EVALUATION OF THE PRODUCTION AND QUALITY POTENTIAL OF MUSCAT OTTONEL AND CABERNET SAUVIGNON VARIETIES IN RELATION TO CLIMATIC FACTORS IN DEALU MARE VINEYARD

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Abstract

The varieties taken into study were Muscat Ottonel and Cabernet Sauvignon, part of the basic assortment for the production of quality wines, typical for Dealu Mare vineyard, which are very valuable in view of the oenological aspect. The experimental results obtained showed that under the ecoclimatic conditions specific to 2019 year, characterized by a high heliothermic regime, on the background of low water resources, especially during the veraison-ripening period of the grapes when the ripeness of the grapes was slow. Under conditions of water stress (precipitation reduced by 40.8 mm compared to the normal value of 124.9 mm), the growth rate of the berry weight being 1.28 g/day (Muscat Ottonel) and 0.93 g/ day (Cabernet Sauvignon) and sugar accumulation of 1.59 g/l/day (Muscat Ottonel) and 1.00 g/l/day (Cabernet Sauvignon). The total acidity of the must had very low values, 5.8 g/l tartaric acid in the Muscat Ottonel variety and 6.5 g/l in the Cabernet Sauvignon variety, which resulted in a large increase of the glucoacidimetric index, far exceeding the optimal value required for the production of wines with a high degree of quality and typicality.

Key words: grapevine, water stress, glucoacidimetric index

The increase of temperatures in recent years have influenced the quality of grapes and implicitly obtaining wines with high alcohol content.

The factors determining the alcohol content of wines are: varieties of vines; the soil on which the vine is grown (calcareous soils generally giving the most alcohol-rich wines); the climate of the vineyard and the way climatic factors evolve during the year; technological conditions and especially fermentation of must (Dokoozlian N., 1996; Tardea C., 2007).

The concentration and composition of phenolics in a wide range of environmental and management factors such as climate, soil conditions, canopy management factor (Jackson D. I., Lombard P. B., 1993; Sanchez P., 2007).

MATERIAL AND METHODS

The research was carried out in 2019 on the Muscat Ottonel and Cabernet Sauvignon varieties, grafted on the Kober 5BB rootstock.

The planting distances are 2 x 1 m and the driving form Bilateral cordon, with the fruit load distributed on fruit links consisting of ropes with a length of 8-10 eyes and replacement plugs (2 eyes). The dynamics of grape ripening were followed and the anthocyanins were determined by spectrophotometric evaluation of the color variation at the addition of sulfur dioxide (Ribereau-Gayon P., 2006).

RESULTS AND DISCUSSIONS

From an ecoclimatic point of view, the year 2019 was characterized by a moderate heliothermal regime, against the background of rich water resources, especially in April and May, when the multiannual averages were exceeded.

The vegetation period (April) started with higher average temperatures than the multiannual average (12.6ºC compared to 11.2ºC), compared to the multiannual averages.

The average air temperatures recorded during the ripening period of the grapes show positive oscillations between 0.2% (August) and 2.1% (September) compared to the multiannual average, as well as negative oscillations of -6.2% in July.

The volume of rainfall during the ripening period of the grapes (July, August, September) was deficient by 123.6 mm, well below the normal multiannual averages of 209.0 mm, which determined the appearance of the phenomenon of pedological drought. In the ripening phase of the grapes (August - September 2019) the rainfall is 40.8 mm lower than the normal value of 124.9 mm, favoring the ripening of the grapes (*table 1*).

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Table 1

The viticultural climate of the vegetation period

Month	Air temperature			Rainfall (mm)	Huglin index
	Average temperature (°C)	Minimum temperature (°C)	Maximum temperature (°C)		
April	11.2	6.0	16.8	74.8	120.0
May	17.0	11.9	22.5	190.6	302.3
June	23.6	18.2	29.6	85.6	498.0
July	22.7	16.7	28.9	44.6	489.8
August	24.2	18.2	31.5	37.0	530.1
September	19.1	13.8	26.3	3.8	381.3

In 2019 the ripeness of the grapes was slow, the growth rate of the berry weight being 1.28 g/day (Muscat Ottonel) and 0.93 g/day (Cabernet Sauvignon) and the accumulation of sugars of 1.59 g/l/day (Muscat Ottonel) and 1.00 g/l/day (Cabernet Sauvignon) (*figure 1 and 2*). The full ripeness of the grapes was registered on September 19

