The ethanolic extract was filtered, and the solvent was distilled off. When the extract had been concentrated to 1/6 of its initial volume a precipitate deposited in the form of a greenish yellow crystalline powder, mp 185-186°C, yield 5%, calculated on the absolutely dry raw material.

An aglycon with mp 306-307°C was obtained by acid hydrolysis; rhamnose and glucose were detected in the sugar fraction. Enzymatic hydrolysis showed the presence of rutinose.

A comparative UV analysis of the substance that we had isolated and the aglycon with standard rutin and quercetin using complex-forming and ionizing reagents showed their respective identity. Mixtures of the substance that we had isolated and its aglycon with authentic samples gave no depression of the melting points. On PC in various solvent systems, the substance we had isolated and its aglycon appeared at the levels of authentic samples of rutin and quercetin [7-9].

A comparison of the physicochemical characteristics of the substance that we had isolated with those given in the literature enabled us to consider the substance isolated as quercetin 3-rutinoside [10, 11].

Thus, quercetin 3-rutinoside (rutin) has been isolated for the first time from the leaves of the papaya tree introduced into the territory of Georgia.

The results that we have obtained from our investigation of the papaya leaves for their yield and composition of total carotenoids, chlorophylls and rutin enabled them to be recommended as an additional raw material for the production of the preparations Karotolin, Khlorofillipt, and Rutin.

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ESSENTIAL OILS OF THE INFLORESCENCES AND LEAVES OF *Ziziphora brevicalyx*

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At the present time, many species of the genus *Ziziphora*, family Lamiaceae, are being investigated as drug and essential-oil plants [1-6]. The component composition of the essential oil *Z. brevicalyx* Juz.* has not hitherto been studied.

The raw material was collected in 1986 in the environs of the village of Khandiza (Surkhandar'ya province, Uzbek SSR; southwest Pamir-Alai, spur of the Hissar range) at heights of 1550-1700 m above sea level. The essential oil was distilled from

*At the present time, *Z. brevicalyx* Juz. has been assigned to *Z. clinopodiodes* Lam. [8].

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TABLE 1. Compositions of the Essential Oils of *Ziziphora brevicalyx*

Compound	Inflorescences		Leaves	
	amount, %	retention index	amount, %	retention index
1. α-Pinene	0,2	930	—	
2. Sabinene	0,1	965	—	
3. β-Pinene	0,3	969	+*	969
4. Myrcene	0,2	980	—	
5. Limonene	1,6**	1020	1,4**	1020
6. Unidentified	—		0,2	1058
7. Linalool	—		0,1	1087
8. Menthone	3,2	1131	9,6	1133
9. $C_{10}H_{18}O$	3,6	1140	4,2	1142
10. Pinocamphone	1,1	1148	1,5	1151
11. Menthol	0,5	1160	4,7	1158
12. Pulegone	88,0	1214	75,0	1215
13. Linalyl acetate	—		0,3	1242
14. Thymol	0,1	1269	0,4	1268
15. Carvacrol	—		0,3	1278
16. p-Methoxyacetophenone	0,6	1311	0,1	1312
17. Caryophyllene	0,9	1415	1,5	1414
18. α-Cedrene	—		0,1	1436
19. $C_{15}H_{24}$	—		0,1	1472

*Compound present in an amount of less than 0.1%.

**Limonene was determined as the sum of its mixture with 1,8-cineole.

the freshly collected raw material in a Ginzberg apparatus [7]. The component compositions of samples of these essential oils from the inflorescences and leaves collected in the mass flowering phase were determined.

The component compositions and the quantitative amounts of the substances in the samples investigated were studied without preliminary separation into fractions. The components were identified from their mass spectra and retention indices. Methodologically, the work was carried out in the same way as that published previously [9, 10]. The results of the investigations are given in Table 1.

The yield of essential oils from the inflorescences of *Z. brevicalyx* amounted to 0.6-0.8% and from the leaves 0.2-0.3% of the weight of the raw material.

The main component of the essential oils of the inflorescences and leaves was pulegone, a substance characteristic for species investigated previously [1-6]. The amount of pulegone in the inflorescences was 88%, and in the leaves 75%. In the essential oil from the inflorescences of *Z. brevicalyx* the amounts of menthone and of an unidentified compound with the composition $C_{10}H_{18}O$ each exceeded 3% of the sum of all the substances. The essential oil of the leaves contained more than 9% while the amounts of menthol and of substance 9 were more than 4%. The amounts of each of the other components both in the leaves and in the inflorescences ranged from trace amounts to 1.5%. The essential oil of the inflorescences differed from that of the leaves by the presence of α-pinene, sabinene, and myrcene, and also by the absence of six substances (substance 6, linalool, linalyl acetate, carvacrol, α-cedrene, and sesquiterpene hydrocarbon 19) that were present in the essential oil of the leaves.

On the basis of the results presented, it may be concluded that the raw material of *Z. brevicalyx* should be gathered with a large amount of leaves (epigeal part) since the amount of menthol and menthone as a proportion of the total in the essential oil of the leaves exceeds 15%, and these substances exert a favorable action on the work of the cardiovascular system.

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ESSENTIAL OIL OF THE LEAVES OF *Hyssopus seravschanicus* FROM SOUTH UZBEKISTAN

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Hyssopus seravschanicus (Dubjan.) Pazij is a semishrub of the family Lamiaceae. In the essential oil of *H. seravschanicus* 29 substances have been identified [1].

The raw material for investigation was collected in 1986 in the environs of the village of Khandiza (Surkhandar'ya province, Uzbek SSR, spur of the Hissar range, southwestern Pamir-Alai) at heights of 1550-1700 m above sea level. The essential oil was distilled from the freshly gathered raw material in a Ginzberg apparatus [2]. The component composition and quantitative amounts of the components of the essential oil of the leaves gathered in the vegetation phase were determined.

The essential oil was chromatographed without preliminary separation into fractions. Mass spectra were recorded on an LKB-2091 chromato-mass spectrometer using a 2 mm × 1.8 m filled glass column with 2% of the polydimethylsiloxane elastomer SE-30 on Chromosorb W. Spectra were recorded at an ionization energy of 70 eV. Analysis was performed in the regime of programming the temperature from 40 to 200°C at the rate of 5°C/min.

The quantitative analysis of the essential oil was carried out on a Biokhrom-1 chromatograph with a flame-ionization detector using a 0.25 mm × 50 m glass capillary column with the polydimethylsiloxane stationary phase OV-101 in the regime of programming the temperature from 40 to 200°C at the rate of 2-3 deg/min. The linear rate of flow of the carrier gas (helium) was 8-15 cm/sec. The temperature of the evaporator was 220°C and the flow split 1:110. Areas were recorded with a TR-2213 electronic integrator (Japan). The minimum detectable relative amount of a component at a dose of 0.2-0.4 μl was 0.1% [3, 4].

The yield of the essential oil from the leaves of *H. seravschanicus* amounted to 0.34% on the weight of the raw material, which was only half that given in the literature [5].

The results of the investigation of the component composition and the determination of the quantitative analysis of the substances in the essential oil of the leaves of *H. seravschanicus* are given in Table 1 and are shown to two significant figures since the reproducibility of these magnitudes was ±10 rel. % for the main components and ±50 rel. % for the trace components.

On analyzing the literature figures [1] and our results, we came to the conclusion that the samples of the essential oils of *H. seravschanicus* that were investigated differed not only between component composition but also in the quantitative amounts of individual substances.* The differences are possibly connected with the growth sites of the specimens, the phase of development, and the year of collection.

*We were unable to detect a number of substances isolated by Zotov et al. [1].

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