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STUDY REGARDING THE SENSORIAL AND PHYSICO-CHEMICAL CHARACTERISTICS OF CERTAIN WINES PRODUCED IN ROMANIA

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Abstract

Romania is well recognized for the wine consumption, vineyards and for its specific important varieties of grapes. Accordingly to the statistical data (EUROSTAT), in Romania the gross grape annual consumption for 2008 was 5.532 kg / inhabitant and 25.379 l wine / inhabitant.
The objectives of this study were to analyze by comparison certain types of wines from Romania in order to underline the influence of the raw material and technology on the total quality of the final product. For this, there were selected home made wines, ordinary wines and also superior wines, red and white. The investigated parameters were: alcoholic grade, total acidity and pH, total and reduced sugars, sulphur dioxide, superior alcohols content and also sensorial analysis of the wine samples.

Key words**:** *wine, alcoholic grade, sugars, sulphur dioxide, sensorial analysis*

INTRODUCTION

There is a tradition in Romania regarding the wine consumption because of the fact that Romania detains important varieties of wines and vine.
Accordingly to the FAO dates, compared to other European countries, Romanian occupied five place for vine surface (after Spain, France, Italy and Portugal), six for the wine production (after France, Italy, Spain, Germany and Portugal) [6]
The National Institute for Statistics (INS) published in 2009 data that showed a decrease to 1.4% in vinery surface in 2005-2009. The decrease was also registered for the grapes production: 1.004.000 tons (2009) compared to 1.010.000 tones (2008). The Romanian wine exports in 2005-2009 for "wines from fresh grapes, including alcohol enriched wines" represented between 0.05% and 0.07% from total Romanian exports. [6].

The objectives of this work were to analyse by comparison different types of wines produced in Romania. We have chosen homemade wines, young wines and superior wines also.

MATERIAL AND METHOD

Alcoholic concentration was determined using the alcoholmeter after a simple distillation and the results were correlated with temperature [3].
Total and free SO_2 was determined by iodometric titration of the total reducing substances [5].
The *reducing sugars* were determined by standard methods (Schoorl) based on their propriety to reduce in alkaline medium at high temperature the Fehling solution. Results were expressed in mg glucose /l of wine [5].
Total acidity of wines was determined by titrimetric method using bromthymol blue as indicator [5].

Superior alcohols content was determined using ρ-dimetilaminobenzaldehyde using an etalon curve [3].

Sensorial analysis was conducted accordingly to descriptive analysis and affective testing using the hedonic scale with 5 points: (5) *like*; (4) *like moderately*; (3) *not like but not dislike*; (2) *dislike moderately*; (1) *dislike*. The evaluators were 120 students from faculty of *Animal Husbandry* [4].

Abbreviation of analysed samples of wines:

VAC – homemade white wine
VRC – homemade red wine
VAM – ordinary white wine
VRM – ordinary red wine
VAS – superior white wine
VRS – superior red wine
DOC-CMD A – controlled origin white wine harvested at full maturity
DOC-CMD R – controlled origin red wine harvested at full maturity

RESULTS AND DISCUSSIONS

Alcoholic concentration

The level of alcohol in wines is negative correlated with the residual level of sugars (the sweetness of wines). The alcohol results from sugars fermentation and the higher is the alcohol in wines, the higher is the consumption of sugars during fermentation, which determines a reduced level of residual sugars in wines (figure 1).

The highest level of sugars it was observed for ordinary white wine (VAM) up to 17.85g glucose/l wine. This is correlated to a low level of alcohol level (10.6% vol.).

It can be also observed from figure 1 that the lowest level of sugars was registered for DOC-CMD R – controlled origin red wine harvested at full maturity, at 2.5g glucose/l wine.

It is also interesting to observe that the home made wines (white and red) have a high level of alcohol (up to 11-11.5% vol.) and a low level of residual sugars. This could be due to the fact that the fermentation is intense and also confirm the local producer's declaration that they did not used added sugar for fermentation.

Acidity of wines

This parameter is reflected in Fig. 2, compared to the level of glucose content.

