

EVOLUTION OF WINES QUALITY LEVEL IN ORDINARY STORAGE CONDITIONS

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Abstract

The wine is a food that must be preserved at optimal storage conditions which refer to the two variables: space (air temperature and relative air humidity) and time (period of preservation). But, in real life, there are situations in which the wines are stored in conditions that exceed the standard level. Thus, it is important to know the moment (measured in days) when the first negative changes emerge in wine quality. In this case, the consumers can drink wines without any harmful effect on their health until this moment.

A research was carried out on white wine in order to find out the period of time in which the wines stored in ordinary conditions can be drunk by consumers. Thus, the wine samples were preserved at air temperature of 20°C, relative air humidity of 75% and preservation period of 60 days. The study highlighted that the preservation period should not exceed 30 days.

Key words: *quality level, wine, ordinary temperature, storage conditions*

Introduction

Like any other food, the wines have specific period of validity and must be preserved in certain storage conditions. The period of validity is between 15 days and 12 months, and the optimal storage conditions are air temperature 10-15°C and atmospheric relative humidity 75% (Diaconescu, et al., 2007).

In day by day living, there are some circumstances in which the wines are not preserved in the optimal storage conditions due to different reasons. In this case, they are stored at the ordinary temperature and relative air humidity for one or more days.

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It is clear that the quality level of these wines will decrease, but it is important to know the moment when the ordinary storage conditions have negative influence on wines quality in order to avoid consumption of altered wines.

This time is measured in days from the production date of wines or from the moment when the consumers start to preserve the wine in ordinary storage conditions. It is necessary to mention that there is an important difference between these two moments.

In the second case, the consumers must know the gap between the production date of wines and the moment of buying. Taking into account that the retailers preserve the wines in standard conditions, this time will be added to the maximum number of days in which the wines preserved in ordinary conditions maintain their quality level.

Evolution of Quality Level of Sauvignon Blanc Wine Preserved in Ordinary Storage Conditions

In order to identify the influence of ordinary storage conditions on white wine quality, a study was conducted on medium dry **Sauvignon Blanc** wine. The analyzed Sauvignon Blanc wine was DOC superior quality wine with CMD. The sample was obtained by crushing the grapes from Dealu Mare vineyard (Prahova country), 2005 vintage. The product was packaged in 75 cl glass bottles, labeled with “Sauvignon Blanc, 2008” reference (Label of Sauvignon Blanc Wine, 2008).

The research consisted in preserving the wine in the ordinary preservation temperature (20°C), maximum relative air humidity 75% and preservation period 60 days. During the research, eight analyses have been carried out (i.e. four physicochemical analyses and four sensory analyses) at 0, 30, 45 and 60 days from the production date.

In the bottle day of wine (0 days) it has been undertaken two analyses (physicochemical and sensory) to obtain the blank test, i.e. the reference in which all the results of further analyses will be set against.

The physicochemical characteristics analyzed were alcohol content, reducing sugar, total acidity, volatile acidity, free sulphur dioxide and total sulphur dioxide, and the sensory characteristics were color, clarity, bouquet and taste.

Evolution of Physicochemical Characteristics Level of Sauvignon Blanc Wine Preserved in Ordinary Storage Conditions

The influence of ordinary temperature of storage conditions in physicochemical characteristics level of medium dry Sauvignon Blanc wine is shown in table 1. Thus, the physicochemical characteristics level had irrelevant changes.

Table 1. Influence of ordinary temperature of storage conditions in physicochemical characteristics level of Sauvignon Blanc wine

No.	Preservation period (days)	Physicochemical characteristics					
		Alcohol content (% alcohol by volume)	Reducing sugar (g/l)	Total acidity (g/l tartaric acid)	Volatile acidity (g/l tartaric acid)	Free SO ₂ (mg/l)	Total SO ₂ (mg/l)
1.	0	12.0	9.74	5.73	0.15	65	162
2.	30	12.0	9.74	5.73	0.15	42	162
3.	45	12.0	9.74	5.73	0.15	23	162
4.	60	12.0	9.74	5.73	0.15	15	162

Source: Data from own analysis

The figures 1-6 show that the level of main physicochemical characteristics remains constant during the 60 days preservation period, i.e. *alcohol content, reducing sugar, total acidity, volatile acidity and total sulphur dioxide.*

