



INSTABILITY OF QUALITY WHITE AND RED WINES WITHOUT A GEOGRAPHICAL INDICATION MARKETED IN COMMERCIAL CHAINS

Peter Czako¹, Marek Závrecký^{2}, Jana Jančovičová², Vladimír Vietoris¹*

Address: ¹Slovak University of Agriculture, Faculty of Biotechnology and Food Sciences, Department of Storing and Plant Products Processing, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic.

²State Veterinary and Food Administration of the Slovak Republic, Division of Wine Inspection, Botanická 17, 842 13 Bratislava, Slovak Republic.

*Corresponding author: zavracky@svssr.sk

ABSTRACT

Wine in the quality category without geographical indications in consumer glass containers with a distinctive label are sold in the largest quantities in the lowest price level. These wines are the most prevalent in multinational trade chains. For this reason, we have focused on the quality and sustainability of quality of these wines on sale. Date of minimum durability is optional and voluntary indication for wines. In the sale, however, we meet as well with the wines, which are offered to the consumer, and are exposed at the point of even a few years. In our pursuit it has been clearly shown that the date of minimum expiration stated on the prepackaging wines without geographical indication would be justified and vouched by the consumer to the sustainability of quality wines.

Keywords: wine, sensory, quality, storage

INTRODUCTION

The color of the glass bottles may affect the organoleptic characteristics of the wine. Most of the wines are sold in retail chains, where they are subjected to prolonged exposure to artificial lighting with the wine bottle. Such exposure can alter the profile of the wine. We should know the nature of all changes in the wine after the lighting, which can occur to prevent loss of quality when exposed to lighting in chains. (D' Auria *et al.*, 2009)

Temperature changes can modify the quantity of volatile substances in wine (Benítez *et al.*, 2006) Volatile components affect the organoleptic characteristics of the wine, in particular, their aromatic properties. (Dí azet *et al.*, 2003)

Sulphite or sulphur dioxide, often with 2, is the most important and most widely used chemical that prevents the oxidation of the wine. The addition of SO₂ in wines, raises objections around health and serious allergic reactions, resulting in susceptible individuals. Sulphites concerns led to regulatory constraints set by the World Health Organization (WHO) and the International organisation of vine and wine (OIV) (Li *et al.*, 2008).

Browning is the oxidation process that includes sugars, lipids, amino acids or phenols in food. It is one of the major problems with which we encounter during the production of the wine. On the one hand, adversely affecting the sensory characteristics of the wine (loss of colour, taste and smell, and the increase of astringency) (Escudero *et al.*, 2002, Ferreira *et al.*, 1997, Schneider, 2001) and (Silva Ferreira *et al.*, 2002), and on the other, leads to the loss of nutritional value of wines (Bonilla *et al.*, 2001) and (Sioumis *et al.*, 2005).

Quality control of the wines is carried out in two ways: 1. the sample is from the terminal after importation into the country and 2. the collection of wine is already carried out in a commercial network (check is carried out after several months of qualifications, that the wine retains the quality provided by the manufacturer.)

MATERIAL AND METHODS

The observation of the changing quality of wine depending on the length of its storage have been selected wines in the prepackage to be sold in Slovakia in the greatest volume. This is a wine without a geographical indication, the cheapest category – imported from Hungary and Serbia and a variety of wines originating in the EU. The wines were divided into the following groups: 1. non-aromatic white wines, 2. aromatic white wines, 3. red wine Vranac type and 4. red wines Cabernet type.

Control observations were divided into two basic time phases namely: 1. stage-right after they had been imported into the Slovak market to Wine rated Terminal. This means that the time from the wine producer has not been longer than 3 weeks after bottling, and of the results of observation indicated that the quality of the wine was on the level required within a given category. 2. stage-wines were rated at the end of 5. months, samples were collected on sales in commercial chains.

For comparison, the parallel tracking of table wines from the Slovak production was carried out by the same method and the same period.

The assessment was carried out in an accredited sensory laboratory of the State Veterinary and Food Institute in Bratislava. Sensory evaluation was carried out by an evaluation Commission of expert tasters consisting of five members. In the evaluation, the main emphasis was on the quality of wines, must not be treated with other parameters. Sensory evaluation was carried out in the form of a sensory profile, in which the precise characters for smell and taste were stated by the taste tester. Sensory profile for each sample and compared well with the analytical analysis was supported by wine.

