

FATTY ACID COMPOSITION OF THE WOODY VERDURE OF THE SIBERIAN LARCH

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Continuing the chemical study of the complex of polar lipids from the woody verdure of coniferous species of Siberia [1], we have determined the fatty acid compositions of the total phospholipids (PLs) of the needles and shoots of the Siberian larch, *Larix sibirica*. The methods of isolation and the qualitative and quantitative compositions of the phospholipid fraction of the woody verdure of the Siberian larch have been described previously [2]. In the present communication we give information on the composition and the dynamics of the amounts of fatty acids in the total PLs of the needles and shoots of the Siberian larch in the course of the vegetation period (Table 1).

The fatty acid compositions of the total PLs were determined after alkaline hydrolysis, followed by isolation and methylation, and the GLC analysis of the fatty acid methyl esters. GLC was conducted on a Tsvet-100 instrument with a flame-ionization detector and programmed heating of the column. The stationary phase used was SE-30 deposited on Chromaton N-AW-DMCS with a particle size of 0.20-0.25 mm (5%). The length of the glass column was 2 m and its diameter 4 mm. The carrier gas was helium at the rate of 90 ml/min. The column was heated from 100 to 280°C at the rate of 8°C/min. The temperature of the detector was 320°C and that of the evaporator 250°C.

The qualitative compositions of the fatty acids of the total PLs of the needles and of the shoots were identical and consisted of 10 individual acids of the C₁₂-C₂₂ series. However, differences were found in the amounts of the acids. Thus, in the PLs of the shoots unsaturated acids predominated only from May to July, while in the PLs of the needles they did so over the whole vegetation period.

TABLE 1. Fatty Acid Composition of the Total Phospholipids from the Woody Verdure of *Larix sibirica* (% GLC)

Acid	Needles					Shoots				
	May	June	July	August	September	May	June	July	August	September
12:0	3.09	3.02	2.39	4.88	5.47	2.84	1.94	2.45	2.68	3.05
14:0	1.48	1.55	0.94	2.16	2.76	5.24	3.72	1.71	2.58	3.45
16:0	22.05	20.97	18.16	17.67	18.13	21.85	11.70	24.61	36.14	40.54
16:1	8.12	7.01	9.33	6.18	7.52	6.12	7.18	5.12	4.53	4.29
18:0	10.88	6.64	3.85	8.13	9.60	1.85	1.28	1.49	1.67	1.93
18:1	12.22	13.92	14.61	13.63	8.86	6.34	10.44	6.52	4.12	3.66
18:2	33.00	40.16	41.85	39.67	38.18	23.29	31.07	26.49	18.44	12.96
18:3	6.51	5.23	7.15	5.68	6.72	24.16	27.73	24.25	20.03	18.31
20:0	0.84	0.94	0.74	1.05	1.20	5.22	4.21	6.12	7.95	9.69
22:0	1.84	0.56	0.98	0.95	1.56	3.09	0.73	1.24	1.86	2.12
Total saturateds	40.15	33.68	27.06	34.84	38.72	40.09	23.58	37.62	52.88	60.78
Total unsaturateds	59.85	66.32	72.94	65.16	61.28	59.91	76.42	62.38	47.12	39.22

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From the beginning of the vegetation period (May) physiological processes connected with the formation of needles and the growth of shoots are activated in the tissues of the Siberian larch. The amount of unsaturated acids in the PLs of the needles and shoots is then higher than that of saturated acids. In the following months (from May to July for the PLs of the needles and from May to June for the PLs of the shoots) a further increase is observed and a maximum is reached in the amount of unsaturated fatty acids. With the completion of the vegetation process the total level of unsaturation falls (mainly through an increase in the proportion of the 16:0 acid). The 18:2 and 18:1 species predominate among the unsaturated acids of the PLs of the needles, and the 18:2 and 18:3 species among those of the shoots.

Information in the literature according to which growth processes are connected with the composition of the fatty acids of the polar lipids [3, 4] permits the conclusion that the fatty acid compositions of the total PLs of the needles and shoots that have been found reflect the state necessary for the growth and development of these tissues during the vegetation period.

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