

# PHYSICO-CHEMICAL CHARACTERIZATION OF MERLOT WINE FROM ȘARBA / ODOBEȘTI

ȘANDRU Daniela Maria<sup>1</sup>

“Lucian Blaga” University from Sibiu, Romania, [danielaraulea@yahoo.com](mailto:danielaraulea@yahoo.com)

**ABSTRACT:** Merlot wines are full of fruity, delicate wines, the variety being of French origin from the Bordeaux area. Merlot wine from Șarba / Odobești, harvested in 2019, has a special quality, being ideal to be used as such or in combination with plant extracts. Polyphenols do not have high values, so they are used to prepare appetizers.

**KEY WORDS:** Merlot, polyphenols, glucose, acidity, tannins.

## 1. INTRODUCTION

Pioneering investigations into the precursors of fruity aromas have established the importance of terpenoid and for the aroma of aromatic wines. Currently, the precursors of flavorings in grapes and wine are known to be different structures, including glycosides, amino acid conjugates, odorless volatiles, hydroxycinnamic acids and many others. The precursors of aromas come mainly from grapes, but also from oak or other materials involved in winemaking. Flavors are released from the precursors during the crushing and subsequent production steps by enzymatic and non-enzymatic transformations, by microbial glycosidases, esterases, by acid-catalyzed hydrolysis and chemical rearrangements (Du Toit et al, 2017; Day et al, 2015).

Oxygen can play an important role during the vinification process. It can influence the composition and quality of must and wine. Phenolic compounds are the main substrates for the oxidation of must and wine. The addition of oxygen leads to color changes and the polymerization of phenolic molecules in wine. However, oxygen can drastically influence the aroma and microbial composition of wine, forming certain unusual flavors and spoiling microorganisms capable of growing with too much oxygen added to the wine. However, a state-of-the-art, updated review of the effects of oxygen in must and wine has not been published recently. This analysis focuses on the effects of oxygen in the must, during alcoholic fermentation, prolonged contact with yeast and during the aging of white and red wines. It is generally recognized that oxygen can have both a positive and a negative impact on the chemical composition and sensory attributes of wine. During the production process, from the initial harvesting of the grapes to ripening in the glass, there are many points where oxygen can be introduced, either intentionally or unintentionally. The impact of oxygen on fermentation performance, as well as during maturation, has been the subject of extensive research, both during winery operations and in the final package. Recent studies have highlighted the impact of oxygen on wine chemistry in the early parts of the winemaking process (Englezos et al, 2018; Varela et al, 2017; Varela et al, 2012; Ochando et al, 2017).

Strategies for producing wines with lower alcohol concentrations are in high demand for reasons of quality, health and taxation. The development and application of wine yeasts that are less efficient at converting grape sugars to ethanol has the potential to allow winemakers the freedom to make wines with lower alcohol from grapes harvested at optimum maturity, without the need for post-fermentation processes necessary to

remove the ethanol. The production of quality wines with low alcohol content continues to be one of the major challenges facing wine producers. Therefore, there is considerable interest in isolating or generating less efficient wine yeasts when converting grape sugars to ethanol (Mazza et al, 1999).

In our country, this variety is cultivated over large areas, mainly due to its characteristics, the wine being softer, with raspberry flavor, imposing itself through delicacy and lower acidity (Lengyel et al, 2013; Lengyel E., 2014).

Precisely due to these properties, it is also suitable for use in various recipes for invigorating drinks.

In this study, the Merlot wine from Șarba / Odobești was analyzed from a physico-chemical point of view, the harvest of 2019, a harvest of a special quality of wines as well.

## 2. MATERIALS AND METHODS

- The Merlot variety, 2019.

- Physico-chemical analyzes of the selected wines were carried out according to the methodological indications of the Hanna Instruments apparatus using specific putties for:

-determination of pH with the HI 222 apparatus. HANNA pH HI 222 is a stationary, microprocessor-based on temperature and REDOX potential analysis apparatus with the possibility of connection to a PC.