In the comparison of the analytical values of the wines produced outside of Slovakia, and wines from Slovakia, it was found that the alcohol content and extract of non-sugar in non-Slovak wines is much lower than in the comparative sample of Slovak table wines.

Table 1 List of foreign samples of wines by provenance

wine	Aromatic provenance	- non-aromatic provenance	type Vranac provenance	Type cabernet provenance
White wines	4 samples Hungary 4 samples Serbia 2 samples EU wine mixtures	4 samples Serbia 5 samples Hungary 4 samples EU wine mixtures		
Red wines			4 samples Serbia 2 samples Macedonia 4 samples EUwine mixtures	5 samples EU wine mixtures 4samples Macedonia 2 samples Hungary
Total	10 samples	13 samples	6 samples	11 samples

RESULTS AND DISCUSSION

All wine taken for observation were filled in by default-green glass bottle containing 1 litre closed with an agglomerate cork stopper (stopper moulded ground cork). All kinds of foreign wines had very low levels of alcohol, non-sugar extract and sulphur. The alcohol content of wines ranged from 9.2% to 9.5% vol. Wine on first observation, which has been carried out in the importer dispatch warehouse did not show signs of poor quality. Within the lower classification of wine products met the basic parameters for direct human consumption table 2, no.2 figure no. 1 and 2.

Table 2 Analytical indicators for white and red wines 1st observation

	alcohol	non-sugar Extract	residual sugar	Acid titer	Acetic acid	Free SO ₂	total SO ₂
White wine							
aromatic	9.5	14.2	2.5	5.2	0.65	25	130
non-aromatic	9.2	14.5	3.6	6	0.55	18	125
Red wine							
vranac	10.0	16.6	2.6	5	0.78	16	115
cabernet type	10.5	15.8	3	4.5	0.75	20	140

When comparing non-Slovak wines with wines from the Slovak production, we have observed that in Slovak wines was by analytical analysis detected a higher alcohol content, a higher content of total acidity, especially in white wines and a higher content of freeform of sulphur dioxide. See table 2a)

Table 2a) Comparison sample of Slovak wines without geographical indication

	alcohol	non-sugar Extract	residual sugar	Acid titer	Acetic acid	Free SO ₂	Total SO ₂
White wines	10.5	16.2	3.2	6.6	0.55	32	155
Red wines	11.5	18.2	3.5	5.4	0.65	35	145

After five months from the first testing was carried out the subsequent evaluation of the exact production batch wines was carried out as in the first observation. The wines were collected in commercial chains directly from the sales. Evaluation of wines was found to be a significant poor quality of goods being sold. The most significant differences were observed in sensory evaluation. In the sensory characters there was shown poor quality in the oxidation, wine lacked fruit bouquet, non-harmonic taste, while oxidation was felt in addition to scents and the taste as it appears in the figures no. 1,2,3. The analytical values have not changed

significantly, except for the contents of any indicators of freeform of sulphur dioxide, which has been significantly lower in all wines compared with the first observation (see table 3.)

Table 3 Analytical indicators for white and red wines 2st observation

	alcohol	non-sugar Extract	residual sugar	Acid titer	Acetic acid	Free SO ₂	Total SO ₂
White wine							
aromatic	9.5	14.0	2.5	5.0	0.70	5	122
non-aromatic	9.2	14.3	3.6	5.5	0.65	7	119
Red wine							
vranac	10.0	16.4	2.6	4.5	0.95	6	100
cabernet type	10.5	15.4	3.0	4.0	0.86	8	115