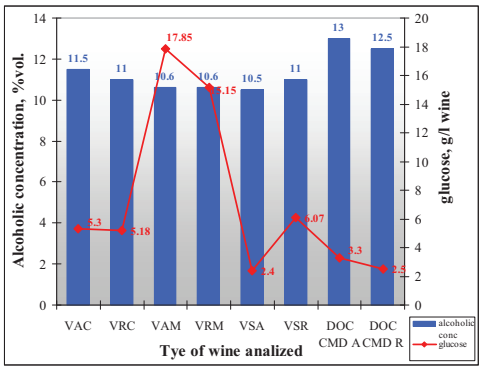

Fig.1. Alcoholic concentration of wines vs. reducing sugars content

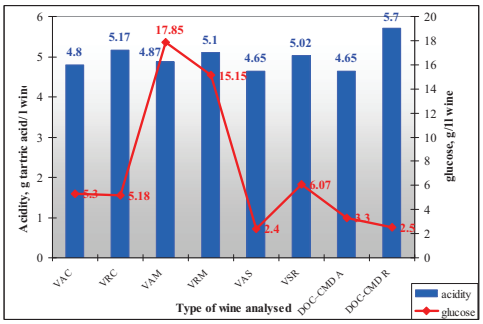

Fig. 2. Acidity of wines, compared to reducing sugars level

First of all, it can be observed from figure 2 that red wines had a higher level of acidity compared to white wines: 5.1g tartric acid/l wine for VRM sample compared to 4.87g tartric acid/l for VAM sample. For special wines with controlled origin, the red one (DOC-CMD R) has an acidity with 18.42% higher that the white one (DOC-CMD A). This can be explain by the fact that the technology of red wines includes the whole grape which determines the intense extraction of tannins, anthocyans and acids, responsible for the acidity in wines, but also for the specific astringent taste of red wines [2].

Comparing the white wines, it can be observed that the lowest level of acidity was registered for superior white wine (VAS) 2.4g tartric acid/l wine.

Level of SO_2 in wines

Sulphur anhydride (SO_2) can be considered as a natural component of wine because a lot of grapes because specific yeasts can metabolise the sulphur compound into SO_2. But the SO_2 resulted from this transformation is not enough to cover the antiseptic activity, the need to prevent enzymatic oxidation and wine clarification (this is the reason why in winery it is added SO_2).

Sulphur anhydride (SO_2) is found as free, active form (as gas) or bounded in covalent links. The total level of SO_2 is the result of addition of free and bounded SO_2 [1].

From figure 3 and 4 it can be observed that the red wines need less added SO_2 for conservation and stabilisation that white wines.

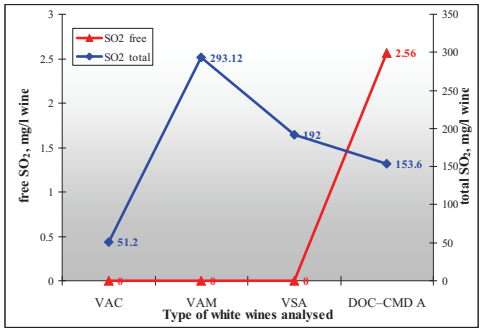

Fig. 3. Level of sulphur anhydride in white wines

It can be also concluded from figure 3 that the highest quantity of SO_2 in white wines was 293.12 mg SO_2/l ordinary white wine (VAM). This is correlated to the total level of residual sugars in wine; this wine is containing the highest level of sugars. The higher is the residual level of sugars, the bigger is the possibility of fermentation, so it is needed a higher level of SO2 for stabilization. The controlled origin white wine harvested at full maturity (DOC-CMD A) has a lower level of residual sugars, so, the level of SO2 is only 153.6mg/l wine.