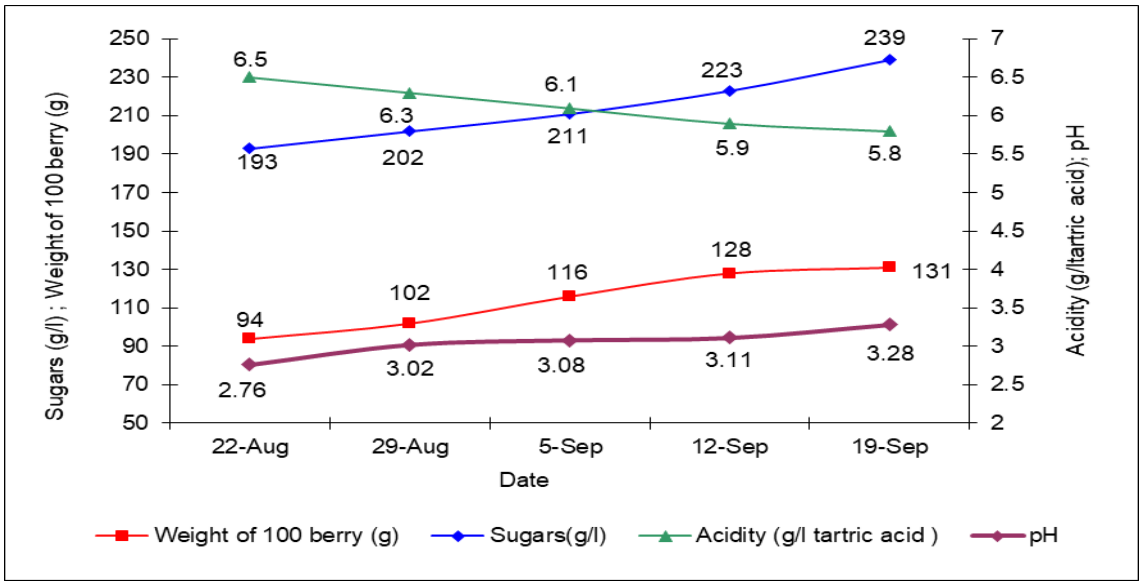

Figure 1 **Grape ripening dynamics at Muscat Ottonel varirty**

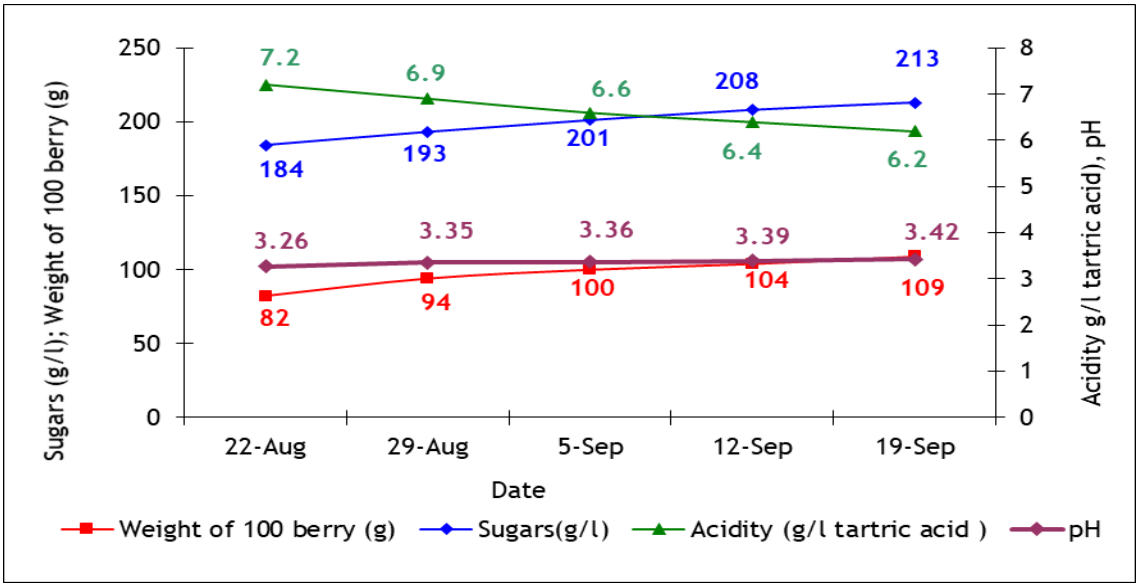

Figure 2 **Grape ripening dynamics at Cabernet Sauvignon variety**

The richness in phenolic compounds of grapes is typical of the variety and year of harvest. The 2019 harvest was characterized by a very good accumulation of phenolic compounds and anthocyanins (*figure 3*). After the full maturity of the grapes, so in conditions of over ripeness, there was a slow increase of total polyphenols and anthocyanin potential and a significant increase of anthocyanins, due to the increase of their extractability. After 10 days of full maturity, the amount of anthocyanin's reaches a maximum.

During grape over ripeness, the extractable anthocyanin content of Cabernet Sauvignon grapes increased from 650 to 736 mg /L. The comparative analysis of the other phenolic maturity indices revealed significant differences for anthocyanin extractability and seed maturity (*figure 4*), which positively influenced the phenolic composition of the crop.

