



RESEARCH ON THE QUALITY ASSESSMENT OF IMPORTED WINES

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Abstract: Nowadays, wines are one of the most consumed and appreciated beverages in the world due to the nutritional value and biologic compounds content. The concept of quality of wines is quite difficult to define because of its complex character and its subjective interpretation, but there are nevertheless some defining elements that constitute a benchmark for quality assessment. The aim of this work is to investigate white (Sauvignon Blanc) and red (Cabernet Sauvignon) wine characteristics. Oenological properties, colour, sensory characters and acidic content have been evaluated and the influence of the variety has been taken into account. The sensory evaluation of the two varieties cultivated in different areas shows that there are differences between the same varieties as the country of origin is a factor that imprints certain characteristics of each type of wine, due to the climate and the soils.

Keywords: wine quality, Sauvignon Blanc, Cabernet Sauvignon

1. INTRODUCTION

Since ancient times, wine has been integrated into human existence. Along with bread and oil, he is part of the poor triad of food and the fundamental rites of mankind. Wine is one of the oldest known alcoholic beverages, tracing its antiquity to at least 5000 BC, and is known to have been prepared by the Assyrians by 3500 BC. It has always been considered a safe healthy drink, a therapeutic agent having medicinal power (antioxidant and antimicrobial activity), enhancing longevity, reducing cardiovascular diseases, and reducing the risk of type two diabetes [1].

The concept of wines quality is quite difficult to define because of its complex character and its subjective interpretation, but there are nevertheless some defining elements that constitute a benchmark for quality assessment. Wine quality refers to the conditions of authenticity and typicality, the wines being characterized by personality and a specific imprint, an imprint resulting from the various factors such as ampelotechnical practices, variety and winemaking techniques [2].

According to the Law of Vine and Wine, wine means the product obtained exclusively by total or partial alcoholic fermentation of fresh grapes, crushed or not, or grape must. The wine a) has an alcoholic strength by volume of at least 8.5% vol.; b) has a total alcoholic strength of not more than 15% vol.; c) has a total acidity content, expressed in tartaric acid, of at least 3.5 grams per litre or 46.6 milliequivalents per litre. However, the term "wine" may be permitted if: a) it is accompanied by the name of a fruit in the form of a compound name, in order to market the products obtained by fermentation of fruits other than grapes; or b) is part of a compound name [3].

Apart from the fact that wine is a pleasant drink, which impresses with its appearance, colour, aroma and taste, it also has an undeniable nutritional and physiological value. One of the quality elements for which the wine is appreciated is its naturalness and authenticity. These attributes are protected by laws, which specify the conditions that the wine must fulfil in terms of provenance, its chemical composition as well as that of the treatments applied to it. Wine is classified as follows: a) wine with Controlled Origin Designation; b) wine with Geographic Indication; c) wine without Controlled Origin Designation and without Geographic Indication, with variety denomination, hereinafter referred to as varietal wine; d) wine without Controlled Origin Denomination, without Geographical Indication and without variety denomination, hereinafter referred to as wine.

Regarding quality of wines, the wines specific to human consumption must present, the organoleptic properties characteristic of the quality category and type of wine, as well as the following physicochemical parameters, attested by analyzes carried out in authorized laboratories: a) alcoholic strength at 20 ° C - minimum 8.5% alcohol by volume; b) total acidity - minimum 3.5 g / L expressed in tartaric acid [3].

The diversity of natural conditions, assortments, preparation technology and taste currently determines the existence of a very diverse range of wines, which differ in terms of their chemical composition and their organoleptic properties. The elements that can underlie these classifications are: alcoholic strength, sugar content, technology used in the preparation of wines.

According to The International Organisation of Vine and Wine, terms relating to the sugar content are as follows:

- Dry, when the wine contains a maximum of 4 g/l of glucose plus fructose or 9 g/l when the acidity strength totals (expressed in grams of tartaric acid per litre) is not less than 2 g/l to glucose plus fructose strength.
- Medium dry, when the sugar content of the wine is higher than the sugar content indicated under the first bullet point and does not exceeds 12 g/l or 18 g/l, when the difference between the sugar content and the level of total acidity expressed in g/l of tartaric acid does not exceed 10g/l.
- Mellow or semi-sweet, when the wine contains more than the figures aimed for in the second drawing off and achieves at the most 45 g/l.
- Sweet, when the wine contains a glucose plus fructose strength of at least 45g/l [4].

