TRIGLYCERIDES OF THE WINE GRAPE

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The technological importance of triglycerides (TGs) in the winemaking industry [1] is largely due to their participation in oxidizing processes [2]. The resistance of TGs to oxidation is, as is well known, determined by the nature and position of the distribution of the fatty acid residues in their molecules. However, the contribution of the component parts of the wine grape to the formation of the technological reserve and the position-species compositions of the TGs of wine materials have remained unelucidated.

In the present communication we give the results of an investigation of the composition of the TGs of the structural elements of the wine grape (flesh, skin, and seeds) and of the wine materials formed from these elements.

The structural elements of the grape of the cultivated vine *Vitis vinifera* L., variety Pinot Gris were subjected to the following treatment: The seeds were ground in a mortar with the addition of liquid nitrogen, and the skin and flesh were comminuted in a homogenizer. The wine materials were obtained by the methods generally adopted under identical conditions [3].

The lipids were extracted by a modified Bligh-Dyer method [4], and the TGs were separated by TLC in the heptane–methyl ethyl ketone–acetic acid (42.5:7.5:0.5) system followed by the elution of the spot corresponding to the TGs (R_f 0.73) on the chromatogram. The position-species composition of the TGs was studied by enzymatic hydrolysis with the aid of pancreatic lipase [6]. The fatty acids were identified by the GLC analysis of their methyl derivatives.

In the TGs of the structural elements of the wine grape we detected from 24 to 32 fatty acids (C_8–C_{24}). Six acids – palmitic (S_1), lignoceric (S_2), stearic (S_3), oleic (U_4), linoleic (U_5), and palmitoleic (U_6) proved to be quantitatively the main ones. Consequently, in order to simplify the calculations we separated all the acids in accordance with their chemical characteristics into six groups: S_1, S_2, S_3, U_4, U_5, and U_6. The amounts of the acids of the given six groups in the TGs and monoglycerides (MGs) obtained after enzymatic hydrolysis are given below (%):

	S_1		S_2		S_3		U_4		U_5		U_6	
	MGs	TGs	MGs	TGs	MGs	TGs	MGs	TGs	MGs	TGs	MGs	TGs
Flesh	4.6	22.7	5.1	26.4	2,6	8,1	28,2	14.7	39.4	15.8	20.1	12,3
Skin	3.7	8,1	9.4	38.3	6.6	19,8	43.4	18.7	10,8	5.0	26,1	10.1
Seeds	4.9	12.3	2.6	7.4	0,9	2,1	9.9	12,2	76.0	59.6	5,7	6,4
Wine material from the flesh	9.4	34.5	6.0	22.0	4,6	7.5	41.9	20,4	12,2	3,0	25,9	12,6
Wine material from the grape	3.8	21.0	2.9	18.1	2.1	10.5	40.5	24.9	22.0	8.5	28.7	17,0

The amounts and position-species composition of the TGs were as follows (%):

	SSS	*SSU*	*SUS*	*USU*	*SUU*	*UUU*	Total amount, mg/mg
Flesh	7,8	4,0	55,7	0,5	28,4	3,6	118
Skin	15,8	3,7	64,2	0,2	15,2	0,9	1420
Seeds	0,7	3,4	7,5	4,6	37,3	46,8	3210
Wine material from the flesh	14,7	4,0	62,8	0,3	17,0	1,2	54
Wine material from the grape	4,3	3,7	44,7	0,8	38,3	8,2	132

In accordance with the experimental results, the structural elements of the wine grape form the following sequence of decreasing TG contents: seeds, skin, flesh.

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Characteristic for the seeds is a substantial predominance of di- and triunsaturated TGs, and for the skin and flesh a predominance of disaturated TGs with the unsaturated acyl in the sn-2 position. The degree of saturation of the TGs of the skin is substantially higher than for the flesh.

The position-species composition of the TGs of the wine material is, as was to be expected, largely determined by the composition and TG content of the structural elements participating in the formation of these wine materials. Thus, the composition of the TGs of the wine materials from the flesh is qualitatively similar to that of the TGs of the flesh itself, but with a somewhat increased amount of TGs with saturated fatty acid residues. The latter can be explained by the oxidative destruction of the unsaturated acyls. At the same time, the composition of the TGs of the wine material from the grape differs considerably from the composition of the TGs of the flesh by a higher amount of di- and triunsaturated glycerides. The latter is obviously connected with the passage of TGs from the seeds into the wine material from the grape.

The experimental results confirm the characteristic feature of the preferential nature of the sn-2 position of the unsaturated acyls in the TGs of plant oils.

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