-determination of reducing sugar (g / l) with HI 83746. The concentration of reducing sugars (ZR) is one of the most important parameters that must be measured during the wine production process. Increasing the concentration of ZR during grape ripening can help to choose when to start harvesting. Obtaining the highest possible concentration of ZR is very important because this parameter defines the commercial value of the grapes.

-determination of glucose (%) and fructose with HI 96801. Brix determination is given by measuring the refractive index of a solution. The refractive index is an optical characteristic of a substance given by the number of particles dissolved in it. This index is defined as the ratio of the speed of light in an empty space to the speed of light through a substance. One result of this feature is the deviation, or change of direction of light, when it passes through a substance with a different refractive index.

-determination of total acidity (g / l) and tartaric acid (g / l) with HI 83748. Tartaric acid and tartrate play an important role in the stability of wines. They can be present in wine and juice in

various forms, such as tartaric acid (H<sub>2</sub>T) and calcium tartrate. The ratio between these depends mainly on the pH of the wine.

-determination of alcohol concentration (% v / v) with HI 83540. Determination of alcohol content is done using a new method. The instrument performs two readings, one before adding the Hanna reagent and the second reading after the reagent is added. The difference between the two readings is used to calculate the alcohol concentration. The sugar content of the wine creates interference. To eliminate the interference created by the sugar content, the instrument is equipped with an algorithm for compensating the sugar content. There are three types of sugar content compensation: Fixed sugar compensation (same type of compensation for all types of wine); Sugar compensation according to the type of wine (it is possible to select the type of wine) and Sugar compensation according to the concentration (it is possible to enter the value of the sugar content).

-determination of dissolved oxygen (g / l) with HI 2400. HI 2400 is a laboratory device with microprocessor, designed to measure dissolved oxygen having the function of recording. It can store up to 99 batches of data with a total of up to 8,000 records. Dissolved oxygen is indicated by the apparatus in ppm units (parts per million) or in percentages (%). Thermal compensation is done using the ATC circuit of the device. Compensating for the effect of salinity in water allows the direct determination of dissolved oxygen in salt water, and compensation with altitude adjusts the values according to its variations. The dissolved oxygen sensor has a membrane such as the polarographic and temperature sensor.

-The Folin-Ciocalteu method was used to determine the total polyphenols.

-Anthocyanins, tannins and phenolic acids were determined by spectrophotometric methods (Țârdea și colab, 2010; Dos Santos K.C. et al, 2014; Bashmakov Y.K. et al, 2014; Knop F.K. et al, 2013).

- Phenolic compounds in Merlot red wine from Șarba / Odobești were determined using a HPLC, Agilent Technologies series 1200.

#### Results and discussions

As can be seen in Figure 1, the reducing sugar is found at an amount of 3.5 g / L, the pH of the wine being 3.65. Glucose and fructose stand at 9.1%, and the total acidity does not exceed 4.4 g / L tartaric acid. Tartaric acid reaches 3.3 g / L, oxygen at 3.7 g / L, the alcoholic strength being 12.5% v / v.

The concentration of polyphenols, anthocyanins, tannins and phenolic acids is observed in Figure 2. Thus the selected wine has an amount of 1344.682 mg / L total polyphenols, of which 423.087 mg / L tannin, 301.093 mg / L anthocyanins and 89.275 mg / L phenolic acids. According to the literature, Merlot wine from Receaș has values of polyphenols between 2330 and 2460 mg / L and anthocyanins between 572.8 and 588.9 mg / L (Lengyel et al. 2012), which presents compared to the Șarba features much harsher features. Eight phenolic compounds were also identified by HPLC methods, namely: quercetin, at 0.4387 mg / 100 mL wine, gallic acid at 9.0489 mg / 100 mL wine, syringic acid with 1.7596 mg / 100 mL wine, caffeic acid with 3.6876 mg / 100 mL wine. Cinnamic acid, ferulic acid and resveratrol have subunit values of 0.1824 mg / 100 mL wine, 0.2023 mg / 100 mL wine and 0.8256 mg / 100 mL wine, respectively. Catechin values are the most substantial, reaching 17.9598 mg / 100 mL of wine (figure 3, 4).

