

## STRUCTURAL COMPOSITION OF RED WINES DETERMINED BY THE COLOR OF BOTTLE

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### INTRODUCTION

Red wines occupy a preponderant part of the total wine production. White wines are distinguished not only by colour, taste and aroma, but also by physic-chemical properties, physiological action on the human body.

Young red wine colour is usually intense, but at the stage of maturation and aging is also diminished in intensity leading to shades of peel of onion. Physico-chemical methods of analysis make it possible to measure the instrumental intensity and hue of the wine. The evolution of wine red colour quality largely depends on the conditions of storage of wines. The factors that ensure the conditions of wines storage, particularly red ones are: temperature, humidity, ventilation, vibration, the colour of the bottle in which the wine is kept.

Glass bottle is the best known and all at once most appreciated packaging for wine. Glass bottles presents a series of advantages namely that they are chemically inert, non - impermeable and hygienic, resistant to high pressures, recyclable and relatively inexpensive. The disadvantages I could notice: fragility, high weight. There are several types of bottles as: bordeaux, porto, jidvei, murfatlar, rhein, tokay.

Color tints of the bottles are: white, white with yellowish tinge, green and brown. The darker coloured tint resists UV rays, especially between 360-440 nm and are used in bottles in high-quality wines as well as in sparkling and white wines. The colour of the container can greatly influence the consumer choice, but it may have some influence on the quality of wine.

### 1. MATERIALS AND METHODS

The aim of the study was to investigate the structural changes of the red wines stored in bottles of different colours under similar conditions.

As the research object were untreated red wines Merlot and Rară Neagră (Rare Black) produced in the southern zone of Moldova, Cahul. The wines have been produced by the classical technology of red wine production.

To determine the physic - chemical indexes of untreated red wines Merlot and Rară Neagră (Rare Black) have used modern methods, in accordance with the standards in force, as well as recommended by O.I.V. Specific and stable chromatic indexes were determined by spectrophotometric method of analysis.

Initially, the wines were sulfited up to a concentration of 100 mg/l of SO<sub>2</sub>, and maintained at a temperature of t = 0 °C for 3 days, then filtered and bottled.

Red wines Merlot and Rară Neagră (Rare Black) were kept in bottles of transparent white and green within 90 days, at a temperature of 14-16°C.

### 2. RESULTS AND DISCUSSION

During the retention samples of the red wines Merlot and Rară Neagră (Rare black) in white transparent and green bottles were determined the following specific and stable chromatic indexes: the content of: the total phenolic substances, polyphenol index (I. P. T.) total and ionized anthocyanins); the intensity and hue of colour.

**Table 1.** The influence of bottle colour on the evolution of the content of total phenolic substances and I. P. T. in red wines Merlot Rară Neagră (Rare Black).

Name of wine	Initially		Wine treated		Green bottle		White bottle	
	Total phenolic substances, mg/l	I.P.T.	Total phenolic substances, mg/l	I.P.T.	Total phenolic substances, mg/l	I.P.T.	Total phenolic substances, mg/l	I.P.T.
Merlot	2534	42,62	2436	41,12	2371	38,12	2153	36,12
Rară Neagră	1682	31,9	1640	30,2	1601	29,2	1512	29,05

According to data in the chart 1 shows that keeping wines in white bottles is contributing to a higher decrease of phenolic substances than in green bottles. The lowest concentration of phenolic substances of 1512 mg/l and the value of I. P. T. by 29,05 was registered for wine sample Rară Neagră (Rare Black) maintained in white bottle.

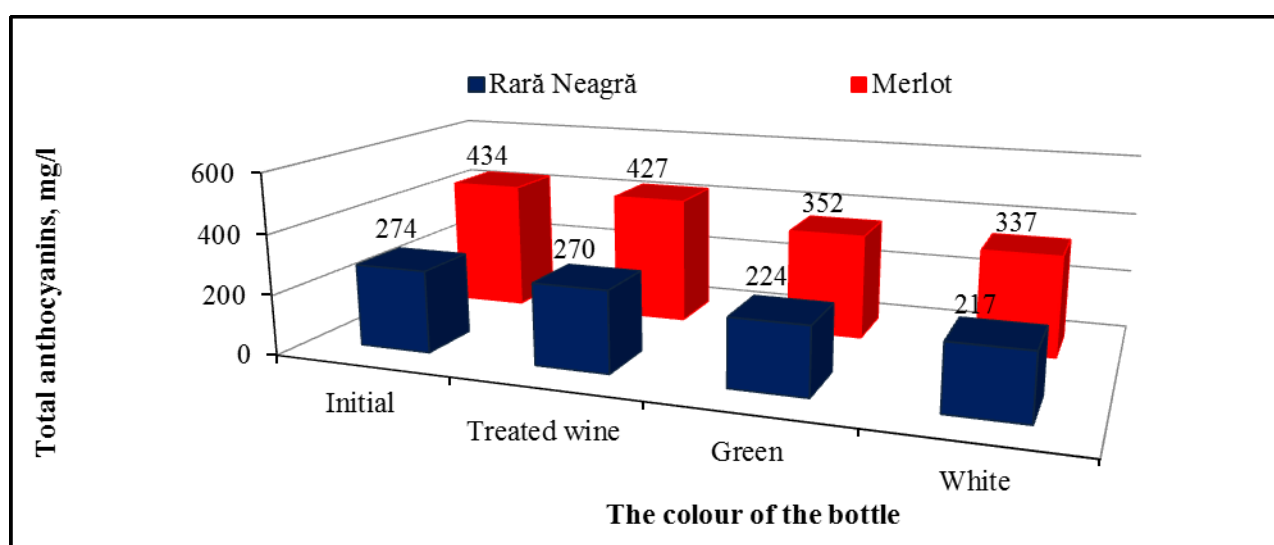
The results obtained are in complete correlation with the data in the specialized literature [1, 3] that white glass with high transparency allow visible light radiation to destroy the colouring of red wines while coloured glass bottle retains some of these radiations.

