EVALUATING THE QUALITATIVE POTENTIAL OF SOME BREEDS OF BLACK GRAPES FROM SEGARCEA WIN-GROWING AREA

EVALUAREA POTENȚIALULUI CALITATIV AL UNOR SOIURI DE STRUGURI NEGRI DIN AREALUL VITICOL SEGARCEA

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Abstract. *Due to its heliothermic resources, Oltenia represents the region with the highest favorability for growing black grapes in our country, they having a polyphenolic potential superior to the other wine-growing areas and a more intense cumulation in sugars, resulting red wines of a superior quality very much appreciated both in the country and abroad. The study developed within 2007-2008 aimed to be realized a comparative frame between famous breeds in the autochthonous wine-growing (Cabernet, Sauvignon and Merlot) and mediteranean breeds recently introduced in cultivation (Siraz and Marcelan) cultivated in the pedoclimatic conditions of Segarcea wine-growing area. In this way, realizing the comparative frame, encloses along the analysis of some qualitative parameters from the grapes of the analyzed breeds (acidity, sugars, poliphenols) during the aging activity and an attentive monitoring of the climatic factors (the air's temperature, relative humidity of the air, light) as well as establishing some correlations between these parameters.*

Key words*:* black grapes, heliothermic resources, wine

Rezumat. *Oltenia, datorită resurselor heliotermice ridicate, reprezintă regiunea cu cea mai mare favorabilitate pentru cultura strugurilor negrii din țara noastră, aceştia având un potențial polifenolic superior celorlalte zone viticole precum şi o acumulare mai intensă în zaharuri, rezultând vinuri roşii de calitate mult apreciate atât în țară cât şi în străinătate. Studiul întreprins în perioada 2007-2008 a vizat realizarea unui cadru comparativ între soiuri consacrate în viticultura autohtonă (Cabernet Sauvignon şi Merlot) şi soiuri de proveniență mediteraneană, recent introduse în cultură (Syrah şi Marcelan) cultivate în condițiile pedoclimatice ale arealului viticol Segarcea. În acest sens, realizarea cadrului comparativ cuprinde pe lângă analiza unor parametrii calitativi din strugurii soiurilor luate în analiză (aciditate, zaharuri, polifenoli) în timpul perioadei de maturare şi o atentă monitorizare a factorilor climatici (temperatura aerului, umiditatea relativă a aerului, lumina) precum şi stabilirea unor corelații între aceşti parametrii.*

Cuvinte cheie: struguri negrii, resurse heliotermice, vin

INTRODUCTION

Since 1955, Florov A. and his collaborators have studied the dynamics of some biochemical substances from the grapes (sugars, acids, tanning materials,

azote, flavours, vitamins, enzymes and mineral substances), establishing their accurate proportions in different moments of the ripening process.

In order to reach a certain type of wine, with normal biochemical composition and pleasant organoleptic features, both the wine-grower and the oenologist must study first very attentively the row materia and the grapes aging phenomena (Ribereau - Gayon P., Peynaud E.-1960-1961). The grape's polephenols proved to be the most important ones after sugars and acids: they confer color to wines, the smooth or astringent taste, the exactiveness and corpolence, physical-chemical stability (Puissant A., Huguette L.-1967, Popa A.-1996, Țârdea C. and collab.-2000, ş.a.). The climate's influence upon the grapes composition and implicitly of the obtained production quality was studied by various researchers.

Due to the changes of the climatic conditions occured over the last years, it is imposed a rigurous monitoring of them in order to establish the hydric and thermic stress level to which the vine is submitted with consequences upon the qualitative potential. For a more accurate establishment of the best moment for harvesting the grapes, many ripeness parameters and indexes are used (Abbal and collab.- 1992, Panigai and collab.-1994).

MATERIAL AND METHOD

The supervision of the climatic data has been achieved by means of the weather station set up on the vine plantation belonging to S.C. Domeniul Coroanei S.R.L. The biological material used for analysis consisted in grapes of well-known varietys Cabernet Sauvignon and Merlot, also sorts of mediterranean sorts newly introduced in cultivation (the fourth year of plantation) Syrah and Marcelan. The organization of the experiments had been done by the method of the randomized blocks, with four versions, representing the studied varieties, cultivated in the same edaphical and orographical conditions (plateau). The qualitative analysis of the mentioned sorts was realized at a distance of five days during the ripening period and it comprised: mass determination of one hundred grains by means of automatic analytical balance for laboratory, sugars determination obtained with the refractometry method (Abbe refractometer), total acidity value with Mettler Toledo titrimetric method. The following of the ripening process of autochthonous and mediterranean varieties was achieved by determination of the glucoacidimetric index expressed according to the calculation formula: I.G.A.=G/At, in which G signifies sugars quantity (glucides) and At means total acidity of the respective sort. The determination of the colouring substance was obtained spectophometric (spectophometer UV-150pc) with the method elaborated by Puissant A. and Hoguette L. The dyamics of phenolic compounds was followed at five days distance starting with the first of August until the harvesting moment.

