

ESSENTIAL OIL FROM LYCOPUS EUROPAEUS

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In a phytochemical study of Lycopus europaeus L. (European bugleweed, family Labiatae) [1, 2], we have established the presence of  $\beta$ -sitosterol (0.09%), flavone (2.28%) and coumarin substances (0.12%), a nitrogenous base (choline, 0.18%), amino acids, and an essential oil which has not previously been studied. The content of essential oil obtained by distillation with steam from the air-dry epigeal part (in the flowering-fruit-bearing phase) amounts to 0.2% on the absolutely dry weight.

The oil is reddish with a characteristic odor and has the following constants:  $n_D^{20}$  1.5217,  $d_4^{20}$  0.9520,  $[\alpha]_D^{20}$  +15°.

We studied the component fractions of the essential oil by gas-liquid chromatography on a Khrom-2 chromatograph with a flame ionization detector; the carrier gas was nitrogen and the rate of flow 20 ml/min. The analysis was carried out with a column 1.6 m long and 0.4 mm in diameter filled with Celite (80-100 mesh) upon which 15% of the weight of the carrier of poly(ethylene sebacate) was deposited. The analysis was carried out at 78° C (low-boiling fraction) and 184° C (high-boiling fraction), and the components of the essential oil were identified by their retention times and by the addition of known substances to the samples. In the low-boiling components we identified  $\alpha$ -pinene camphene, limonene,  $\gamma$ -terpinene, p-cymene, and terpinolene. The investigation at 184° C showed the presence in the oil, in addition, of linaloyl acetate, linalool, camphor, bornyl acetate, geranyl acetate, nerol, and geraniol.

## REFERENCES

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ISOLATION OF 7-ACETOXYROYLEANONE FROM SALVIA NEMOROSA

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The family Labiatae includes more than 500 species of sage, Salvia, of which more than 70 grown in the Soviet Union [1]. We have made a chemical study of three samples of the roots of Salvia nemorosa L. (violet sage). Two of them were collected in September 1961 and September 1968 in the Poltava region and the third in July 1967 in the environments of Belogorsk (Crimea). Qualitative reactions (distillation with sodium hydroxide; magnesium acetate) and thin-layer chromatography on silica gel showed that each of the samples investigated contained three substances of quinone nature but no tanshinones.

Column chromatography yielded a yellow crystalline substance with the composition  $C_{22}H_{30}O_5$ , mp 195-198° C (yield 0.14%). The IR spectrum of the substance (mull in paraffin oil) exhibited absorption bands at ( $cm^{-1}$ ) 3370 (OH), 1718, 1650, 1629, 1604. In a chloroform solution of the substance, the band at  $1718\ cm^{-1}$  is shifted to  $1738\ cm^{-1}$ , which is characteristic for ester carbonyl groups. The acid residue is acetyl, as follows from the presence in the NMR spectrum of the substance of a three-proton singlet at 1.97 ppm. The bands at  $1650$  and  $1629\ cm^{-1}$  also undergo a shift in the high-frequency direction in chloroform (to  $1675$  and  $1645\ cm^{-1}$ , respectively). The first band can be ascribed to a quinoid carbonyl and the second to a quinoid carbonyl bound by an intramolecular hydrogen bond to a neighboring hydroxy group. UV spectrum:  $\lambda_{max}^{EtOH}$  272 m $\mu$  (log  $\epsilon$  4.15) and 406 m $\mu$  (log  $\epsilon$  2.93). By comparing the constants of the substance studied