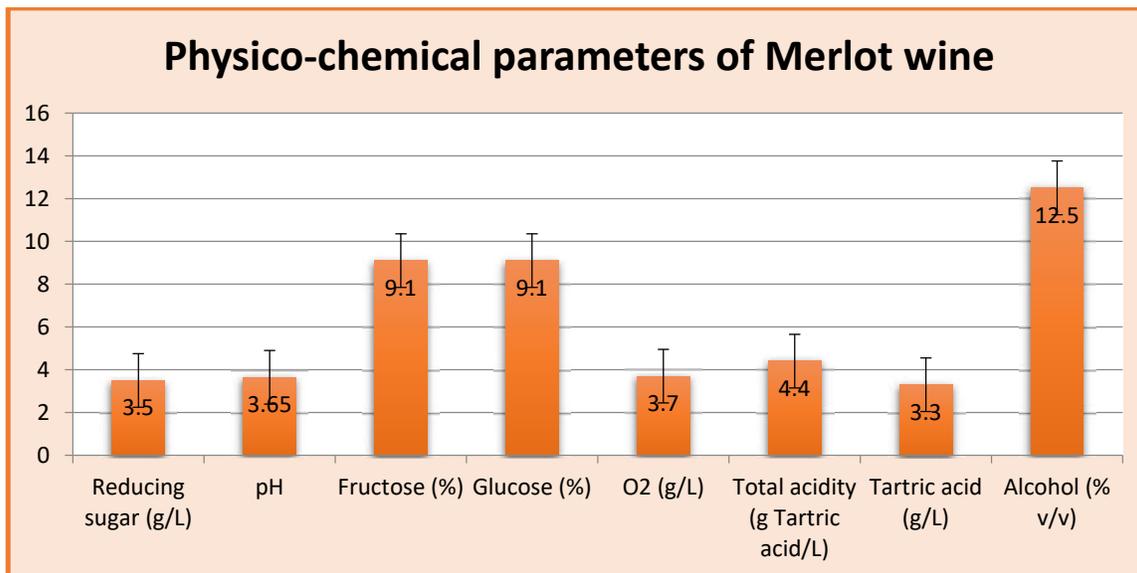
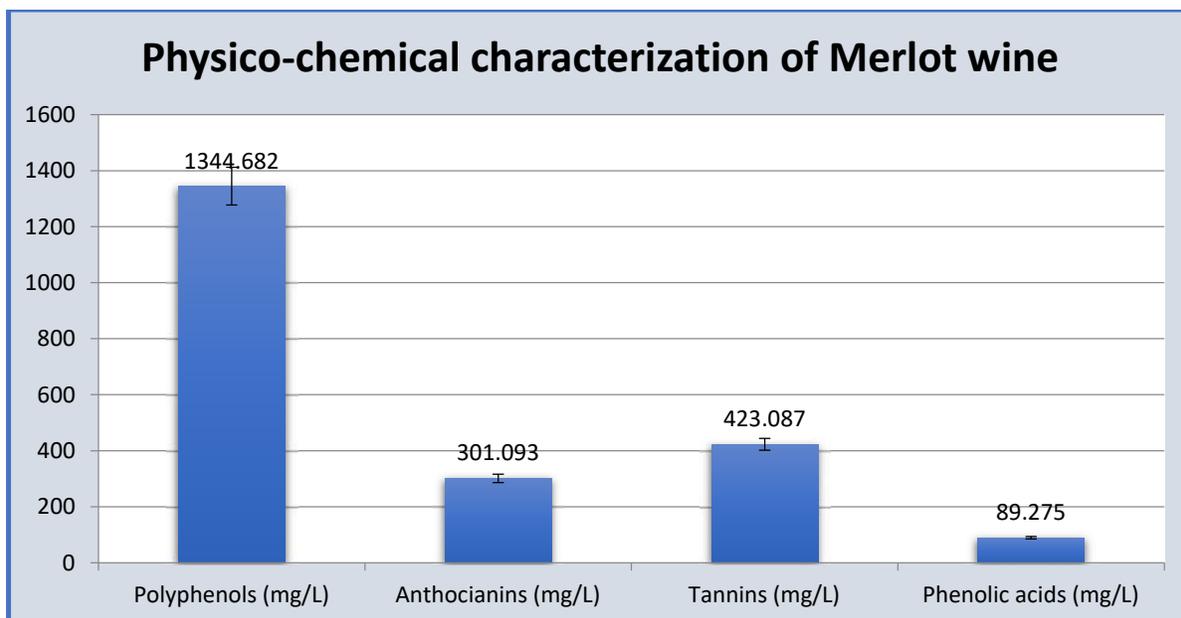