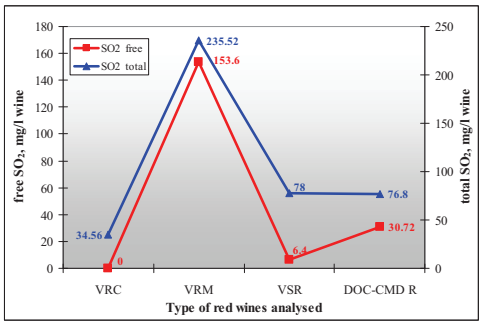

Fig. 4. Level of sulphur anhydride in red wines

The red ordinary wine (VRM) has the highest level of total SO_2 (235.52 mg SO_2/l wine), which is smaller than those in ordinary white wine (VAM).

Superior wines (DOC-CMD A and DOC-CMD R) registered similar level of total SO_2: 76.8 mg SO_2/l white wine respectively 78 mg SO_2/l red wine).

The level of SO_2 in homemade wines is low (total SO_2 is 51.2 and 34.56 mg SO_2 /l wine, for white and red respectively). This conduces to a smaller shelf life, maximum 6 months. But this is not a problem for producers because this type of wine is produced for self consumption of the family, not for commercial activities.

Superior alcohols

The main superior alcohols founded in wines are: isobutylic, izoamylic and amylic alcohols. Their content varies from 0.15-0.50g/l and represents 0.03-0.06% from total alcoholic grade of wine. They result from yeast fermentation of sugars and their quantity depends on the nitrogen compounds of wine, total sugars, yeast species and fermentation conditions.

So, their quantity is not so important, but their quality and role: they influence the palatability, texture and other sensorial characteristics of wine.

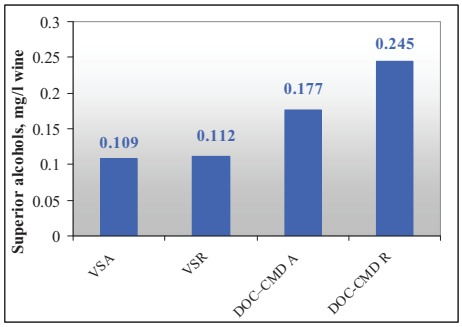

Fig. 5. Superior alcohol level in red and white wines

In figure 5 it can be observed that superior alcohols were founded only in superior wines (DOC-CMD red and white and VAS (VRS).
The higher level of superior alcohols was found in red DOC-CMD wine (0.245 g superior alcohol /l wine) and the smallest was in superior white wine – 0.109 g superior alcohol /l wine.

Sensorial analysis

After the sensorial evaluation of all samples, the panel expressed their preferences.

The sensorial profile for all types of wine regarding limpidity, colour, aroma and taste is shown in figure 6.

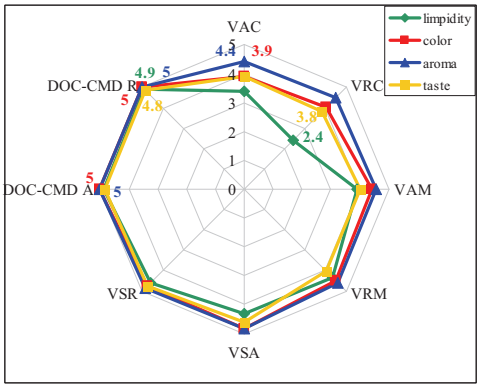

Fig. 6. Sensorial analysis for investigated white and red wines

For figure 6 it can be observed that the most appreciated *limpidity*, 4.9 points, was for DOC-CMD red wine and the less appreciated for homemade red wine (VRC), 2.4 points.

The best *colour and aroma* was found for superior wines, red and white equally (DOC-CMD) with 5 points.

Regarding the taste, the best score was registered for DOC-CMD red wine and the lowest for red homemade wine (VRC).

CONCLUSIONS

Experiments showed the correlation between the alcohol and residual sugars in wines (both white and red)
The highest level of SO_2 (293.12 mg SO_2/l wine) was registered in ordinary white wine (VAM) which is the sweetest wine of all samples, so it was needed additional SO_2 for conservation and stabilisation.
Only superior wines had superior alcohols, as a result of the yeast metabolism.
The most appreciated wines were superior controlled origin white wine harvested at full maturity, both red and white but the other were also well appreciated as aspect, aroma and colour, the less appreciated was a young homemade red/white wine which was not maturated and has no opportunity to develop these characteristics.

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