extracted sesquiterpene lactones with chloroform followed by the treatment of the dry extract with 70% ethanol. The mixture of substances was separated by chromatography on a column of silica gel. Previously known substances [1] were separated by elution with petroleum ether-benzene (1:1) and with benzene. The fractions eluted by benzene-acetone (9:1) deposited crystals with mp 191-192°C (ethyl acetate-ethanol) with the composition $C_{20}H_{28}O_6$, $[\alpha]_D^{25} -139^\circ$, (c 1.38; methanol), mol. wt. 364 (mass spectrometry). The individuality of the substance was tested in several systems of solvents on Silufol; R_f 0.45 [chloroform-methanol (17:3)]. We have called the substance *tanapsin* (I).

The IR spectrum (KBr) of (I) shows absorption bands characteristic for hydroxy groups (3450, 3495 cm^{-1}), a γ -lactone (1760 cm^{-1}), and an ester grouping (1720, 1255 cm^{-1}).

The NMR spectrum of *tanapsin* (δ scale, deuteropyridine, 0 - HMDS, JNM-4H-100) has signals in the form of singlets at 1.10 and 1.46 ppm relating, respectively, to an angular methyl group ($-C-CH_3$) and to a methyl group at C_4 in the geminal position to which there is a tertiary hydroxy group. Signals are also seen at 1.76 and 1.93 ppm, which are characteristic of the fragment $H_3C-C=CH-CH_3$. The signal of a lactone proton is present in the form of a multiplet at 4.15 ppm. The nature of the splitting of this signal shows that the lactone ring is attached to C_7-C_8 and that there are two protons on the neighboring C_9 atom. Doublets at 5.37 and 6.04 ppm ($J = 3$ Hz) show the presence of an exomethylene group conjugated with the lactone carbonyl.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from *Khimiya Prirodnykh Soedinenii*, No. 2, pp. 261-262, March-April, 1976. Original article submitted October 13, 1975.

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