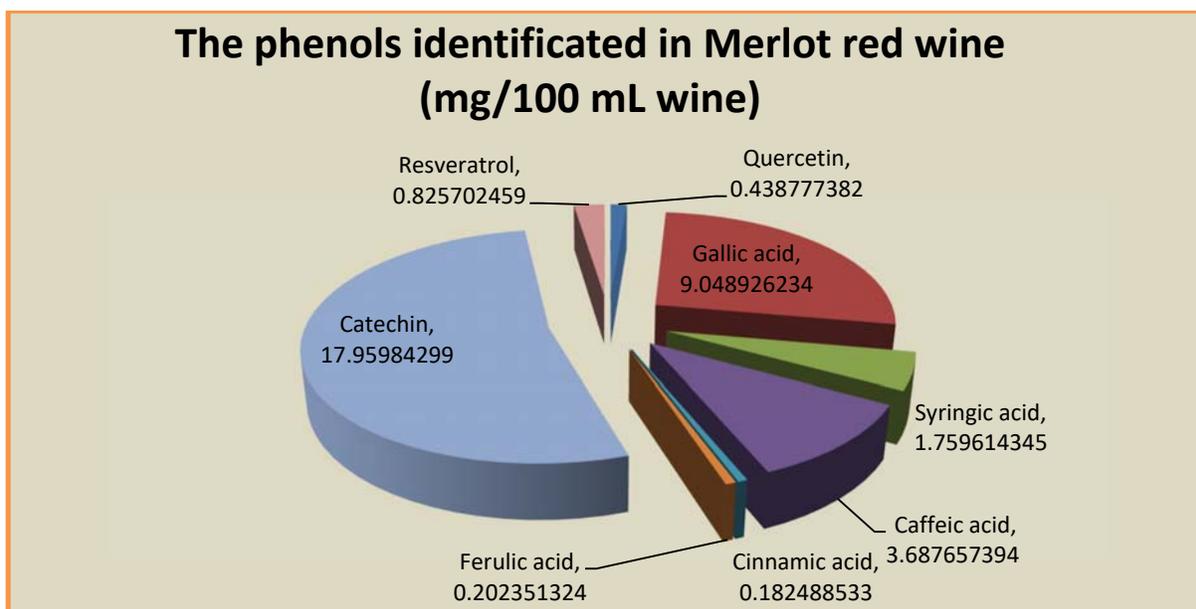


