THE MATURATION OF THE GRAPES IN THE CONDITIONS OF EXCESSIVE DROUGHT OF 2012 IN THE VINEYARD DEALU BUJORULUI

MATURAREA STRUGURILOR ÎN CONDIȚIILE SECETEI EXCESIVE ALE ANULUI 2012 ÎN PODGORIA DEALU BUJORULUI

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Abstract. *The quality of raw material plays an important role in producing of the quality wines. For this purpose we aimed ripening grapes in the dry climatic conditions of the year 2012. Due to excessive drought during the growing season, the grapes had a limited increase in the biological variety, the index of grapes and weight of grapes was around at the half of the specific weight. The phenophases of growth and maturation of grapes decreased, so the harvesting of grapes was done from the third decade of august. The complete maturity of the grapes in the conditions of 2012 was made prematurely and forced under the impact of excessive temperatures which produced the strong dehydration of grape berrys and a concentration of the sugars more through evapotranspiration than by synthesis. The dry climate during the maturation period of the grapes favoured the high quantitative accumulation in compounds by colour, due to their synthesis and also the change of quantity ration between the skin and the pulp of the grape.*
Key words*: maturation, sugar, grapes, acidity, phenolic compounds*

Rezumat. *Calitatea materiei prime ocupă un loc important în producea vinurilor de calitate. In acest scop s-a urmărit maturarea strugurilor în condițiile climatice deosebit de secetoase ale anului 2012. Datorită secetei excesive din perioada de vegetație, strugurii au avut o creştere limitată sub nivelul biologic de soi, indicele de boabe şi greutate a strugurilor s-a situat la aproximativ jumătatea greutății specifice. Fenofazele de creştere şi de maturare a boabelor s-au redus, astfel că recoltarea strugurilor s-a efectuat începând cu a treia decadă a lunii august. Maturitatea deplină a strugurilor în condițiile anului 2012 s-a efectuat prematur şi forțată sub impactul temperaturilor excesive producând deshitratarea puternică a boabelor şi o concentrare a zaharurilor mai mult prin evapotranspirație decât prin acumulare. Climatul secetos din timpul perioadei de maturare a strugurilor a favorizat acumulări cantitative ridicate în compuşii de culoare, fapt datorat sintezei lor dar şi de schimbarea raportului cantitativ dintre pielița şi pulpa strugurelui.*
Cuvinte cheie*: maturare, zahar,struguri, aciditate, compuşi fenolici.*

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INTRODUCTION

The maturation of the grapes was monitored every year to SCDVV Bujoru but were obtained different results in almost all years of harvest. 2012 was an exceptional year. Thanks to the excessive drought, was a forced maturation through the dehydration of the grapes (fading) followed by a concentration of the sugars. The proces of maturation of the grapes was done in other vineyards of Romania (Odobeşti and Murfatlar) establishing the full maturity and technological of the grapes in the pedoclimatic conditions of these areas (Braga et al., 1962; Mujdaba et al., 1962).

The full maturity of the grapes in the vineyard Dealu Bujorului over a period of 10 years was accomplished from 15 September (Ciubucă et al., 1999), compared with the 2012 harvest year, when the maturity of the grapes was achieved earlier 20-25 days. In the surrounding vineyards Nicoresti and Iveşti the maturation of the grapes on the same 10-year period was conducted from 20 September (Ciubucă et al., 2000). After 2002 assist at this phenomenon of early maturation of the grapes, but 2012 was the exception.

MATERIAL AND METHOD

In 2012 is watched the dynamic of maturation of the grapes at white and red varieties in the vineyard Dealu Bujorului. These determinations were made: sugar, acidity, weight of 100 seeds and at the harvesting of grapes was determined: the weight of a grape, the volume of a grape, the weight of the beans, the number of the beans, the weight of the clusters, the index of composition of the grape (skins, seeds, pulp), the polyphenols and anthocyanins. The varieties that were analyzed:, Fetească albă, Fetească regală, Aligote, Băbească gri, Riesling italian,Sauvignon, Burgund mare, Băbească neagră, Fetească neagra Merlot, Cabernet Sauvignon and Muscat Ottonel. The culture conditions of plantation are: the planting distance of 2.0 m x 1.2 m, middle leading, type of cutting, rings bilateral in rings of fruit.

RESULTS AND DISCUSSION

The annual climate of viticulture is reproduced in the table 1. The precipitations in this period were very low, placed to 412 mm from above 448 mm, the annual average for the vineyard Dealu Bujorului. The unprecedented excessive drought during the growing season was due to the rainfall distribution during this time that is only 5 days of May fell on 102 mm, and the rest of 143.3 mm were distributed in other months. The drought have emphasized and because of duplication evapotranspiration effects due to average of maximum temperatures in summer months were very high, ranging from 30.3°C in June, 32.4°C in August and 34.3°C in July. The average temperature during the ripening of the grapes fall in July from 28 º C to 20.7 º C in September (Table 1).

