Physico-Mechanical Analysis and Uvological Indices at Three Varieties of Grapes for Superior White Wines Grown in North-West Romania

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Abstract. The mechanical composition of the grapes is expressed by numerical ratio between the structural elements of the cluster (uvologic units): clusters, skins, pulp and seeds. The research in this paper aims the mechanical structure and uvologic values of three grape varieties for superior white wines: 'Fetească albă', 'Fetească regală' and 'Riesling italian', cultivated in NW Romania in 2013. The highest weight of a grape was recorded in the 'Fetească albă' variety cultivated in Șimleul Silvaniei (135 g) and the lowest was recorded in Fetească regală, in Baia Mare (91 g). The lowest index structure was recorded in 'Fetească albă' in Turulung Vii (21.54) and the higher was registered in 'Fetească regală' (36.69) in Șimleul Silvaniei area.

Keywords: *grape indices, physico-mechanical analysis, white grapes varieties*

Introduction

Uvology is the science that deals with the study of grapes as raw material in manufacturing and exploitation of grapes. By knowing the ampelographic characteristics of varieties, uvology follows their specialization for their economical use in production, to obtain varied and high quality products (Lung, 2013). The mechanical composition of the grapes is expressed in weight and numerical ratios between the elements of grape structure, uvologic units: clusters, skins, pulp and seeds (Mureșan, 2008).

Material and Methods

The biological material was represented by: 'Fetească albă', 'Fetească regală' and 'Riesling italian' from three different areas of NW Romania: Baia Mare (BM), Șimleul Silvaniei (SS) and Turulung Vii (TUR). Determinations were made on the mechanical structure of the clusters (the average weight of a grape, the number and weight of grapes per 1 kg of grapes, the average weight of a grape, rachis weight, peel, seed and their number, must

yield) and the uvologic index were determined (structure index, grape and grape composition) using the formulas: structure index=grain weight/weight of bunches, berries index=no. grapes/100 g grapes, composition index=weight of pulp/peel + seed weight.

Results and Discussion

Knowledge of the mechanical structure of the grapes is important to characterize the technological potential of varieties of vines, calculating yield must, but also to determine the ability of different types of wine for fermentation (Lung, 2013). The highest value of grapes weight was achieved in 'Fetească albă' in Șimleul Silvaniei (135g) and the lowest weight was recorded in 'Fetească regală' (91g in Baia Mare, 97.9 g Șimleul Silvaniei) (Tab. 1). The variety with the highest average weight of a grape was 'Fetească regală' (1.90g) and 'Riesling italian' has the smallest grapes in all three areas (between 1.21-1.31 g). The best yield in must was obtained in 'Fetească regală' (83.50%), cultivated in Șimleul Silvaniei.

Tab. 1. Physico-mechanical composition of the varieties studied / 1kg grapes

Variety	Area	Average weight of a grape bunch (g)	Berries		Average weight of aberries (g)	Skins (g)	Seeds		Rachis (g)	Pulp (g)	Yield Must (%)
			Nr.	(g)			Nr.	(g)			
'Fetească albă'	BM	122	622	964	1.54	141	563	45	36.4	778	80.70
	ŞS	135	749	972	1.29	149	558	51.3	28.1	775	79.73
	TUR	124	683	949	1.38	138	571	48.1	43.9	760	80.08
'Fetească regală'	BM	91	502	957	1.90	133	675	37.2	40.7	787	82.23
	ŞS	97.9	534	976	1.82	121	704	40.3	26.6	815	83.50
	TUR	102.5	513	971	1.89	124	710	38.7	30.1	790	81.31
'Riesling italian'	BM	118	786	953	1.21	164	867	48.1	47.3	740	77.64
	ŞS	125	731	964	1.31	159	913	51	36.8	751	77.90
	TUR	131.3	759	970	1.27	143	849	47	30.0	780	80.41

Tab. 2. Grape index of the wine grape varieties

Variety	Area	Structure index of bunch grape	Berries index	Berries composition index
'Feteasca albă'	Baia Mare	26	65	4
	Şimleul Silvaniei	35	77	4
	Turulung Vii	22	73	4
'Feteasca regală'	Baia Mare	24	52	5
	Şimleul Silvaniei	37	55	5
	Turulung Vii	32	53	5
'Riesling italian'	Baia Mare	20	82	3
	Şimleul Silvaniei	27	76	4
	Turulung Vii	32	78	4

The lowest index structure of the grape was recorded in 'Fetească albă' in 'Turulung Vii' (22), while 'Fetească regală' registered the highest values in all areas: Şimleul Silvaniei (37), 'Turulung Vii' (32) and Baia Mare (24) (Tab.2). Of the three grape varieties studied, 'Riesling italian' has the highest grape index values for the three areas of culture: 82 in Baia Mare, 76 in Şimleul Silvaniei and 78 in 'Turulung Vii' and the lowest grain index was achieved in 'Fetească regală' in the three areas studied (52-55). When analyzing the composition index of grapes it can be observed the lowest index was achieved in the 'Riesling italian' variety (3-4).

Conclusion. Regarding the mechanical analysis, 'Fetească regală' has the highest grape weight, pulp weight and best must yield compared

with 'Fetească albă' and 'Riesling italian' in all three areas. The uvologic index for the analyzed varieties are within the specific intervals for varieties for white wines of superior quality.

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