

THE INFLUENCE OF THE MATURITY STAGE OF GRAPES ON THEIR BASIC COMPOSITION AND THE WINES OBTAINED

Alina Bacanu, M. Gheorghită

University of Craiova, Faculty of Horticulture, A.I. Cuza Street no 13, Postal Code
200585, Craiova

Abstract

Is know the fact that the wines obtained from the grapes of the same variety to harvest in high degree of over-ripeness are better than the ones obtained from early picked grapes, regarding the alcohol and the other constituents. Is also known the fact that the qualitative level of the wines obtained through late harvested is realized by the loss of one part from the winegrowing production. In this paper are presented the results of rigorous conceived and applied experiments concerning the quality levels of wines obtained from picked grapes in different maturity phenophases, in report with complete maturity and phenolic maturity for some varieties with black grapes. Is been followed the relation among the size of the production losses at harvests derived from over-ripeness and the efficiencies of wines quality, expressed through reports among: alcohol and glycerol, alcohol and acidity, unreduced extract and ash, yellow and red pigments and so on.

Keywords: *variety, grapes, complete ripeness, over-ripeness, composition*

Introduction

Regarding the improvement of chemical composition and of organoleptic qualities of wines in the past exists scientific concerns on many fields. So, were made studies for: modernizing the technological procedures of primary winemaking, involving more biotechnological factors at the must transformation in wine and also for biophysical and biochemical process which define the maceration and the maceration-fermentation (Teodorescu, 1975; Villetaz, 1996; Celotti, 1997), identifying the most adequate methods of wine keeping and

The Influence of the Maturity Stage of Grapes on their Basic Composition and the Wines Obtained

maturation, having oenologic and economic advantages (Vivas, 1993; Chatonnet, 1997; Chassin, 1999).

In the speciality literature is mentioned another important aspect by the scientific and practic point of view, that of the wines obtained from grapes picked in over-ripeness stages presents not only higher alcoholic degrees but their chemical composition improvement (Gheorghita, 1973).

For defining the over-ripeness stage influence upon the level of main components of wines and upon the report which give the naturalness of the products, there were made researches of which results are the main idea in this paper.

Experimental

The study was made in the winegrowing years 2005 and 2006 about Merlot variety from Dragasani vineyard, Valcea County. The grapes were picked, in the sight of wine-making, to their complete ripeness (MD) and at three stages in over-ripeness, thus: MD+10 days, MD+15 days, MD+20 days.

At complete ripeness and at the three stages were determined: the grapes productions, their contents in glucides, acidity and anthocyan.

To show exactly the influence of the moment of harvest upon the wines composition, each time the biotechnological factors of primary wine-making were applied rigorous uniform. For fermentation-maceration process were added selected yeasts (LSA) and pectolitic enzymes (3 g/hl); the fermentation period pre-established was of 144 hours; the temperature of maceration was between 26-28°C; homogenization phase of must 6 times/day.

The wines were analyzed after two months from the separation of the phases, being used the official methods recommended by OIV.

Results and Discussions

The technological characteristics of grapes at complete ripeness as a moment of reference in the maturation process of grapes and at all three stages from over-ripeness are showed in the table 1.

The grapes production decreases from one stage to another of over-ripeness, the contents in glucides increase with the extension of maintain the grapes on clumps posterior to complete ripeness, in the same way also increase the proportions in anthocyan, while the contents in acidity decrease gradually through the process of respiratory “combustion”

Table 1. The Merlot grapes characteristics in different moments of harvest and winemaking

Winegrowing years	The moment of harvest	Grapes production kg/ha	Glucides g/l	Acidity g/l H ₂ SO ₄	Anthocyan mg/kg beans
2005	MD	9249	192	5.11	1132
	MD+10days	9076	205	4.89	1267
	MD+15days	8881	214	4.52	1205
	MD+20days	8794	221	4.33	1179
2006	MD	8467	189	5.26	1152
	MD+10days	8306	201	4.93	1235
	MD+15days	8082	211	4.56	1196
	MD+20days	7915	219	4.27	1183

The quantification of the efficiencies and decreasing of technological parameters of the grapes, in absolute and relative expression, at different moments of grapes picked, is convincingly presented in the table 2. Thus, in 20 days after complete ripeness the grapes production comes down with 455 kg/ha in 2005 and with 552 kg/ha in 2006, which means 5% respective 6.5%. Concomitantly with the losses of productions, specially, evaporation of the water from beans, the glucides suffer a concentration process, the relative content increasing with 29.0 g/l in 2005 and with 30.0 g/l in 2006, increases being 15.1% respective 15.9%.