Table 1

The annual viticultural climate in the viticultural center Dealul Bujorului

Month	T average (°C)	T minimum average (°C)	T maximum average (°C)	Precipitations (mm)
January	-1.3	-4.7	2.2	32.7
February	-7	-11.9	-2.9	21.1
March	6.0	0.5	10.8	6.1
April	14.9	7.7	20.8	14.6
May	19.7	13.4	25.1	102.2
June	24.3	17.0	30.3	11.9
July	28.1	19.9	34.3	27.1
August	26.1	18.3	32.4	23.1
September	20.7	12.5	27.5	24.6
October	14.6	8.8	20.3	42.0
November	8.2	5.0	11.1	4.3
December	-1.7	-5.2	1.4	102.3

The rate of daily accumulation in sugars of the grapes is good for most varieties except Fetească regală variety which had a rate of sugar accumulation very low because the damage of foliar appliance by wilting that therefore has reduced the photosynthesis process and to the decrease in sugar accumulation. The Fetească albă variety had a low rate of sugars accumulation because of the alert rate in the grape berry growth in weight, which is favored by young plantation potential (Table 2).

The rate of daily diminishing of acidity is normal at most varieties except the above mentioned varieties, which records the lowest rate of acidity, with the same causal (Table 2). The rate of quantitative accumulations is higher at Fetească albă and Băbească gri and very low in variety Riesling italian which otherwise is the particularity of the Fetească regală variety, where photosynthesis was strongly inhibited (Table 2).

The harvest date of grapes varied depending on the state of maturation of the crop but also the degree of damage to crops, grapes more or less fades (Table 3). The maturation and harvesting of the grapes in this year were made prematurely, is as an unprecedented situation, of excessive drought, and harvesting was done in August, as follows: Fetească neagră harvested on 27.08. followed by Fetească regală at 29.08. (strong fade grapes). At supramaturare, was harvested on 18.09.2012 Riesling italian to obtain the sweet wine that is specific our area. The weight of a grape at harvesting was located a little over half of variety potential, because to lower growth of grapes followed by fading.

Table 2

The dynamic of maturations grapes in the viticultural center Dealu Bujorului

The variety	The daily accumulation rate of sugars, g/day	The daily accumulations rate of acidity, g/L sulfuric acid /day	The quantitative daily accumulations rate of 100 grape berrys. g/day
Fetească albă	1,41	1,10	1,10
Fetească regală	1,18	1,00	0,50
Aligote	2,65	2,34	0,96
Băbească gri	3,38	1,48	1,79
Riesling italian	2,00	1,14	0,38
Sauvignon	2,72	1,35	0,92
Burgund mare	3,30	1,27	0,46
Băbească neagră	3,00	1,43	2,00
Fetească neagră	2,70	2,13	0,32
Merlot	2,57	1,76	0,00
Cabernet Sauvignon	2,62	1,43	0,41
Muscat Ottonel	2,60	1.72	0,80

Table 3

The quality of the grape at harvesting in the viticultural center Dealu Bujorului

The variety	The harvest date	The weight of the grape(g)	The volume of the grape(ml)	The weight of the grape berrys(g)	Number of grape berrys	The weight of the bunch (g)
Fetească albă	31.08.2012	79.7	74.3	74	118.3	5.7
Fetească regală	29.08.2012	99.3	83.3	93	101.3	6.3
Aligote	09.09.2012	79.6	79.3	76.6	81.7	3
Băbească gri	31.08.2012	132.7	113.7	127.7	90.7	5
Riesling Italian	18.09.2012	70.3	70	67	86	3.3
Sauvignon	13.09.2012	118.3	110	113	120	5.3
Burgund mare	11.09.2012	75.7	66.7	72.3	90.3	3.3
Băbească neagră	15.09.2012	123.7	110	119.3	93.7	4.3
Fetească neagră	27.08.2012	91.3	86.7	86	120.3	5.3
Merlot	12.09.2012	95.3	80	90	149.7	5.3
Cabernet Sauvignon	17.09.2012	64	58.3	61	85.3	3.3
Muscat Ottonel	01.09.2012	90	83	86.6	61	3.3

The mechanical analysis of the grapes at harvest highlights a lightweight at a half of a grape, with a identical volumetric reporting, a reduced weight of the grape berrys and weight of the rachis located at the upper limit

(Table 3). Analyzing the structure of grape berry itself, is found a large proportion of grape peel and seeds in detrimental of the pulp. This had negative effects on grape berry composition, which recorded low levels in most varieties, varying between 1.3 at variety Riesling italian and 3.3 at variety Băbească gri. Compared to the annual average recorded with values between 5-8, the values obtained at analyzed varieties are very small which shows that the ratio core weight / weight of peel + weight of seeds is very low (Fig. 1). The Index of grape berrys, indicating the small size of the grapes, represented by the number of grape berrys per 100 g grapes attest high values, over 100, reaching the maximum at variety Fetească regală (148.5), the variety which has been most affected by drought and freezing in winter. The average weight of a grape was located at reduced parameters, which is below 100 g in all varieties, which show damage to all varieties of this unprecedented drought. The polyphenolic potential of black grapes at harvesting was high, approaching to the upper limit that is 85 at the Băbească neagră variety and 98 at Merlot variety.

