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CHEMICAL COMPOSITION OF FRUITING BODIES FROM TWO STRAINS OF *Laetiporus sulphureus*

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The species *Laetiporus sulphureus* (Bull.:Fr.) Murr., which belongs to the ecological group xylotrophs, is widely distributed in deciduous and mixed forests near Lake Baikal. This species is readily cultivated and colonizes both living and dead wood. It possesses pharmacological activity and; therefore, is promising for biotechnology development [1].

The goal of our work was to determine the fatty-acid, amino-acid, and elemental compositions of fruiting bodies of two strains of *L. sulphureus*.

We used cultures of *L. sulphureus* strains LS-BG-0804 and LS-UK-0704, which were isolated from fruiting bodies collected from dead wood in Irkutsk Oblast by the standard procedure [2]. Mycelium was grown on agar-gel medium (8° Balling) in Petri dishes at a controlled temperature of 21°C. Innoculated wood was incubated at 21°C until the substrate was fully overgrown. Fruiting bodies were produced on the wood under natural conditions [3]. Fatty acids were analyzed as methyl esters on an Agilent GC—MS with a mass-selective detector (No. 5973) and a diffusion pump using a PH-Innowax 30 m/250 μm/0.50 μm column. The temperature gradient was 150-250°C at a heating rate of 2°C/min. Helium was used as the carrier gas. The amino-acid composition was analyzed on an AAA-339 automated amino-acid analyzer. The total content of amino acids was determined using ninhydrin [4]; the elemental composition, emission spectroscopy on a DFS-8 spectrograph.

The lipid composition of strain LS-UK-0704 typically had fatty acids with chain lengths in the range C_{12}-C_{25}; strain LS-BG-0804, C_{14}-C_{18}. Saturated fatty acids made up 29.84 and 30.05% of their total mass with 16:0 acid dominating. Unsaturated acids made up about 69% of the acid mass. The content of oleic acid was 19.33 and 19.43%; linoleic, 47.50 and 48.19%, i.e., the latter dominated the fatty-acid complex of both strains (Table 1). The strains differed only in the qualitative composition of fatty acids. Strain LS-BG-0804 did not have 12:0 and 20:0-25:0 constituents and the content of 14:0-17:0 was higher than in LS-UK-0704. The ratio of saturated and unsaturated acids was the same at 1:2.29.

Investigation of the composition of free amino acids found that the content of essential amino acids was 41.54 and 45.41% for LS-BG-0804 and LS-UK-0704, respectively (Table 2). Strain LS-UK-0704 had a higher content of histidine, isoleucine, lysine, methionine, threonine, and tyrosine. Valine was missing in both strains. The main component of the amino-acid complex for LS-BG-0804 was glutamic acid; for LS-UK-0704, tyrosine.

Differences in the strains were observed by examining the elemental compositions of the fruiting bodies. LS-BG-0804 typically accumulated Ag, Fe, Mo, Si, and Zr whereas LS-UK-0704 concentrated Al, Be, Ca, Co, and Zn (Table 3).

The differences found in the chemical compositions of the investigated strains confirm the morphological and anatomical differences found previously for LS-BG-0804 and LS-UK-0704.

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TABLE 1. Fatty-Acid and Lipid-Fraction Compositions in Fruiting Bodies of Two *L. sulphureus* Strains, %

Acid	LS-BG-0804	LS-UK-0704	Acid	LS-BG-0804	LS-UK-0704
12:0	-	0.10	25:0	-	0.94
14:0	1.10	0.33	$\Sigma_{Sat.}$	30.05	29.84
15:0	3.55	1.26	16:1n-7	1.34	0.64
16:0	20.80	17.56	18:1n-9	19.43	19.33
17:0	0.86	0.81	18:1n-7	-	0.94
18:0	3.74	4.05	18:2n-6	48.19	47.50
20:0	-	0.60	$\Sigma_{Unsat.}$	68.96	68.41
22:0	-	1.48	$\Sigma_{Unident.}$	0.98	1.74
23:0	-	0.60	Σ_{Acid}	99.99	99.99
24:0	-	2.11			

TABLE 2. Amino-Acid Content in Fruiting Bodies of Two *L. sulphureus* Strains, %

Acid	LS-BG-0804	LS-UK-0704	Acid	LS-BG-0804	LS-UK-0704
Ala	0.25	0.07	Met	0.17	0.18
Arg	0.47	0.38	Orn	0.18	0.14
Asn	0.08	0.09	Pro	0.14	0.19
Asp	0.14	0.18	OH-Pro*	0.14	0.40
CysA*	0.09	0.10	Ser	0.24	0.21
Gln	0.49	0.49	Tre	0.20	0.24
Glu	0.85	0.39	Tyr	0.33	0.79
Cly	0.18	0.05	α-AMK*	0.18	0.28
His	0.40	0.58	γ-AMK*	0.15	0.15
Ile	0.11	0.13	Cln*	0.01	0.06
Leu	0.52	0.30	Σ_{A-A}	5.97	6.43
Lys	0.28	0.32	$\Sigma_{essent.}$	2.48	2.92

* CysA is cysteinic acid; OH-Pro, hydroxyproline; α-AMK, α-aminobutyric acid; γ-AMK, γ-aminobutyric acid; Cln, citrulline.

TABLE 3. Elemental Composition of Fruiting Bodies of Two *L. sulphureus* Strains, %

Element	LS-BG-0804	LS-UK-0704	Element	LS-BG-0804	LS-UK-0704
Ag	$4.17 \cdot 10^{-4}$	$0.83 \cdot 10^{-4}$	Na	0.08	0.08
Al	$0.83 \cdot 10^{-3}$	$5.80 \cdot 10^{-3}$	Ni	$6.56 \cdot 10^{-4}$	$5.82 \cdot 10^{-4}$
Be	$0.82 \cdot 10^{-5}$	$2.49 \cdot 10^{-5}$	P	0.21	0.33
Ca	1.50	2.17	Pb	$3.92 \cdot 10^{-3}$	$3.32 \cdot 10^{-3}$
Co	$0.27 \cdot 10^{-3}$	$5.39 \cdot 10^{-3}$	Sc	$1.67 \cdot 10^{-4}$	$1.66 \cdot 10^{-4}$
Cu	0.02	0.03	Si	0.23	0.08
Fe	0.13	0.08	Sn	$5.00 \cdot 10^{-5}$	$4.15 \cdot 10^{-5}$
Mg	0.22	0.38	Ti	0.03	0.02
Mn	0.16	0.11	Zn	$0.83 \cdot 10^{-3}$	$1.66 \cdot 10^{-3}$
Mo	$6.67 \cdot 10^{-5}$	$3.32 \cdot 10^{-5}$	Zr	$4.18 \cdot 10^{-4}$	$0.91 \cdot 10^{-4}$

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