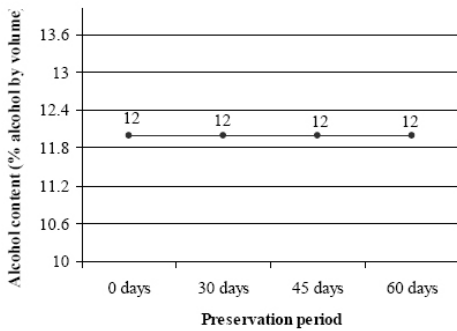


Figure 1. Evolution of Sauvignon Blanc alcohol content preserved at ordinary temperature of storage conditions

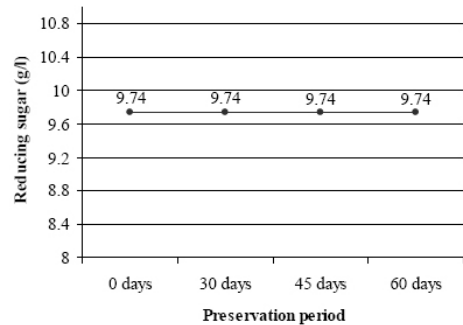


Figure 2. Evolution of Sauvignon Blanc reducing sugar preserved at ordinary temperature of storage conditions

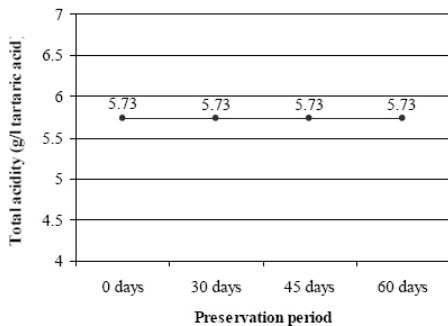


Figure 3. Evolution of Sauvignon Blanc total acidity preserved at ordinary temperature of storage conditions

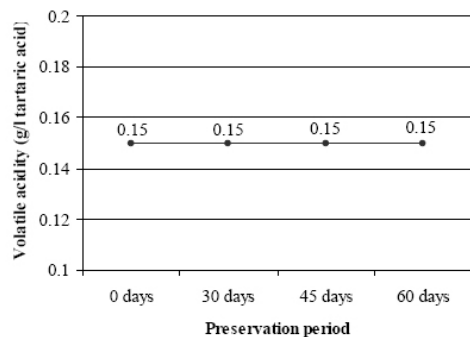


Figure 4. Evolution of Sauvignon Blanc volatile acidity preserved at ordinary temperature of storage conditions

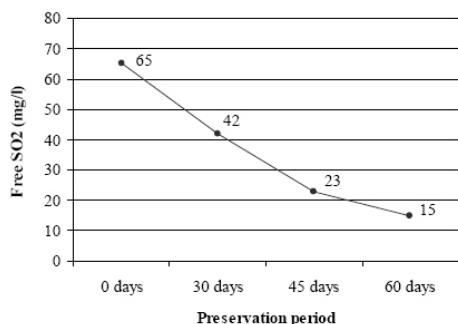


Figure 5. Evolution of Sauvignon Blanc free SO₂ preserved at ordinary temperature of storage conditions

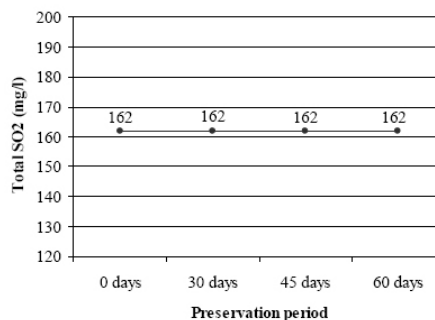


Figure 6. Evolution of Sauvignon Blanc total SO₂ preserved at ordinary temperature of storage conditions

Source: Data from own analysis

The only physicochemical characteristic that has changed throughout the preservation period was *free sulphur dioxide*.

The absolute and relative changes of physicochemical characteristics (free sulphur dioxide) level of Sauvignon Blanc wine are shown in table 2.