The grapes acidity is quantitative limited from a stage to another, the diminutions, after 15 days of over-ripeness being 11.5% in 2005 and 13.3% in 2006. After 20 days, contents in acidity were lower than 15.3% in 2005 and 18.8% in 2006. In absolute digits (table 1), at 20 days after complete ripeness, the proportions in acidity were placed over 4 g/l (in H₂SO₄), considered as extremely good, in the perspective to obtain red wines of superior quality.

The Influence of the Maturity Stage of Grapes on their Basic Composition and the Wines Obtained

The anthocyanins contents increase in the first 10 days of over-ripeness, when is reached the phenolic anthocyanic maturity, after that are produced some diminishes, without coming down after 20 days to below the ceiling registered at the moment of complete ripeness.

The transformations that took place during the three stages of over-ripeness phenophase are trusty reflected in the basic composition of obtained red wines (table 3).

Accordingly to the glucides contents from the grapes harvesting in different moments of their maturation process, alcoholic degree had grown up from 11.18 %vol. (MD) to 12.92 %vol. (MD+20 days) in 2005 and from 11.0 %vol. (MD) to 12.75 %vol. (MD+20 days) in 2006. As consisted, the alcoholic degree related to the superior quality wines is realized through grapes picked to at least 10 days posterior to the complete ripeness, but with loss of a part from the production, between 7 and 16 %.

In wines, the contents in acidity don't come down in any other situation under the minimal limit foreseen in the actual wine-making legislation.

The effects of Merlot grapes picked in over-ripeness phenophases are shown with the proportions in alcohol, to the glycerol, unreduced extract and ash parameters. In the conditions of applying uniform primary wine-making, in wines the characteristics contents mentioned are as bigger as the harvest was late. Thus to the wines obtained through harvest after 20 days of over-ripeness, the contents are bigger: with 21-22 % at glycerol; with 7-10% at extract; with 11.5-13.0% at ash in report with the levels of the three existing parameters in the wines obtained through the harvest at complete ripeness.

The consequences of the grapes picked in over-ripeness are reflected extremely concluding in the proportions of glycerol between alcohol and in the proportion of ash against unreduced extract. This reports signify the degree of wines naturalness and the legal framework, correct of obtaining breed on the measure of harvest lateness, reaching in the final stage very close to the level supposed to be ideal, that of 10%. This limit, to ash · 100 / extract report was easy over down in 2006, to the wine obtained from the grapes picked after 3 weeks from their complete ripeness.

Conclusions

In the ecological conditions of Dragasani vineyard, the chemical basic composition of Merlot wines can be improved through grape picked in different moments of over-ripeness phenophase, established in report with the type of wine to be realized. Because of the grapes picked delay, the productions come down proportionally with the passed time. In the same way the grapes acidity comes down also, while the proportions in glucides and anthocyanins grows up till 10 – 11 days. The effects of different constituents in grapes during the over-ripeness process is reflected in wines against the alcohol, glycerol, extract and ash contents, which presents bigger values as the harvest process is done later. Applying this device can be possible the wine-making at improved composition parameters and in conformity with the internal and external market requests.

