of the inflorescence it is arabinose. The amounts of arabinose in the PSs of the whole plant and of the leaves were approximately the same and were at the level of galactose in the inflorescences, which accumulated in them in amounts 1.5 and 1.2 times less than in the whole plant and in the leaves, respectively. The level of xylose was approximately the same in all the PSs. The amounts of rhamnose in the leaves and the whole plant were also basically similar, while in the inflorescences it was present at the level of glucose. In the quantitative respect, glucose accumulated more in the leaves and less in the whole plant.

The results obtained permit the ESPSs of the cowslip primroses to be assigned to the class of pectin substances.

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MONOCARBOXYLIC ACIDS OF THE ESSENTIAL OILS OF SIBERIAN AND FAR EASTERN SPECIES OF Ledum

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UDC 615.322(517.1/5+581.192)547.913

The essential oil was obtained by steam distillation from leafy shoots of Siberian and Far Eastern species of Ledum: crystal tea ledum, macryophyllous ledum*, sprawling crystal tea ledum, and ledum-butterbur*. The acids were isolated by a published method [1]. Their amount in the various species ranged from 0.11 to 3.94%. Only formic and n-valeric acids have been detected previously, with the aid of descending paper chromatography [2].

The acid fractions were analyzed more completely by gas-liquid chromatography. Chromatograms were recorded on a Chrom-5 instrument with a flame-ionization detector. A packed glass column (3 mm × 1.2 m) with 15% of Carbowax 20 M on Chromaton NAW-DMCS as stationary

*Literal translations of the Russian names; not identified in Western sources [Translator].

TABLE 1. Monocarboxylic Acids in the Essential Oil of the Ledum Genus

Acid	Setting point, °C	Amount in the essential oil of the Ledum, μg/g			
		crystal tea	macro-phyllus	crawling	butterbur
4:0	138	—	1,51	—	4,00
5:0	148	21,15	0,97	—	2,35
6:0	160	14,97	2,06	1,36	13,28
7:0	169	—	18,27	3,15	22,24
8:0	180	1 49	8,86	5 01	40,54
9:0	189	—	15,83	13,09	66,88
10:0	198	5,30	57,20	9,01	21,44
11:0	212	5,95	94,66	—	67,36
13:0	233	0,83	14,11	—	—
14:0	237	60 85	—	—	—
15:0	246	2,70	—	—	—
16:0	254	0,65	—	—	—
18:0	263	8,79	—	—	—

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Translated from Khimiya Prirodnykh Soedinenii, No. 4, p. 506, July-August, 1986. Original article submitted January 3, 1986; revision submitted March 21, 1986.

0009-3130/86/2204-0474$12.50

phase was used, the rate of flow of carrier gas (helium) being 40 ml/min and the temperature of the column being raised according to a program from 120 to 260°C at the rate of 4°C/min. The packing of the column had previously been subjected to thermal modification [3]. The acids were identified from the setting points of standard substances – acids of the saturated series. The amounts of the components in a sample were determined by the method of absolute calibration. The results of the analysis, which are given in Table 1, indicate differences in the fractions of the acids from the various species. Myristic acid can serve as a chemical marker for crystal tea ledum in the chemosystematics of the Ledum genus.

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PHENOLIC COMPOUNDS OF Aruncus dioicus AND Adenocaulon adhaerescens

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UDC 547.592

Continuing a search for new types of antioxidants in representatives of the flora of the Far East [1, 2], we have invsetigated the herbaceous plants Aruncus dioicus (Walt.) Fern. (Family Rosaceae) and Adenocaulon adhaerescens Maxim (family Asteraceae) the chemical compositions of which had not been studied. The plants were gathered in the flowering period in the suburbs of Vladivostok (Murav'ev-Amurskii peninsula).

The fresh roots and epigeal part were extracted separately with ethanol. The concentrated extracts were reextracted with hexane, ethyl acetate, and butanol.

The ethyl acetate fractions of the roots, containing phenolic compounds, which showed antioxidant activity in the TLC test [1] were studied in detail.

Four substances were isolated from the ethyl acetate extract of the roots of Aruncus dioicus by column chromatography:

Compound (I) – $C_9H_8O_3$, mp 212-214°C; UV spectrum $\lambda_{max}^{C_2H_5OH}$ 290 sh, 310 nm;

Compound (II) – $C_{10}H_{10}O_4$, mp 168°C; UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 217, 233, 290 sh., 320 nm;

Compound (III) – $C_9H_8O_4$, mp 196-197°C, UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 235, 299, 325 nm.

By a study of methyl and silyl derivatives using the GLC method, compound (I) was identified as p-loumaric, (II) as ferulic, and (III) as caffeic acids.

Compound (IV) – $C_{15}H_{18}O_9$, mp 176°C; UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 218, 241, 301 sh., 333 nm.

When (IV) was subjected to acid hydrolysis, caffeic acid and D-glucose were detected. From the results of elementary analysis, PMR, and literature information [3], compound (IV) was identified as caffeoyl β-D-glucopyranoside.

Three compounds were isolated from the ethyl acetate fraction of the roots of Adenocaulon adhaerescens.

Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, Academy of Sciences of the USSR, Vladivostok. Translated from Khimiya Prirodnykh Soedinenii, No. 4, pp. 506-507, July-August, 1986. Original article submitted January 29, 1986.

0009-3130/86/2204-0475$12.50