TABLE 2. Chemical Shifts of the ^{13}C Nuclei (δ, ppm)

Ketone	C-1	C-2	C-3	C-4	C-5	C-7	C-8, 9	C-10
I	200,8 s	169,9 s	150.5 d	134,5 d	123,1 d	51,1 t	21,8 q 26,9 q	33,4 q
II	200 s	150,4 d	169 s	130,2 d	127 d	54,5 t	27.5 q 21,8 q	33,2 q

Tables 1 and 2 give the chemical shifts of the protons and ^{13}C nuclei in the compounds isolated.

Thus, the results that we have obtained show the presence in industrial turpentine from Pinus sylvestris L. of oxygen-containing monoterpenoids with 7-membered rings.

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CHEMICAL COMPOSITION OF ESSENTIAL OILS OF PLANTS OF THE GENUS Schizonepeta

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The genus Schizonepeta Briq. is represented in the USSR by two species: S. annua (Pall.) Schischk. and S. multifida (L.) Briq., growing in Western and Eastern Siberia and in the Far East [1]. The essential oils of these species, which differ sharply in antifungal activity, have served as a basis for a detailed chemical study, and this all the more since their component compositions vary greatly according to the ecological conditions of growth [2-5].

We have investigated the chemical compositions of the essential oils of S. annua and S. multifida growing in the Gorno-Altai. The plant material was gathered in 1986 in the flowering phase: S. annua in the Ongudai region of the rocky wastes at the confluence of the rivers Chui and Katuni, and S. multifida in the Kosh-Agach region in the environs of the village of Kurai on a southern meadow slope at a height of 1800 m.

The essential oils were obtained from the epigeal parts of these species by the steam distillation of the comminuted air-dry raw material. The amounts of essential oils and their physicochemical constants were determined by the methods usually adopted [6, 7]. For analytical GLC we used a Chrom-41 instrument with a flame-ionization detector, the carrier gas being nitrogen at a rate of 2 ml/min, and the stationary phase polymethylsiloxane (PMS). Capillary column 0.2 mm × 50 m, temperature of the evaporator 160°C and of the column 60°C. The components were identified from their relative retention times and from the increase in the volume of the peaks on the addition of authentic samples.

As a result of the investigation, the following indices were established for the essential oil of S. annua: yield 1.11% on the air-dry raw material, d_{20}^{20} 0.8313; n_D^{20} 1.4975; $[\alpha]_D^{20}$ +0.72°; acid No. 2.8; ester No. 14.9. A considerable amount of phenols was detected:

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thymol (44.5%) and carvacrol (7.0%). In addition, the presence of the following compounds was established: tricyclene (2.4%), α-pinene (0.4%), myrcene (2.5%), α-phellandrene (3.8%), p-cymene (8.4%), β-phellandrene (1.2%), γ-terpinene (25.4%), and terpinolene (3.2%), while six minor components (1.2%) were not identified.

The sample of the essential oil of S. multifida that was investigated was obtained in a yield of 0.9% on the air-dry raw material, d_{20}^{20} 0.8975; n_D^{20} 1.4830; $[\alpha]_D^{20}$ +0.22°; acid No. 2.9; ester No. 13.4; and it had the following component composition: myrcene (0.5%), β-phellandrene (31.0%); limonene (3.9%), linalool (5.0%), sabinol (0.7%), and pulegone (58.2%), while seven minor components (0.7%) were not identified.

The main component of the essential oil of S. annua was thymol, isolated by the method of freezing out with mp 51.5°C (from petroleum ether). Pulegone — the main component of the essential oil of S. multifida — remained only a receiver after the vacuum distillation of the other volatile compounds. It was identified by GLC and by PMR spectroscopy. The phenolic compounds (thymol and carvacrol) that we found for samples S. annua were absent from the essential oil of S. multifida.

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