References

- Celotti, E., Bressan, S., Battistutta, F., Zironi, R. (1997). Impiego degli enzimi nella macerazione delle uve rosse. *Rev. Vignevini*, 11, 57-70
- Chassin, M. (1999) Variations organoleptiques entre barrique, copeaux et microbullage. *Rev. Franç. d'Oenologie*, 174, 24-25
- Chatonnet, P., Ricardo Da Silva, M., Dubordieu, D. (1997). Influence de l'utilisation de barrique en chêne sessile européen (*Quercus petrae*) ou en chêne blanc américain (*Quercus alba*) sur la composition et la qualité des vins rouges. *Rev. Franç. d'Oenologie*, 165, 44-48
- Gheorghîță, M. (1973). *Studiul potențialului oenologic al soiurilor pentru producerea vinurilor roșii în condițiile nisipurilor din stânga Jiului*. PhD Thesis, Univ. of Craiova
- Teodorescu, Șt., Gheorghîță, M., Popa, A., Hudea, N., Giosanu, T., Neamțu, M., Heroiu, E., Vârtolaș, E., Heroiu, D. (1975). Prime rezultate privind comportarea în procesul de vinificație a recipientelor rotative metalice. *Analele ICVV*, vol. VI, 399-414
- Villetaz, J.C. (1996). Les preparation enzymatique utilisez en enologie. *Vigne vin Publications Intern. Bordeaux*, 33, 47-55
- Vivas, N. (1993). Les conditions d'elaborations des vino rouges destines a un élevage en barriques. *Rev. Franç. d'Oenologie*, 68, 27-33.

The Influence of the Maturity Stage of Grapes on their Basic Composition and the Wines Obtained

Table 2. The evolution of absolute and relative differences among complet ripeness and over-ripeness stages of grapes characteristics

Year	The moment of picked grapes	Grapes production		Glucides		Acidity		Anthocyanes	
		Abs.	Rel.	Abs.	Rel.	Abs.	Rel.	Abs.	Rel.
		kg/ha	%	g/l	%	g/l H ₂ SO ₄	%	mg/kg boabe	%
2005	MD	9249	100	192	100	5.11	100	1132	100
	MD+10days	- 173	- 1.8	+ 13.0	+ 6.8	- 0.22	- 4.3	+ 135	+ 11.9
	MD+15days	- 368	- 4.0	+ 22.0	+ 11.5	- 0.59	- 11.5	+ 73	+ 6.4
	MD+20days	- 455	- 5.0	+ 29.0	+ 15.1	- 0.78	- 15.3	+ 47	+ 4.2
2006	MD	8467	100	189	100	5.26	100	1152	100
	MD+10days	- 161	- 2.0	+ 12.0	+ 6.3	- 0.33	- 6.3	+ 83	+ 7.2
	MD+15days	- 385	- 4.5	+ 22.0	+ 11.6	- 0.70	- 13.3	+ 44	+ 3.8
	MD+20days	- 552	- 6.5	+ 30.0	+ 15.9	- 0.99	- 18.8	+ 31	+ 2.7

Table 3. The main characteristics of composition of wines obtained from Merlot picked grapes at different stages of over-ripeness phenophase

Year	The moment of picked grapes	Alcohol		Acidity		Glicerol		Unreduced extract		Ash		Glicerol 100/alcohol		Ash 100/unred. extract	
		%vol.	Dif. ± %	g/l SA*	Dif. ± %	g/l	Dif. ± %	g/l	Dif. ± %	g/l	Dif. ± %	Val. abs.	Dif. ± %	Val. abs.	Dif. ± %
2005	MD	11.18	-	4.92	-	8.06	-	24.6	-	2.34	-	9.14	-	9.51	-
	MD+10days	11.95	+6.9	4.75	- 3.5	8.92	+ 10.7	25.4	+3.3	2.45	+4.7	9.46	+3.5	9.64	+ 1.4
	MD+15days	12.50	+11.8	4.32	- 12.2	9.41	+ 16.7	25.7	+4.4	2.48	+6.0	9.53	+4.3	9.65	+ 1.5
	MD+20days	12.92	+ 15.6	4.18	- 15.1	9.88	+ 22.6	26.3	+6.9	2.61	+ 11.5	9.68	+5.9	9.92	+ 4.3
2006	MD	11.00	-	4.82	-	8.10	-	24.3	-	2.37	-	9.33	-	9.75	-
	MD+10days	11.75	+6.8	4.65	- 3.5	8.83	+ 9.0	25.7	+5.8	2.51	+5.9	9.52	+2.0	9.77	+ 0.2
	MD+15days	12.30	+ 11.8	4.37	- 9.3	9.36	+ 15.6	26.1	+7.4	2.60	+9.7	9.65	+3.4	9.96	+ 2.2
	MD+20days	12.75	+ 15.9	4.10	- 15.0	9.81	+ 21.1	26.6	+9.5	2.67	+ 12.7	9.75	+4.5	10.04	+ 3.0

*SA is H₂SO₄