Table 2. Absolute and relative changes of physicochemical characteristics level of Sauvignon Blanc wine preserved at ordinary temperature of storage conditions

Physico-chemical characteristic	Preservation period													
	0 days	30 days			45 days				60 days					
		Change from 0 days		%	Change from 0 days		Change from 30 days	%	Change from 0 days		Change from 30 days	%	Change from 45 days	
		mg/l	mg/l		mg/l	mg/l			mg/l	mg/l			mg/l	mg/l
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Free SO ₂	65	-23	-35.38	-42	-64.62	-19	-45.24	-50	-76.92	-27	-64.29	-8	-34.78	

Source: Own calculation based on data from Table 1

The level of free sulphur dioxide decreased with 35.38% in the 30th day preservation beside the original level; it declined with 64.62% in the 45th day preservation from the initial level and with 45.24% beside the 30th day level. Equally, the concentration of free sulphur dioxide decreased with 76.92% in the 60th day preservation from the original level, with 64.29% beside 30th day level and with 34.78% from the 45th day level.

The decrease of the free sulphur dioxide content in 30th, 45th and 60th day preservation from the original level is higher than the decline registered beside the levels from pervious days.

Evolution of Sensory Characteristics Level of Sauvignon Blanc Wine Preserved in Ordinary Storage Conditions

The influence of ordinary temperature of storage conditions in sensory characteristics level of medium dry Sauvignon Blanc wine is shown in table 3. If only one physicochemical characteristic has changed, in the case of sensory characteristics all four characteristics had variation of their level.

Table 3. Influence of ordinary temperature of storage conditions in sensory characteristics level of Sauvignon Blanc wine

No.	Preservation period (days)	Sensory characteristics			
		Color (points)	Clarity (points)	Bouquet (points)	Taste (points)
1.	0	2.0	2.0	3.2	10.5
2.	30	2.0	2.0	3.0	10.5
3.	45	1.7	1.8	2.5	10.0
4.	60	1.3	1.5	2.5	10.0

Source: Data from own analysis

The deviation of color, clarity, bouquet and taste level of Sauvignon Blanc wine during the 60 days storage period is shown in figures 7-10.

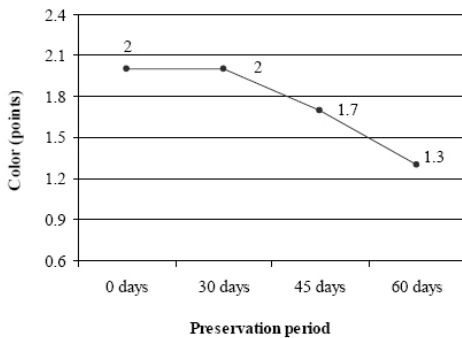


Figure 7. Evolution of Sauvignon Blanc color preserved at ordinary temperature of storage conditions

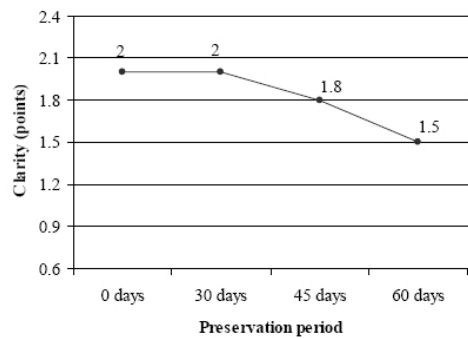


Figure 8. Evolution of Sauvignon Blanc clarity preserved at ordinary temperature of storage conditions

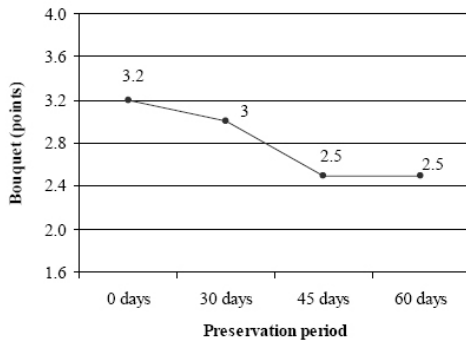


Figure 9. Evolution of Sauvignon Blanc bouquet preserved at ordinary temperature of storage conditions

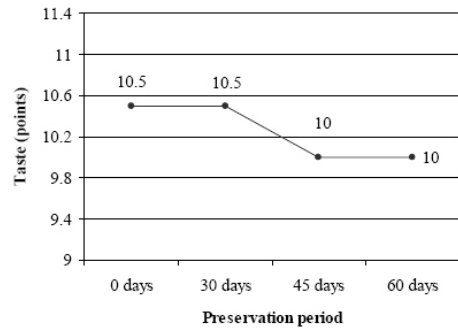


Figure 10. Evolution of Sauvignon Blanc taste preserved at ordinary temperature of storage conditions

Source: Data from own analysis

The sensory characteristics level has changed mainly after 45th day preservation, i.e. in the second half of preservation period as figures 7-10 show.

