

Spectral investigations in the UV region showed that in the molecules of (II) and (III) the hydroxyls in position 3', 4', and 5 are free, and the 7-OH group is substituted by a carbohydrate residue.

Consequently, campanoside is an acylated luteolin 7-apioxyloside the acetyl group of which is present in the carbohydrate part of the molecule. This is the first time that a glycoside with such a combination of sugars has been found. The study of its structure is continuing.

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CHEMICAL COMPOSITION OF THE MONOTERPENES AND RESIN ACIDS OF THE OLEORESIN OF FAR-EASTERN SPECIES OF FIR

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UDC 668.445:547.595.9

There is almost no systematic information in the literature on the physicochemical properties and component compositions of the oleoresins of Far-Eastern species of fir. Only the compositions of the turpentine of the Sakhalin fir and of the acids of the Khingan fir have been reported previously [1, 2].

We have studied the composition of the oleoresin of *Abies nephrolepis* Maxim. (Khingian fir, the specimen being obtained from the Lazo region, Khabarovsk territory), *A. mayriana* Miyabe et Kudo (Mayr's fir), and *A. sachalinensis* Schmidt (Sakhalin fir, collected in the Korsakov and Poronai regions of the Sakhalin oblast).

The physicochemical properties of the fir oleoresins were investigated in accordance with GOST [State Standard] 10271-62:

Index	Khingian fir	Mayr's fir	Sakhalin fir
Refractive index, n_D^{20}	1.5254	1.5270	1.5271
Specific rotation, $[\alpha]_D^{20}$, deg	+12.9	+15.4	+13.4
Acid No.	62	60	63
Content, % of ballast substances	0.8	0.04	0.8
moisture	0.94	3.38	3.49
turpentine	22.9	25.1	23.5
resin acids	62.2	63.3	63.0

The qualitative and quantitative compositions of the turpentine were analyzed by the GLC method (TCEP, 37 m × 3 mm, 74°C). The monoterpene hydrocarbons detected and their amounts are given below (%):

Novosibirsk Institute of Organic Chemistry, Siberian Branch of the Academy of Sciences of the USSR. Translated from *Khimiya Prirodnikh Soedinenii*, No. 1, pp. 118-119, January-February, 1977. Original article submitted September 29, 1976.

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Compound	Khingan fir	Mayr's fir	Sakhalin fir
α -Pinene	28.9	21.3	25.4
α -Thujene	Tr.	Tr.	Tr.
Camphene	1.5	2.8	2.3
β -Pinene	24.1	28.1	29.1
Δ^3 -Carene	13.8	Tr.	3.6
Myrcene	0.5	0.8	0.7
Limonene	12.2	4.8	6.7
β -Phellandrene	18.1	41.3	31.7
γ -Terpinene	Tr.	Tr.	Tr.
Terpinolene	1.1	0.5	0.6
p-Cymene	Tr.	Tr.	Tr.

A study of the chemical compositions of the monoterpene hydrocarbons showed that their qualitative characteristics for the different species of fir are similar, but differences are observed in the relative amounts of the components such as Δ^3 -carene, limonene, and β -phellandrene.

To separate the acid and neutral compounds, the oleoresin was treated in the usual way [3]. The mixture of acids obtained was dissolved in petroleum ether to eliminate polymeric and oxidized products the amount of which in the oleoresins was fairly high (up to 30% and more). The petroleum-ether-soluble resin acids were methylated with diazomethane. The methyl esters of the acids were analyzed by GLC (XE-60, 5% on Chromaton, 2.5 m \times 3 mm, 214°C).

It was found that the composition of the acid fraction of the fir oleoresin was the usual one for conifers [2]. Among the methyl esters we found trace amounts of methyl Δ^8 -isopimarate, methyl pimarate, methyl isopimarate, and methyl sandaracopimarate.

The main resin acids of the oleoresins on the Khingan, Mayr's, and Sakhalin firs were compounds of the abietic type and they were distributed in the following way: methyl abietate (52.9, 60.5, 65.8%, respectively), methyl neoabietate (18.9, 22.7, 20.5%), methyl palustrate/methyl levopimarate (18.6, 10.1, 7.7%), and methyl dehydroabietate (8.4, 5.5, 4.9%).

The rosin from the oleoresin of these species of fir may serve as a high-yielding source of pure abietic acid.

The study of the composition of the high-boiling neutral fraction of the oleoresin is continuing.

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