The indication of terms relative to a superior quality of wine (Grand vin, cru, superior wine, classico, vino nobile, etc) must satisfy the following conditions:

- the wine must have entitlement to a recognised appellation of origin or recognised geographic indication;
- the terms must be attributed by an official organisation of the country of production and refer either to the classification of the viticultural land or to criteria relating to wine quality.
- the labels must show the vintage [4].

Viticulture and wine from the Republic of Moldova

Moldova is a country and former Soviet republic that now offers one of the most diverse and interesting range of vineyards from the Central European region. Currently, the wine range of the Republic of Moldova is much diversified, with varieties for table grapes, white wine, red wine, sparkling wines or distillates. It consists of native varieties, but also from varieties taken from abroad [5].

Viticulture and wine in Chile

Chile is a South American country that is the tenth-largest wine-producing country in the world and the fifth largest exporter of wine. The narrow 5,000 kilometre-long strip of land that is Chile is ideal for growing grapes for wine. Everything conspires in its favour: the climate, the volcanic soil and the unusual fact that Chilean vines have never been infected with the phylloxera root aphid. Chilean wines are notable for their clean, fruity varietal nature. Cabernet Sauvignon is the most successful variety, but Chilean Merlots, Pinot Noirs and Syrahs also do well [5].

The aim of this work is to investigate whether grape varieties can be traced in white (Sauvignon Blanc) and red (Cabernet Sauvignon) wines despite high heterogeneity. For this end, white and red wine characteristics such as oenological properties, colour, sensory characters and acidic content have been evaluated and the influence of the variety has been taken into account.

2. MATERIALS AND METHODS

For this research, four selected samples of commercial wines of each single variety were analyzed. The four samples included two samples of Sauvignon Blanc (P1.1 and P1.2) and two samples of Cabernet Sauvignon (P2.1 and P2.2) from Chile (P1.1 and P2.1) and Republic of Moldova (P1.2 and P2.2). All samples were young wines from 2017 (Chile) and 2018 (Republic of Moldova).

2.1. Oenological parameters

Total soluble solids were evaluated by refractometry, using an Abbe refractometer.

Density and specific gravity at 20°C was determined on the must sample for testing by areometry (hydrometry). The sample of 250 mL of was placed in the measuring cylinder and the hydrometer and thermometer were inserted. The apparent density is read on the stem of the hydrometer. The 20°C/20°C specific gravity is obtained by dividing the density at 20°C by 0.998203.

The pH of the samples was measured using a digital pH meter Consort C5010.

The total acidity (TA), expressed in equivalent of tartaric acid content (g/L), was measured using the Titratable Total Acidity Minititrator HI84102 from Hanna Instruments. The determination of total acids in wine is made according to a neutralization reaction that is the reaction between the acids found in wine and a base. This type of reaction forms the basis of titration methods of analyzing acids. At the end of the titration, the Total Titratable Acidity is displayed in g/L.

The alcoholic strength by volume was determined using an Electronic Ebulliometer Bulteh 2000 that is designed for measurement of ethyl alcohol content percentage in wine. Electronic Ebulliometer provides easy, fast and accurate measurement, based on classic method and advanced electric technology. It enables automatic reading of boiling point and automatic alcohol contents calculation.

2.2. Sensory evaluation

Sensory evaluation is the measurement of a product's quality based on information received from the five senses: sight, smell, taste, touch, and hearing. Sensory analysis of wines contains various aspects of wine evaluation. Examples include preference determination, assessment of specific attributes and the development of aroma and flavour profiles.

Sensory qualities and main organoleptic characters were blind evaluated by a tasting panel of 10 judges in a tasting room. Tasters considered colour intensity, appearance, fragrance (aroma and bouquet) and taste and mouth-feel on a 0–5 scale.

The visual characteristics of wines depend on how their chemical and particulate nature transmit, absorb, and reflect visible radiation [6].