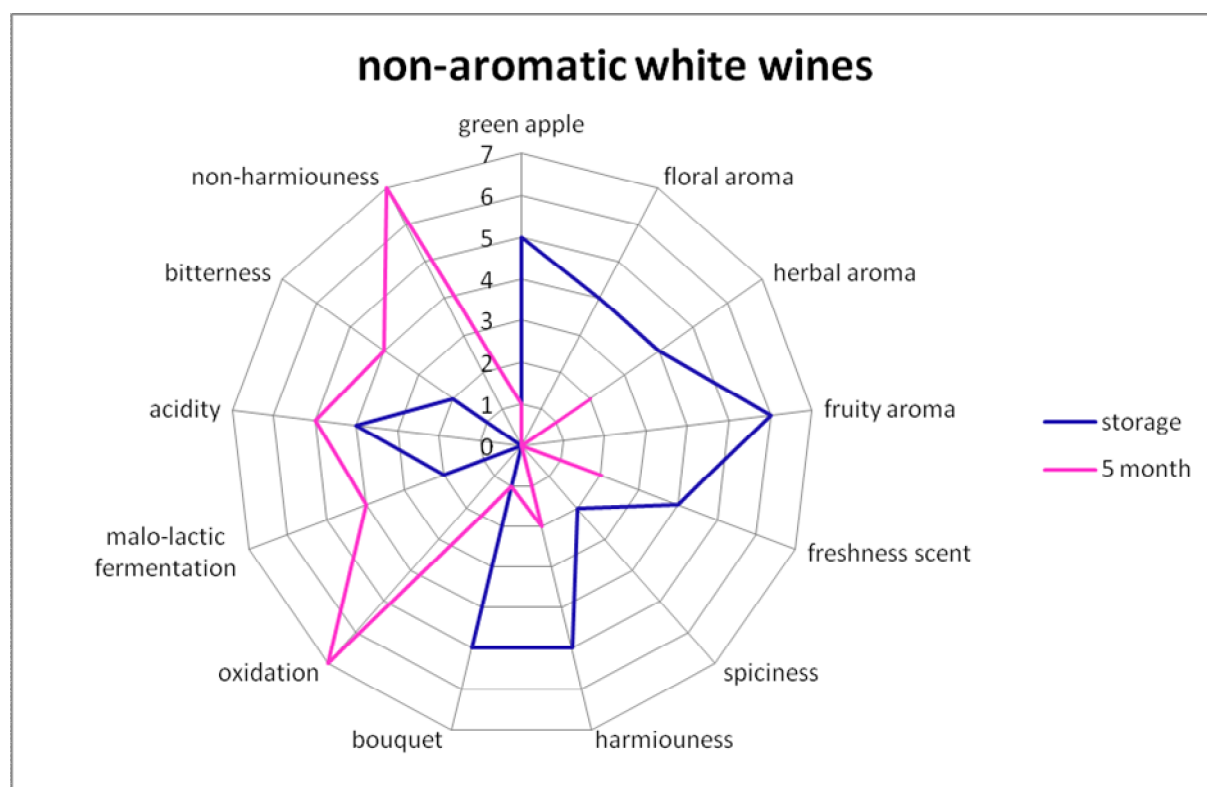


Figure 1 Comparison of foreign non-aromatic white wines

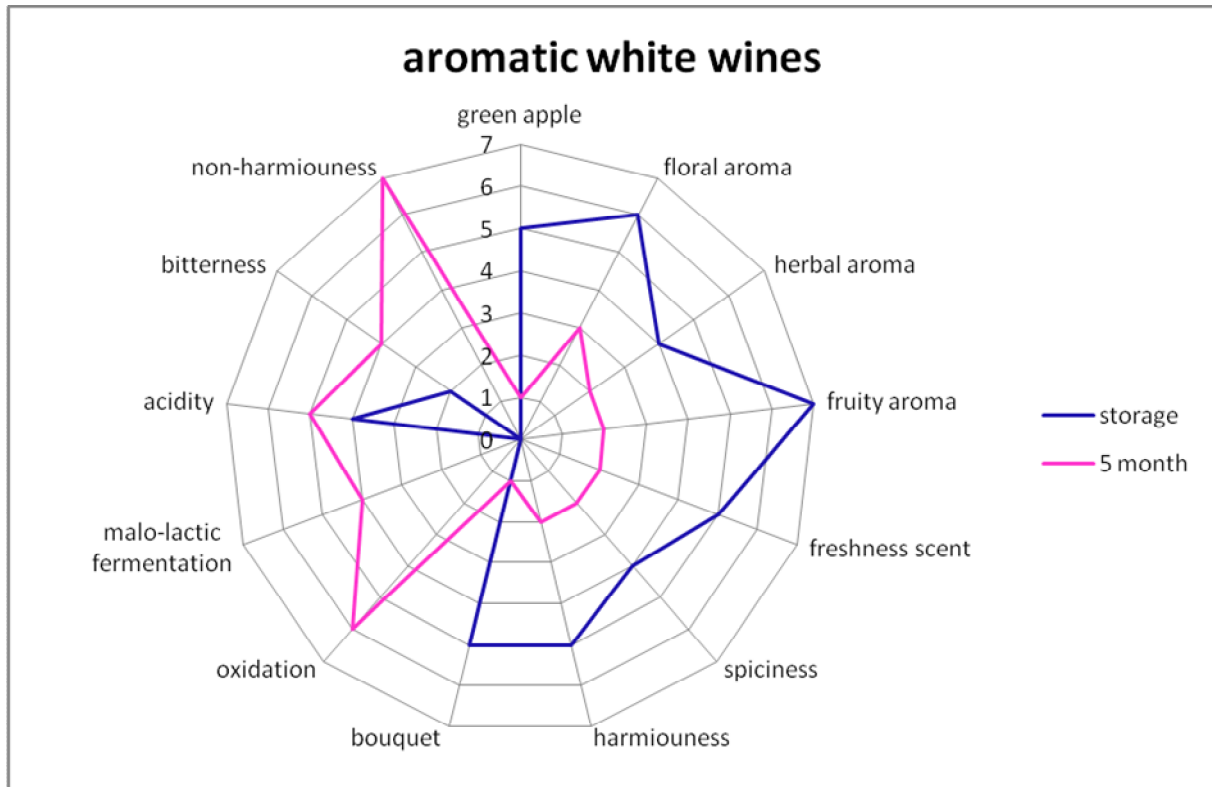


