PMR, present in the oleoresin in the form of a mixture of the 6S,7R- and 6S,7S-isomers in a ratio of 4:1 [4].

Thus, supplementing previous work [1-3], in the oleoresin of the Siberian fir we have identified and determined quantitatively 11 monoterpenoids and seven sesquiterpenoids.

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AN INVESTIGATION OF THE CHEMICAL COMPOSITION OF A SUSPENSION CULTURE OF GINSENG CELLS

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The production of biologically active substances by cultivating plant tissues and cells is attracting attention in view of the possibility of its use on the industrial scale. Furuya et al. were the first to describe the use of a callus culture of gingseng root with the aim of obtaining panaxosides [1, 2]. In a hydrolysate of a crude fraction of saponins from callus tissue, Furuya et al. established the presence of oleanolic acid, panaxadiol, and panaxatriol, and in extracts of the biomass they found panaxosides, β-sitosterol β-D-glucoside, and a mixture of sterols in which β-sitosterol predominated. The basic set of panaxosides of a callus culture corresponded to the set from the roots of *Panex gingseng* C. A. Mey.

In the USSR, an industrial production of gingseng biomass based on the surface method of growing a culture a culture of the plant tissue has been created [3]. One of the tasks for the future is the development of a technology for obtaining biologically active preparations from a suspension of gingseng cells.

In the present communication we given the first results of an investigation of extracts of suspension strains of gingseng from the museum collection of the Omutnisk chemical factory. The dried biomass of a cell culture of the strain BIO-2 (41.7 g) was fully extracted with methanol (3 × 100 ml).

The extract was evaporated in vacuum. The residue (8.57 g) was dissolved in 50 ml of water, the resulting solution was extracted with water-saturated n-butanol (3 × 25 ml), and the solvent was evaporated off. This gave 1.0 g of crude glycoside fraction (CGF). The results of its analysis by TLC in the chloroform–butan-1-ol–methanol–water (10:5:5.5:1.8) system showed the presence of four spots with a specific terpenoid coloration in the interval of R_f values characteristic for panaxosides, and a spot of the same coloration corresponding in its R_f value to an authentic sample of β-sitosterol β-D-glucoside. Detection was performed with 10% H_2SO_4 in ethanol followed by heating at 120-200°C.

A study of the aglycons of the presumed panaxosides obtained after the performance of acid hydrolysis (methanol–water–H_2SO_4 (50:50:2), at 95-100°C), revealed the presence of two main spots at the levels of authentic samples of β-sitosterol and of oleanolic acid. After the methylation of the dry hydrolysate residue with a solution of diazomethane in ether, the

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spot with the R_f value of its methyl ester appeared. On GLC, peaks with relative retention time (RRTs) corresponding to methyl oleanolate and to β-sitosterol arose. On TLC, the presence of additional spots was observed but it has not been possible to determine their nature by GLC.

GLC analysis was performed on a Tsvet-100 instrument with a flame-ionization detector under the following conditions: carrier gas helium (60 ml/min), glass columns (0.4 × 150 cm) filled with Chromaton N-AW (0.200-0.250 mm) impregnated with 65% of SE-30 (174-300°C at 4°C/min).

Thus, the extract of a suspension culture of the cells of *Panax gingseng* C. A. Mey that was studied contained as the main components β-sitosterol β-D-glucoside and an oleanolic acid glycoside and must be studied in more detail.

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THERMAL TRANSFORMATIONS OF CARDIAC GLYCOSIDES AND AGLYCONS

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The transformation of cardenolides under the action of dry heat has been investigated using a derivatograph on the Paulik-Paulik-Erdy system with photorecording. The transformed cardenolides formed in the first stages of the process were isolated preparatively in the pure form and were identified by a direct comparison with authentic samples. Strophanthidin, erysimin, gitoxin, gitoxigenin, strophanthidin oxime, and convallatoxin oxide (for their structures, see [1, 2]), were investigated.

On slow heating from room temperature to 230°C (2 h), strophanthidin formed a mixture of 17α-strophanthidin (mp 245-247°C, $[\alpha]_D^{20}$ + 35.1 ± 2° (s 0.8; methanol), strophanthidin and anhydrocardenolides. The anhydrocardenolides were the main products; their presence was shown by the IR-spectrum, which had absorption bands in the 1650-1670 cm^{-1} region belonging to isolated C=C bonds.

Erysimin, on slow heating to 230°C (2 h) formed a mixture of cardenolides identical in their chromatographic characteristics with the mixture obtained in the experiments with strophanthidin. This unexpected result indicates, in the first place, the complete thermal hydrolysis of the glycoside.

A second, preparative, experiment with comparatively rapid heating (8-9°C/min) to a temperature of 185°C led to the formation of a mixture of cardenolides the main representative of which proved to strophanthidin (mp 227-241°C); in addition, 17α-strophanthidin (mp 245-248°C), erysimin, and 17α-erysimin $[\alpha]_D^{21}$ + 22.0 ± 3° (c 1.0; methanol) were isolated The capacity of erysimin for undergoing hydrolysis on dry heating is perhaps the main characteristic of this glycoside. Gitoxin, in spite of the presence of the same D-digitoxose residue in it, does not have the tendency to such ready hydrolysis (see below).

At 220°C, gitoxigenin and gitoxin were completely converted in 7 min into 16-anhydro- and 14,16-dianhydro- derivatives: 16-anhydrogitoxigen $[\alpha]_D^{20}$ + 88.0 ± 5° (s 0.4; methanol) λ_{max} ethanol 215 and 270 nm (in the UV region, 16-anhydrogitoxin has λ_{max} methanol 222 and

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