Figure 1. Physico-chemical characterization of Merlot wine from Șarba / Odobești, 2019 harvest



**Figure 2.** Evaluation of the concentration of total polyphenols, anthocyanins, tannins and phenolic acids in Merlot red wine from Şarba / Odobeşti, 2019 harvest



**Figure 3.** Identification of phenolic compounds in Merlot red wine from Şarba / Odobeşti, 2019 harvest

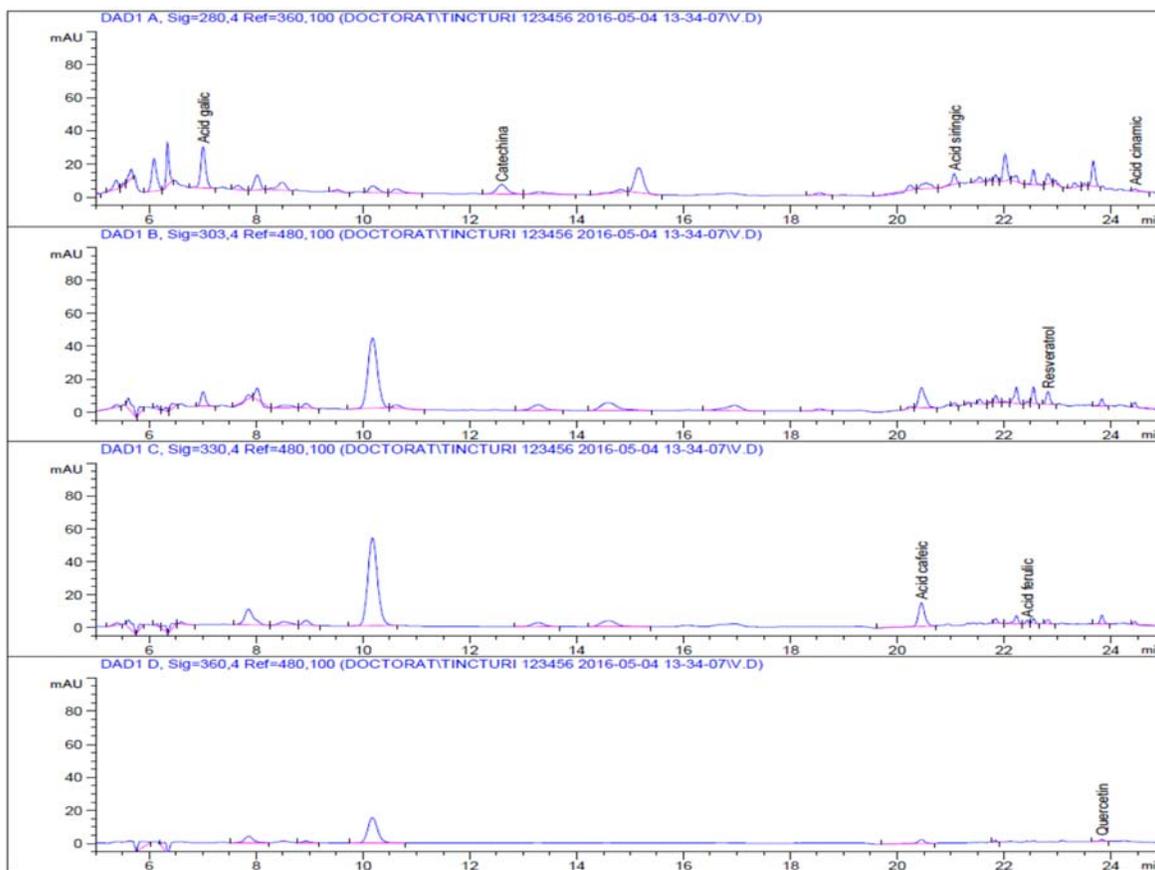


Figure 4. Chromatograms of phenolic compounds identified in Merlot red wine from Șarba/Odobești, 2019 harvest.

### 3. CONCLUSIONS

Physico-chemical parameters that characterize the Merlot red wine from Șarba / Odobești place this wine in the delicate, soft area. The acidity is not strong, the polyphenols are not high, so it is suitable for use in the preparation of beverage recipes. The soft, fruity aromatic notes practically counteract the astringency of some aromatic plants rich in active principles, or the excess tannin in them, the wine giving the drinks pleasant, velvety notes.

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