Figure 2 Comparison of foreign aromatic white wines

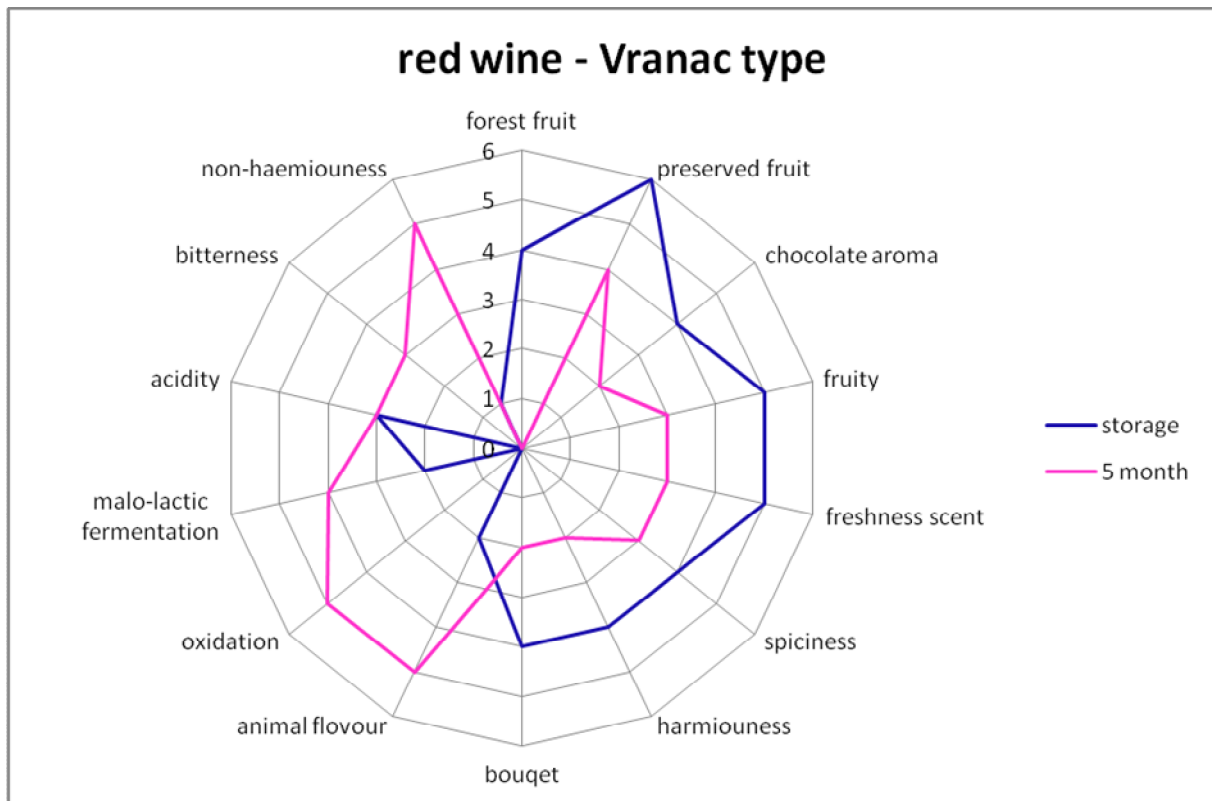


Figure 3 Comparison of