RESULTS AND DISCUSSIONS

Climate supervision was efectuated with the purpose of evaluation of some restrictive climatic indicators, with effects on the bioproductive and qualitative behaviour of the analysed sorts, the obtained data were processed and analysed by means of some general climatic idicators (unicriterial).

As general climatic indicators have been processed data concerning: thermic resources evaluation (absolute maximum and minimum temperatures, medium temperatures), evaluation of the light resources, precipitation conditions, also the relative air humidity. Thermic resources represent the permanent element which through its variability determines the most important manifestations of the vine (Martin T., 1968). Also it is known the inferior level which releases the biological processes of the vine on 10°C. According to the recorded data from table 1 it is noticed that this level was achieved at Segarcea in the year 2008, late spring (March-April) when there were recorded monthly medium temperatures of 8,5°C, respectively 12,2°C, correlated with low absolute minimum temperatures (-4,9°C in March). An orientative estimation criterion of the quality conditions of the grapes is the medium temperature belonging to the warmest month (July-August), that for Romania is a minimum of 18,5°C and a maximum of 23,2°C. In the vine area of Segarcea, August, 2008 represented the month with the highest thermic parameters registrating a medium temperature of 24,5°C. It is noticed the surpass of the maximum level of temperature specific to our country, the rise of this thermic indicator is bounded with the accumulation of the compounds responsible firstly for the quality of black grapes and secondly for the red wines (tables 1 and 2). The absolute maximum temperature in August represents a restrictive factor for the quality of grapes when surpasses the value of 42°C.

Table 1

Climatic parameters registred in the year 2008, in the wine-growing district Segarcea

Month	Air temperature (°C)			Precipitations (mm)	Air relative moisture (%)	Insolations (hours)		
	Max.	Med.	Min.			∑I	∑ia	∑ir
I	9,8	-3,6	-17,2	30,4	91,0	53,8	2438,7	1684,6
II	18,5	3,2	-9,7	2,4	77,0	120,7		
III	21,2	8,5	-4,9	14,8	63,0	182,6		
IV	24,7	12,2	2,1	56,4	76,0	253,2		
V	34,0	16,8	4,2	34,6	71,0	280,6		
VI	35,2	21,3	9,1	130,4	70,0	304,7		
VII	36,2	23,8	11,1	59,2	50,0	335,9		
VIII	38,0	24,5	12,6	2,4	50,0	369,0		
IX	36,2	16,7	4,0	76,0	67,0	241,2		
X	24,4	12,53	0,6	78,8	82,0	145,4		
XI	22,6	6,08	-7,1	13	85,0	74,8		
XII	15,5	2,0	-12,1	111,2	93,0	46,8		

When the air temperature touches this value the photosynthesis process is blocked bringing to a intensification of the breathing and evapoperspiration processes resulting a decreasing content of organic acids (malic acid), glucides and flavoured substances. This phenomenon was not registered in none of the

varieties studied in 2008 at Segarcea, the maximum temperature touched in August was 38°C. In the analysed period the value of this factor was of 32,6°C.

Generally, the studied year, from the hygroscopicity point of view, represents a normal year for the optimum growth of the vine (the values oscillated from the minimum level of 50% in July and August to 80-90% during the repose period). From the precipitation point of view, we can say, analysing the data registered in table 1, that it was a droughty year imposing the insurance of a hydric regime through irrigation. The light presents daily oscillations, the requests of the vine are different according to the species, variety, age and vegetation phase. This is expressed by the global annual sum of the insolation hours (potential ∑ia) and the sum of the effective shining hours (actual ∑ir). According to∑ir after calculations it is noticed a high favourability of the analysed year (1684,6 hours), and the data obtained according to ∑ia indicate the high presence of ligth, mainly in the ripening period (2438,7 hours). This aspects are extremly important, the content of the studied grapes, in means of colouring substance, depends on the quantity of insolation (Marcelan varieties accumulates 5309 mg/kg). In the last two decades, it is found a growth in the interest for scientific research in the area of viticulture regarding those chemical elements found in grapes that establish the specificity of the different wine categories.

Meaningful in this purpose are the researches regarding the qualitative and poliphenolic potential of the grapes, decisive elements for black grapes. With this purpose the curve of ripening was followed through determination of sugar, acidity and the mass of one hundred grains, for each studied variety also for the phenolic potential to time intervals exactly established. Because of the small amount of precipitations registered during the vegetation and ripening processes it is noticed a constant growth in the grains weight, without significant variations. Among the well-known varieties we notice that Merlot has a more constant rhythm of growth as the variety Cabernet Sauvignon (133,1 g compared to 117,1 g). Among the mediterranean varieties it is noticed the Syrah with a harvesting weight of 141,0 g/100 grains (table 2). At the beginning of the ripening period the variety Cabernet Sauvignon is noticed through a high acidity (12,3 g/l), opposite to it there is the variety Merlot with 9,1 g/l acidity expressed in sulphuric acid. Because of the drought from the maturation period (2,4 mm/m) there are noticed rapid reductions of acidity to all studied varieties until the first part of September.