In contrast to the complexity of interpreting the significance of wine colour, haziness is always considered a fault. Winemakers have been performing considerable efforts in producing wines stable in terms of clarity as consumers have become to expect perfectly clear wines [6].

Based on human perception, there are thousands of olfactory substances, spanning a huge range of chemical groups. In order to be perceived, the aromatic compounds must be volatile namely pass into a gaseous phase at ambient temperatures. Wine fragrance can be subdivided into two categories, aroma and bouquet. Aroma refers to odorants derived from grapes while bouquet refers to aromatic compounds developed during fermentation, processing, and aging [6].

Taste and mouth-feel are perceptions derived from two distinct sets of chemoreceptors in the mouth. Taste is initiated by specialized receptor neurons located in taste buds. They generate the four basic tastes – sweet, bitter, sour and salty [7].

In assessing the quality of the wines, the temperature is well known to affect wine perception. Thus, white wines were tasted at 12-14 °C, while red wines at 18-20 °C.

3. RESULTS AND DISCUSSIONS

The results for the oenological parameters of the four samples are summarized in Table 1.

Table 1: Oenological parameters of the wines

Sample	Total soluble solids [° Brix]	Specific gravity	pH	TA [g/L]	Alcoholic concentration [% vol]
P1.1	3,35	0,993	3,05	5,59	12,25
P1.2	3,4	0,995	3,15	5,63	13,25
P2.1	3,83	1,0024	3,45	5,94	14,6
P2.2	3,82	1,0022	3,53	6,02	14,3

According to the physicochemical determinations we noted that both varieties of wines met commercial standards in terms of titratable acidity and alcoholic concentration. However, it seems that geographical origin and other factors influence wine pH as observed in Figure 2a) and noted also by other research [8].

Moreover, Figure 2b) shows titratable acidity profiles according to variety with a similar pattern to the alcoholic concentration.

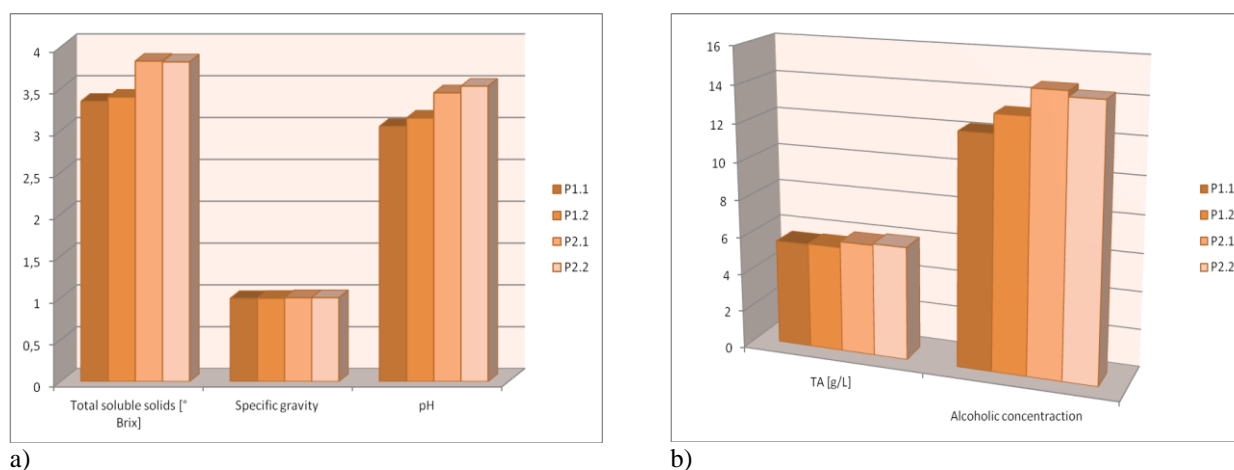


Figure 2: Pattern of the oenological parameters according to variety

Sensory qualities of Sauvignon Blanc

Sauvignon Blanc is one of the primary white varieties and the main white cultivar in the upper cool climate of Loire Valley. In recent years, this variety becomes popular in California and New Zealand. Often, its aroma has shades of asparagus, citrus fruits, lemons, fresh plants, crunchy apples, shock blossom and freshly mowed grass. However, Sauvignon Blanc wines are not made to last forever. In fact, most Sauvignon blanc wines must be drunk within three years. [9]. The sensory qualities of Sauvignon Blanc samples are summarized in Table 2.

