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THE ESSENTIAL OILS OF THE FRUITS OF EARLY-RIPENING VARIETIES OF *Citrus unshiu*

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The most common among the variety of citrus fruits of Georgia have become the mandarins from the Unshiu group (*Citrus unshiu* Marc.) – the common type Owari and the dwarf type Wasi. Varieties of the Wasi-Kovano-Wasi and Miagawa-Wasi types are early-ripening large-fruited plants [1].

There is no information in the literature on the compositions of the essential oils of the skins of the Kovano-Wasi and Miagawa-Wasi fruits growing in Georgia. We give the results of a comparative study of the essential oil of the skins of ripe Kovano-Wasi and Miagawa-Wasi fruits and of the broad-leaved seedless Unshiu of the Owari type growing in the Sukhumi region.

The essential oils were isolated by steam distillation. The oils were extracted from the distillate with methylene chloride.

The essential oils were distilled in vacuum into low-boiling and high-boiling fractions. The high-boiling fraction, after saponification, was chromatographed on Al_2O_3 (activity grade II-III), and by successive elution with petroleum ether and with ethanol the sesquiterpene hydrocarbons and the terpene alcohols were separated. Substances were isolated in the individual state with the aid of preparative GLC from the fractions obtained on fractional distillation and chromatography on Al_2O_3.

The essential oils were separated on the analytical column described in [2]. The components were identified by the procedure described previously [2, 3].

Information on the amounts of the components in the essential oils of the skins of the fruits is given below (% on the total oil):

Component	Kovano-Wasi	Miagawa-Wasi	Broad-leaved Unshiu
α-Pinene	0,4	0,1	0,7
Sabinene	0,1	Tr.	0,1
β-Pinene	0,3	0,1	0,4
Myrcene	1,2	1,3	1,5
Limonene	77,9	81,8	82,3
γ-Terpinene	5,3	3,9	5,3
p-Cymene	0,2	0,3	0,2
Terpinolene	0,1	0,1	0,1
Linalool	3,3	2,7	1,3
Decanal	0,1	0,1	0,1
α-Copaene	0,1	0,1	0,2
β-Elemene	3,4	2,2	0,9
α-Terpineol	0,2	0,1	0,1
β-Caryophyllene	1,2	0,8	0,4
Citronellol	0,1	0,1	0,2
γ-Cadinene	0,1	0,1	0,2

Camphene, octanol, terpinen-4-ol, meryl acetate, geranyl acetate, dodecanol, merol, geraniol, thymol, and methyl methylanthranilate were detected in the oils in trace amounts.

The essential oils of the skins of the fruits of the early ripening varieties, as compared with the broad-leaved Unshiu, are characterized by a high level of sesquiterpene hydrocarbons and terpene alcohols.

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CAROTENOIDS OF Aloe arborescens

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The cartenoid composition of aloe (Aloe arborescens Mill.) has been determined by the method of B. G. Savinov and S. E. Kudritskaya [1]. The carotenoids were extracted from the aloe leaves with a mixture of petroleum ether and ethanol, after which the extracts obtained were saponified and concentrated. Separation was carried out by column chromatography on magnesia and zinc oxide and also by thin-layer chromatography on alumina. The individual substances isolated were investigated with the aid of a SF-10 spectrophotometer. The carotenoids were identified from their colors and the distribution of the zones on a chromatogram, by the chromatography of mixed samples of the zones isolated with known carotenoids, and by the performance characteristic color reactions.

The total mount of carotenoid pigments was determined by a colorimetric method [2]. It amounted to 12.86 μg/ml of the crude mass, or, calculated to dry matter, 200.0 μg/ml.

A total of six carotenoids was isolated, of which five were identified. Their amounts in the aloe leaves, expressed as percentage of the total amount of carotenoids, are given below:

β-Carotene	11.6
β-Zeacarotene	15.2
Cryptoxanthin	12.5
Lutein (xanthophyll)	34.8
Violaxanthin	17.9
Unidentified cartenoid	8.0
Total	100.0

The main carotenoid of the aloe was lutein, which possesses no vitamin A activity. The sum of the vitamin-A-active carotenoids (β-carotene, β-zeacarotene, and cryptoxanthin) amounted to 50% of the total amount of aloe carotenoids.

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