The variety which obtained the highest content of acidity in the process of technological maturation was Cabernet Sauvignon (5,5 g/l), the lowest acidity was registered with the variety Marcelan (4,5 g/l). Progressive quantitative accumulations, more or less spectacular, lead to the achievement of a superior level of sugars at maturation, separated on varieties, with a maximum of 277 g/l in Marcelan and a minimum of 225 g/l in the variety Cabernet Sauvignon (table 2). Following the dynamics of the maturation index it is noticed that in the year 2008, in the established climatic conditions, all the sorts met the necessary

conditions for the achievement of quality red wines, the best ripening had been obtained by Merlot, followed by Marcelan, Syrah and Cabernet Sauvignon.

Table 2

Determination of the qualitative parameters of the studied sorts in the wine-growing district Segarcea

Parameters	Sorts	Calendaristic data						
		10VIII	15VIII	20VIII	25VIII	30VIII	5IX	10IX
Mass of 100 grains (g)	Cabernet Sauvignon	60,5	69,2	78,4	84,5	98,3	114,2	117,1
	Merlot	76,4	81,4	92,4	100,4	111,2	129,5	133,1
	Syrah	85,2	98,6	107,6	119,7	128,3	137,4	141,0
	Marcelan	68,3	73,9	80,3	87,8	97,4	107,9	115,3
Acidity (g/l H2SO4)	Cabernet Sauvignon	12,3	10,8	9,5	8,2	7,1	6,2	5,6
	Merlot	9,1	8,5	7,8	7,1	6,2	5,4	4,6
	Syrah	10,1	9,3	8,5	7,0	6,1	5,2	4,6
	Marcelan	11,0	9,5	8,7	7,3	6,6	5,3	4,5
Sugars (g/l)	Cabernet Sauvignon	164,0	170,0	181,0	200,0	212,0	223,0	225,0
	Merlot	186,0	193,0	212,0	228,0	249,0	251,0	250,0
	Syrah	170,0	187,0	191,0	203,0	214,0	246,0	248,0
	Marcelan	186,0	206,0	232,0	248,0	265,0	270,0	277,0

In terms of the colouring substances, after the effectuated investigations it was noticed that on the base of a low pluviometric regime during the period of vegetation and maturation correlated with strong sunshine lenght and temperature (ripening period), accumulation of total poliphenols was intense to all analysed varieties, Marcelan and Cabernet Sauvignon have been remarked through a high phenolic potential at harvesting (5309 mg/kg respectively 5187 mg/kg) closely followed by Syrah with 5111 mg/kg and Merlot with a poliphenolic content of 4946 mg/kg (figure 1).

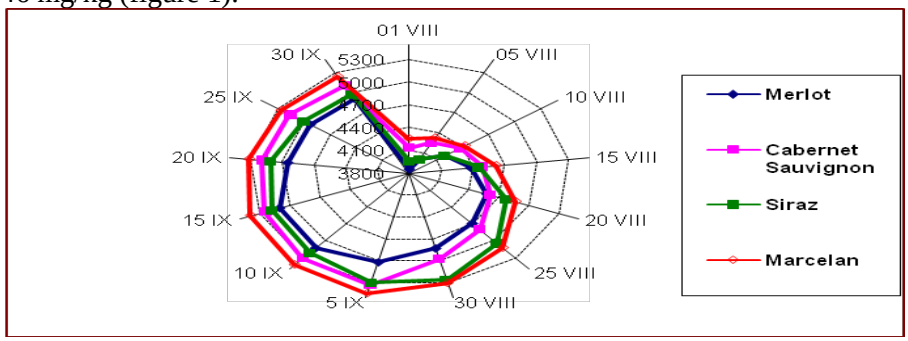

Fig. 1. The dynamics of total poliphenols to the studied varietyes in the viticultural area Segarcea

Accordingly to this point of view the studied varieties fulfil the demands of high quality vinification.

CONCLUSIONS

The thermic and hydric stress installed in the year 2008 in the district of Oltenia affected a large part of the species from the cultivated area. Vine thanks to its distinct endurance to drought, succeeded by the help of viticultors (irrigation was imposed) to achieve a plurality of substances (glucides, acidity, total poliphenols), which allowed oenologists to revaluate the harvest of the year 2008 under the aspect of high quality products.

Because of the drought installated towards the end of the vegetation period and during the ripening process, in the studied grape varieties had been noticed qualitative modifications of the glucides and acidity, in terms of dynamics modification. So, it is remarked a low dynamics of the glucides to Merlot and Syrah, and unsignificant rise to Marcelan and Cabernet Sauvignon, meanwhile the acidity is maintained to a constant level to all the studied sorts.

Despite of the remembered restrictive conditions both the well-known varieties of grapes and the mediterranean varieties have been noticed through a high phenolic potential at harvesting.

All varieties of grapes destinated to the achievement of red quality wines or mass consumption wines found in the south part of Romania specific conditions of temperature and light necessary for the synthesis of those compounds that give colour, corpulence and delicacy to the wine. The wines from Segarcea are famous and appreciated both at national level and at mondial level.

These aspects fulfil the observations made in the late years from the point of view of the adjustment of the mediterranean varieties newly introduced in the vine culture of the wine-growing district Segarcea.

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