Table 2: Organoleptic characters of Sauvignon Blanc

Sample	Colour intensity	Appearance	Fragrance (aroma and bouquet)	Taste and mouth-feel
P1.1	Yellow well, green reflections	Brilliant wine with gloss	Pleasant and cool bouquet, dominated by fruit aroma, pronounced aroma	Pleasant, with juicy pears, green apples and tropical fruits
P1.2	Well, bright yellow	Brilliant wine with gloss	Invigorating, with citrus fruits, rich in exotic fruit notes and floral hues	Well shaped, fruity

Young dry white wines generally range from nearly colourless to pale straw coloured. A more obvious yellow tint may be considered suspicious, unless it is associated with long maceration or maturation in oak cooperage [6].

Following the sensory evaluation of the Sauvignon Blanc samples, the wine from Chile obtained the qualifying score "GOOD". The judges noted that the plum aroma feels vague and a bad taste was observed (Table 3).

The wine from the Republic of Moldova received the qualification "VERY GOOD" which fulfils all the conditions of a high quality wine.

Table 3: Sensory analysis of Sauvignon Blanc

Sample	Colour intensity	Appearance	Fragrance (aroma and bouquet)	Taste and mouth-feel	Score obtained
P1.1	5	5	4	4	18
P1.2	4	5	5	5	19

It was found that for the same variety studied, the differences are visible according to the obtained results, and the country of origin is a factor that imprints certain characteristics of each type of wine, due to the climate and the soils (Figure 3).

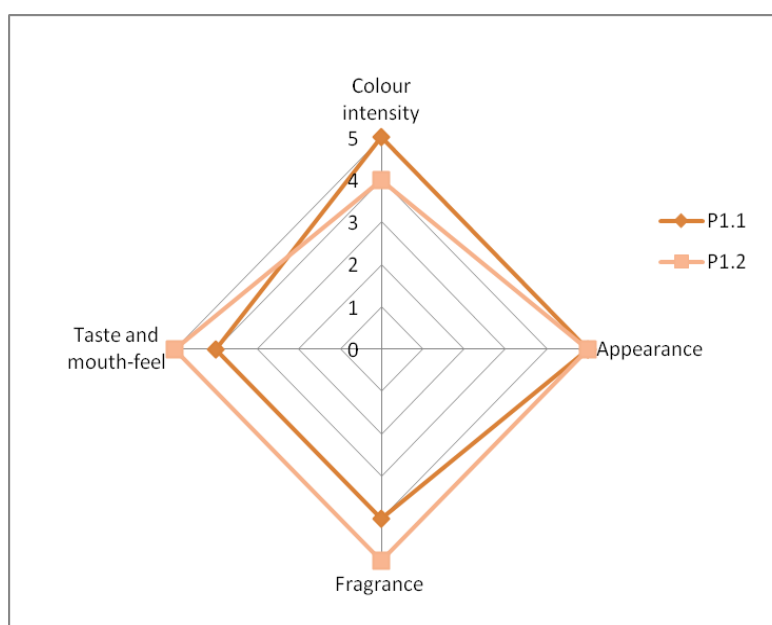


Figure 3: Characteristics of Sauvignon Blanc

Sensory qualities of Cabernet Sauvignon wine

Cabernet Sauvignon is undoubtedly the best-known red cultivar. This is due to both its association with one of Europe's best-known red wines (Bordeaux) and its production of equally superb wines in many parts of the world. Under optimal conditions, it produces a fragrant wine possessing a black-currant aroma (described as Cassis in France), aroma of cigars or cedar wood, sometimes even dark chocolate. Under less favourable conditions, it generates a bell-pepper aroma. The berries are small, acidic, seedy, and possess a darkly pigmented, tough skin. In Bordeaux, and increasingly in regions from the whole world, winemakers are blending wines made from Cabernet Sauvignon with wines produced from related varieties, such as Cabernet Franc and Merlot [9]. The sensory qualities of Sauvignon Blanc samples are summarized in Table 4.