The anthocyanin content of grapes was high, ranging from 540 mg / l at Băbească neagră variety and 901mg / l at Merlot variety. The dry climate during the maturation period of the grapes favored high quantitative accumulations in compounds of color. This was doubled by the high ratio between the skin and the grape berry weight (Table 3, Fig. 2).

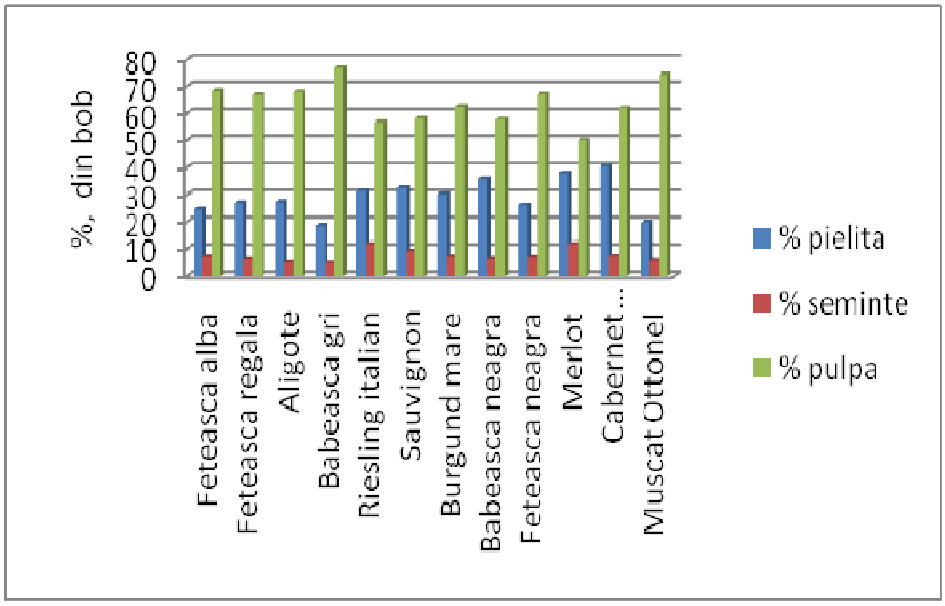

Fig. 1 - The index of composition of the grape berry in the viticultural center Dealu Bujorului

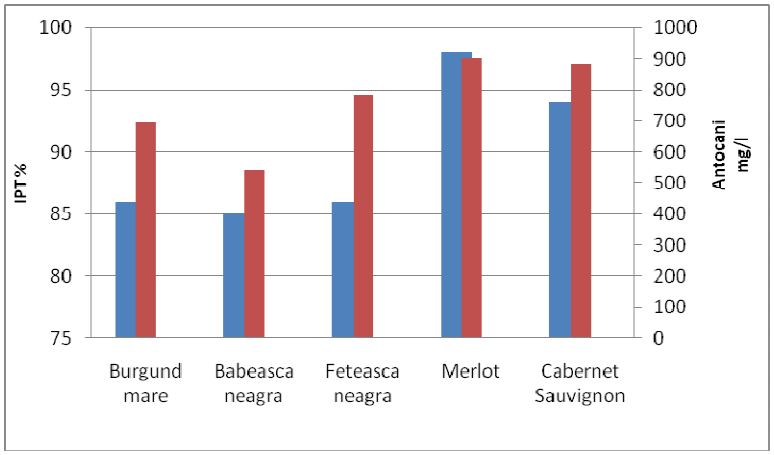

Fig. 2 - The polyphenolic profile of grape at hervesting in thr viticultural center Dealu Bujorului

CONCLUSIONS

1. The climate during maturation period of grapes was excessively dry, a fact underscored by the absolute maximum temperatures of July and August which ranged from 38 to 41.5 C and by the large number of days with temperatures above 30°C.

2. The technological indices of the grapes at harvesting highlight the decisive influence of climatic factor, of excessive drought of 2012, atypical year in this regard, influencing the quantitative growth of grapes, of grape berrys and their composition.

3. Analyzing the structure of grape berry itself, there is a large proportion of grape peel and seed in the expense of pulp. This had negative effects on the production, on the accumulation of grapes as well as the composition of grape berry, which showed low levels in most varieties.

4. The harvest of grapes have surpassed with 2-3 weeks toward other years.

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