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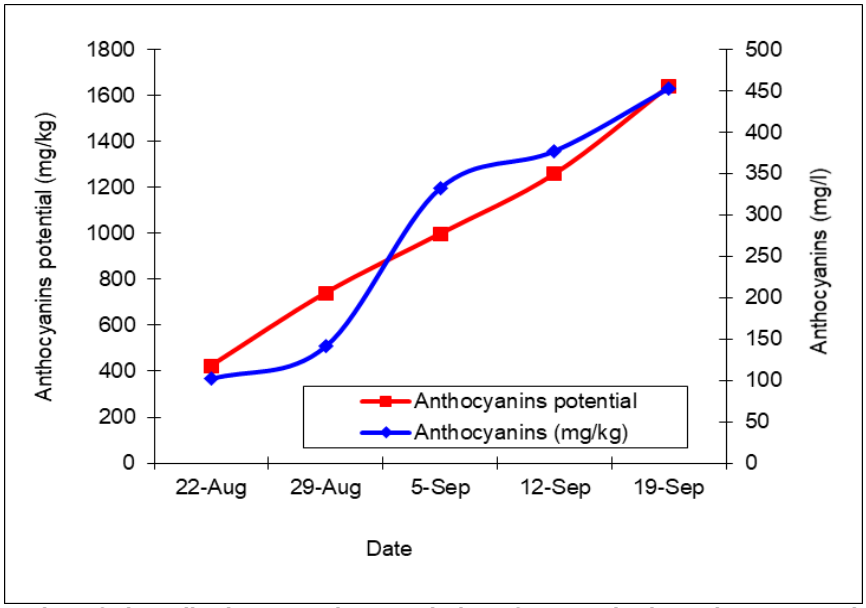

Figure 3 **Dynamics of phenolic ripeness characteristics of grapes in the Cabernet Sauvignon variety**

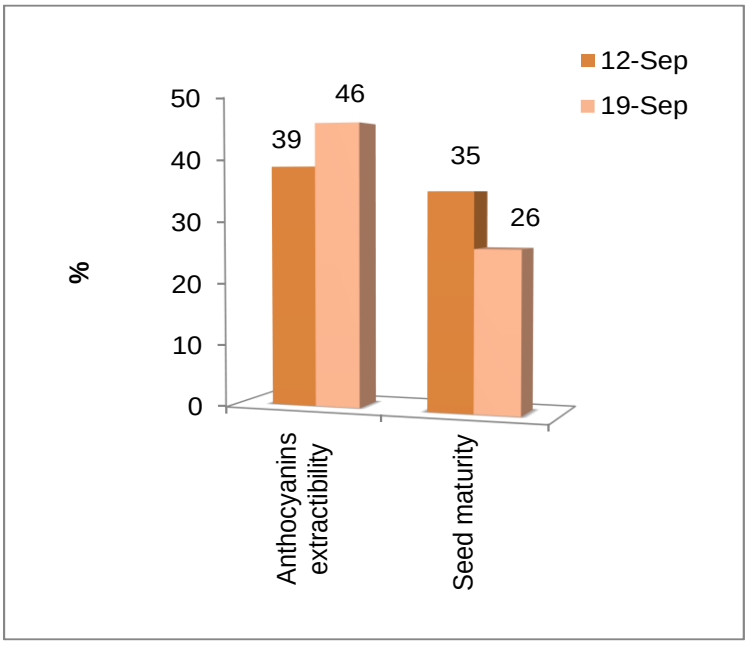

Figure 4 **Evolution of anthocyanin extractability and seed maturity in the Cabernet Sauvignon variety**

The average weight of a grape was variable, with oscillations between 134.49 g (Muscat Ottonel) and 123.38 g (Cabernet Sauvignon), (*table 2*).

Table 2

The quality of the grape harvest

Variety	Weight of grape g	Weight of 100 berry, g	Volume of 100 berry, cm^3	Sugars g/l	Total acidity g/l tartric acid
Muscat Ottonel	134.49	131	120	239	5.8
Cabernet Sauvignon	123.38	109	99	213	6.2

The accumulation potential of sugars in must, a characteristic of the variety, influenced by climatic factors during the ripening period of the grapes, was variable, with values between 239 g/l (Muscat Ottonel) and 213 g/l (Cabernet Sauvignon), and the total acidity of the must in the climatic conditions of 2019, in the case of the Muscat ottonel variety was 5.8 g/l tartaric acid, and in the case of the Cabernet Sauvignon variety it was 6.5 g/l.

CONCLUSIONS

The changes in the viticultural climate registered especially in the leech phenophases and the maturation of the grapes influenced the quality of the grape production, the potential of sugar accumulation in the must, was variable, with values between 239 g/l (Muscat Ottonel) and 213 g/l (Cabernet Sauvignon), and the total acidity of the must was 5.8 g/l tartaric acid in the case of the Muscat Ottonel variety and 6.5 g/l in the Cabernet Sauvignon variety.

The average weight of a grape was variable, with oscillations between 134.49 g (Muscat Ottonel) and 123.38 g (Cabernet Sauvignon).

The 2019 harvest was characterized by a very good accumulation of phenolic compounds and anthocyanins. After the full maturity of the grapes, there was a slow increase in total polyphenols and anthocyanin potential and a significant increase in anthocyanins, due to the increase in their extractability.

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