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LIPIDS OF THE WOODY VERDURE OF THE SIBERIAN LARCH

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At the present time, great attention is being devoted to the problem of the complex utilization of wood biomass. Woody verdure (WV) is one of the main waste materials in the processing of conifer wood. The current technological schemes for the treatment of the WV of conifers is based on the use of spruce, pine, and fir as the raw material [1]. The Siberian larch has not been used for these purposes. This is connected, in the first place, with the seasonal nature of its needles and, in the second place, with the inadequate degree of study of the chemical composition of its WV, particularly in relation to the lipid metabolism. The first point is not a serious disadvantage. If exhaustive information on the chemical composition of the larch WV were available it could be used in complex processing in admixture with other species.

We have investigated the lipids of Siberian larch WV and the change in lipid composition in the course of vegetative growth. The WV consisted of needles and lignifying shoots. We determine the mechanical composition of the Siberian larch WV in the course of the vegetation period:

WV fraction, % on the total weight	Time of collecting the Specimens				
	May	June	July	August	September
Needles	74.70	71.58	69.43	68.31	68.85
Lignifying shoots up to 8 mm in diameter	25.30	28.42	30.57	31.69	33.15

As can be seen from the figures given above, in the period from May to September the amount of needles decreased, which is connected with an increase in the diameter of the lignifying shoots.

The lipids were extracted by the Bligh-Dyer method [2]. The total lipids (TLs) obtained were fractionated by column chromatography on silica gel [3]. As a result of which neutral lipids (NLs), glycolipids (GLs), and phospholipids (PLs) were obtained (% of the absolutely dry weight):

Time of collecting the specimens	Needles			Lignifying shoots		
	NLs	GLs	PLs	NLs	GLs	PLs
May	2,04	0,36	0,12	2,61	0,74	0,26
June	2,71	0,96	0,17	4,15	1,14	0,38
July	3,49	1,80	0,67	4,04	0,85	0,35
August	3,12	0,86	0,45	3,09	0,68	0,29
September	2,93	0,30	0,22	2,85	0,64	0,25

In the TLs of both the needles and the lignifying shoots the bulk consisted of NLs. Polar lipids (PoLs) were represented in considerably smaller amounts, and more than half of them consisted of GLs.

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TABLE 1. Composition of the Phospholipids from the Woody Verdure of the Siberian Larch (% of absolutely dry weight)

Group of PLs	Time of collecting the specimens				
	May	June	July	August	September
Needles					
PS	0,022	0,016	0,015	0,042	0,039
PI	0,017	0,019	0,053	0,057	0,031
PC	0,054	0,089	0,406	0,262	0,110
PE	0,027	0,046	0,196	0,089	0,040
Lignifying shoots					
PC	0,109	0,177	0,168	0,133	0,110
PG	0,057	0,055	0,042	0,049	0,050
PE	0,094	0,148	0,140	0,108	0,090

The total PL fraction was subjected to further investigation. The total PLs were separated into individual groups by two-dimensional chromatography according to [4]. The PLs were identified by qualitative reactions and by a comparison of chromatographic mobilities with standards, and also by IR spectroscopy. The amounts of the PLs were determined according to [5], and the results are given in Table 1.

It was established that the PLs of the Siberian larch WV consisted of phosphatidylserine (PS), phosphatidylinositol (PI), phosphatidylcholine (PC), phosphatidylethanolamine (PE), and phosphatidylglycerol (PG). The main groups of PLs were PC and PE. The maximum amounts of PC and PE for the needles (July) were 60.57% and 29.26% of the sum of the PLs, respectively, while for the lignifying shoots (July) they were 48.11% and 40.12%, respectively.

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