In table 4, the absolute and relative changes of sensory characteristics level of medium dry Sauvignon Blanc wine were calculated in order to underline the amplexness of these variations.

Table 4. Absolute and relative changes of sensory characteristics level of Sauvignon Blanc wine preserved at ordinary temperature of storage conditions

No	Sensory characteristics	Preservation period													
		0 days		30 days		45 days				60 days					
		Change from 0 days		Change from 0 days		Change from 0 days		Change from 30 days		Change from 0 days		Change from 30 days		Change from 45 days	
		points	%	points	%	points	%	points	%	points	%	points	%	points	%
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1.	Color	2.0	-	-	-0.3	-15.00	-0.3	-15.00	-0.7	-35.00	-0.7	-35.00	-0.4	-23.53	
2.	Clarity	2.0	-	-	-0.2	-10.00	-0.2	-10.00	-0.5	-25.00	-0.5	-25.00	-0.3	-16.67	
3.	Bouquet	3.2	-0.2	-6.25	-0.7	-21.88	-0.5	-16.67	-0.7	-21.88	-0.5	-16.67	-	-	
4.	Taste	10.5	-	-	-0.5	-4.76	-0.5	-4.76	-0.5	-4.76	-0.5	-4.76	-	-	

Source: Own calculation based on data from Table 3

The level of wine color remained unchanged in the 30th day preservation; it decreased with 15% in the 45th day preservation from the initial and 30th day levels. It reduced with 35% in the 60th day preservation beside the original and 30th day levels and with 23.53% from 45th day level.

The wine clarity had approximately a similar evolution with the wine color. Its level remained constant in the 30th day preservation beside the original level. In the 45th day preservation the level of clarity decreased with 10% both from the initial and 30th day levels. In the 60th day preservation, the level of clarity decreased with 25% both from original and 30th day levels and with 16.67% from 45th day level.

The level of wine bouquet declined in the 30th day preservation with 6.25% from original level. In the 45th and 60th day preservation, it decreased with 21.88% beside the initial day level and with 16.67% from the 30th day level.

The wine taste had a slightly different evolution with the wine clarity. Thus, in the 30th day preservation its level was constant from initial level, and in the 45th and 60th day preservation it declined with 4.76% beside the original and 30th day levels.

Conclusions

The main overall tendency is that both the levels of physicochemical and sensory characteristics had only reduction. In the case of physicochemical characteristics, the most important decrease of free sulphur dioxide was with 76.92% (in the 60th day preservation from the original level) and 45.24% (in the 45th day preservation beside 30th day level).

The most significant decline of sensory characteristics was the wine color with 35% (in the 60th day preservation beside the initial level) and 23.53% (in the in the 60th day preservation from the 45th day level).

As regards the sensory characteristics which registered numerous changes, it can be mentioned the wine color, clarity and bouquet, each with two decreases (for wine color and clarity in the 45th day preservation beside the 30th day level and in the 60th day preservation beside 45th day level; for wine bouquet in the 30th day preservation beside original level and in the 45th day preservation from 30th day level).

The Sauvignon Blanc wine preserved at ordinary temperature of storage conditions had three changes of physicochemical characteristics and seven changes of sensory characteristics. Thus, its quality level decreased for sensory characteristics especially which are the main characteristics easy perceived by consumers.

In this case, the consumers should avoid preserving the Sauvignon Blanc wine at 20°C temperature. If different situations require storing the Sauvignon Blanc wine at this temperature, the preservation period should not exceed 30 days. After this time, the level of physicochemical characteristics (free sulphur dioxide) halved and all four sensory characteristics significantly reduced.

These conclusions refers only to the Sauvignon Blanc wine and can not be applied to others wines since they have both different levels of physicochemical and sensory characteristics and own evolution of quality level when are preserved at 20°C temperature.

In order to expand the current research, it is possible to study the evolution of physicochemical and sensory characteristics of Sauvignon Blanc wine when it is preserved at 17.5°C (the average preservation temperature between ordinary and maximum limit of normal storage temperature).

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