Table 4: Organoleptic characters of Cabernet Sauvignon

Sample	Colour intensity	Appearance	Fragrance (aroma and bouquet)	Taste and mouth-feel
P2.1	Ruby red, purple reflections	Brilliant wine with gloss	Aromatic bouquet, plum notes and red fruits	Rich fruit notes, especially plums
P2.2	Ruby red, intense with purple reflections	Brilliant wine with gloss	Complex bouquet, fruity, of currants and notes of raisins and chocolate	Notes of black cherries, wrapped in accents of exotic spices

Red wines vary from deep purple to pale tawny red, depending on age, variety and wine style. Initially, most red wines have a purplish red hue. More intensely pigmented varieties, such as Cabernet Sauvignon, may remain deep red for decades [6].

Following the organoleptic analysis, according to the score obtained the wine from Chile received the qualification "VERY GOOD", respecting from an organoleptic point of view all the characteristics of a high quality wine (Table 5). The wine from the Republic of Moldova received the qualification "GOOD" which fulfils all the conditions from the organoleptic point of view of a high quality wine.

Table 5: Sensory analysis of Cabernet Sauvignon

Sample	Colour intensity	Appearance	Fragrance (aroma and bouquet)	Taste and mouth-feel	Score obtained
P2.1	5	5	5	4	19
P2.2	4	5	4	5	18

As in the Sauvignon Blanc case, it was found that for the same variety studied, the differences are visible according to the obtained results, and the country of origin is a factor that imprints certain characteristics of each type of wine, due to the climate and the soils (Figure 4).

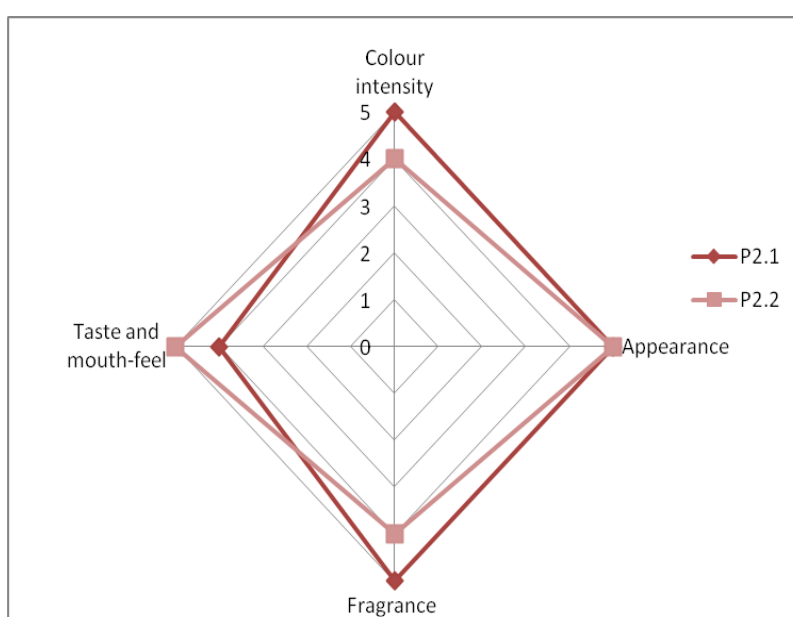


Figure 4: Characteristics of Cabernet Sauvignon

4. CONCLUSIONS

According to the physicochemical determinations we noted that both varieties of wines met commercial standards in terms of titratable acidity and alcoholic concentration.

Following the sensory evaluation of the Sauvignon Blanc samples, the wine from Chile obtained the qualifying score "GOOD" while the wine from the Republic of Moldova received the qualification "VERY GOOD", both samples fulfilling all the conditions of a high quality wine.

Following the organoleptic analysis of the Cabernet Sauvignon samples, according to the score obtained the wine from Chile received the qualification "VERY GOOD", while the wine from the Republic of Moldova received the qualification "GOOD", both samples respecting from an organoleptic point of view all the characteristics of a high quality wine.

The sensory evaluation of the two varieties cultivated in different areas shows that there are differences between the same varieties as the country of origin is a factor that imprints certain characteristics of each type of wine, due to the climate and the soils.

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