Diminutive changes are recorded and on the content visible and ionized anthocyanins for both

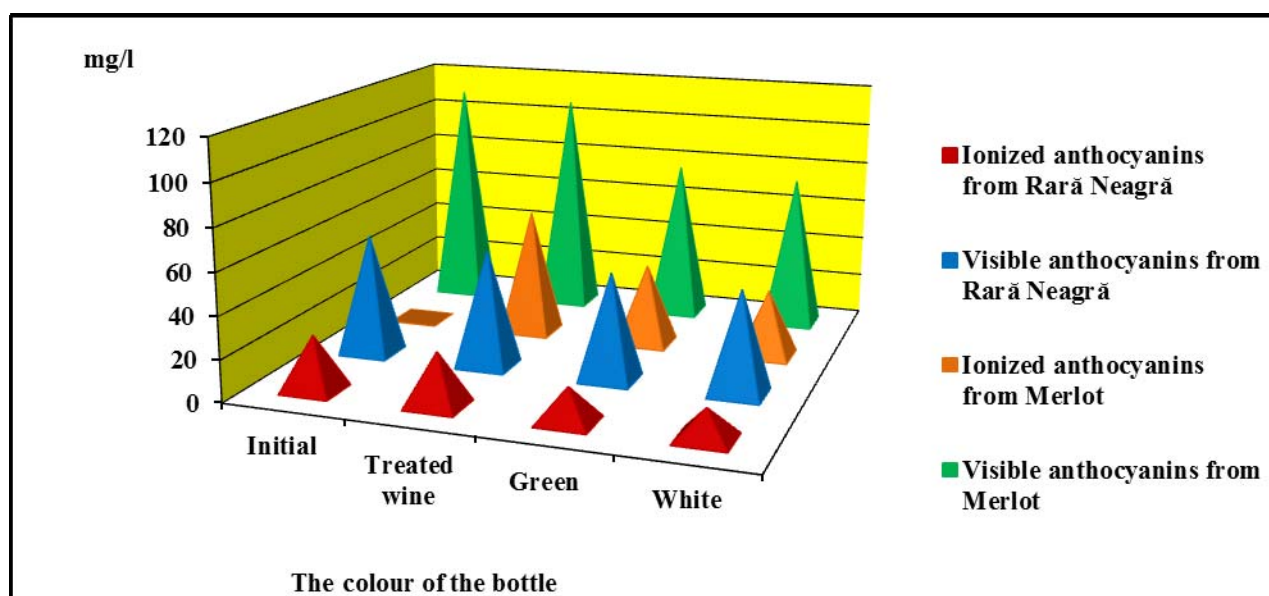
types of red wines samples, the results are presented in figurile 1 and 2. According to the processing results we found that anthocyanins have diminished on the average by 34% to wines kept in green bottles and roughly 48% for those in the white transparent bottles, compared to the original values recorded.

Lowering the concentration of ionized anthocyanins is attested by the minimum value of 14 mg/l in Rară Neagră (Rare Black) wine kept in white bottles, while in the green bottle it is 18 mg/l.

The white transparent glass favours rapid degradation of anthocyanins due to their irreversible oxidation as red wine afterwards change the colour [1].



**Figure 1.** The variation of total anthocyanins in Merlot and Rară Neagră (Rare Black) wines, depending on the colour of the bottle.



**Figure 2.** Modification of the ionized and visible anthocyanins in Merlot and Rară Neagră (Rare Black) wines, depending on the colour of the bottle

**Table 2.** Influence of the bottle colour on the evolution value of colorant intensity and the hue of colour in Merlot and Rară Neagră (Rare Black).

Name of wine	Initially		Wine treated		Green bottle		White bottle	
	Colouring intensity, u.a.	Colour tint, u.a.	Colouring intensity, u.a.	Colour tint, u.a.	Colouring intensity, u.a.	Colour tint, u.a.	Colouring intensity, u.a.	Colour tint, u.a.
Merlot	1,37	0,54	1,25	0,56	1,2	0,63	1,01	0,69
Rară Neagră	1,1	0,43	0,95	0,44	0,7	0,51	0,6	0,59

Distinct changes are recorded and on the evolution of stable chromatic indexes keep samples of red in white wines in white and green bottles. The results obtained are shown in table 2. As a result of keeping the wine in white bottles are observed an increase in the colour hue up to 0,69 u.a. and 0,59 u.a. respectively for Merlot and Rară Neagră (Rare Black), which denotes a decrease of the colouring intensity.

Colouring intensity decreased on average by 36.1% and respectively 26.3% for Rară Neagră (Rare Black) and Merlot wines kept in white bottles and respectively by 35.1% and 13.0% for samples of Rară Neagră (Black Rare) and Merlot kept in green bottles.

Value increasing of the colour hue occurs on average by 18% for wines kept in green bottles and by 32% for samples kept in white transparent bottles.

## CONCLUSIONS

Keeping red wines Merlot and Rară Neagră (Rare Black) in green bottles maintain its chromatic qualities longer in comparison with red wines kept in white transparent as white glass allows transmitting ultraviolet rays, which have the aggressive effect on the colour of the wine, favouring its rapid degradation due to oxidation of tannins, compounds that restore smoothness, colour and softness of wine.

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