red wine Vranac foreign type

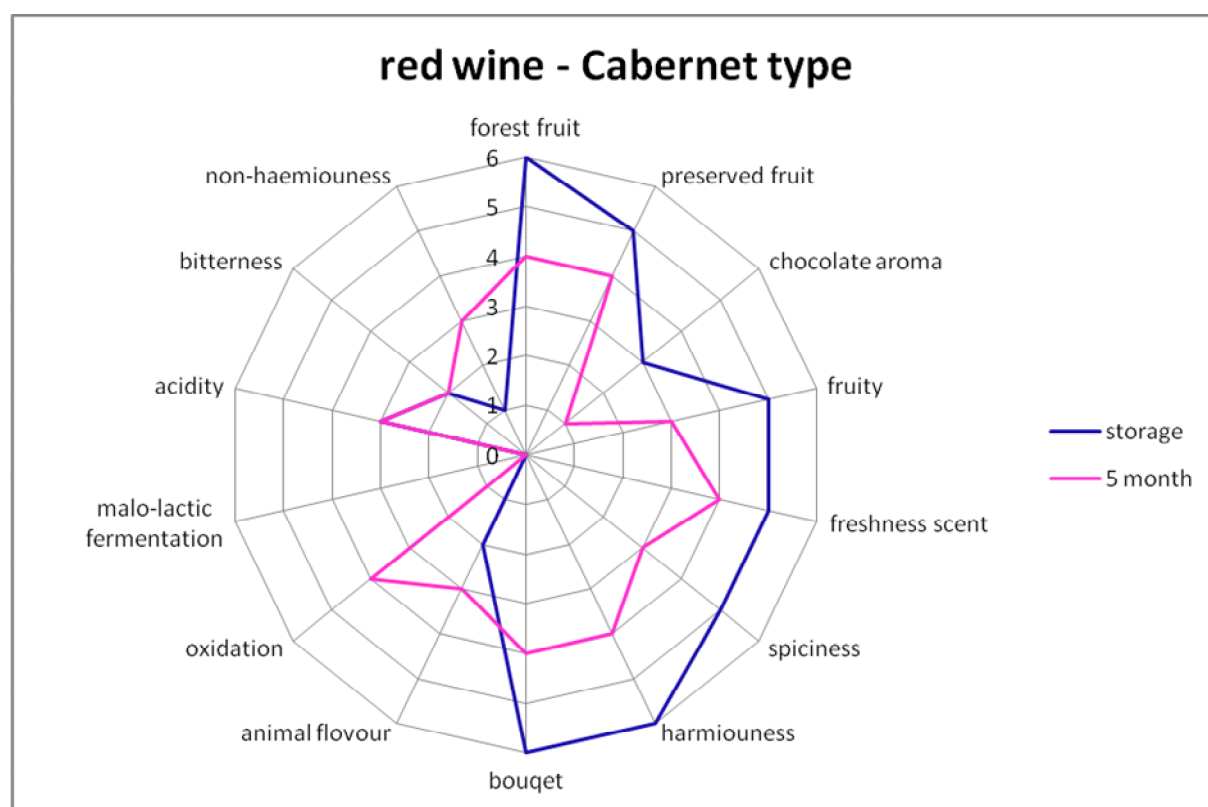


Figure 4 Comparison of red wines cabernet foreign type

Slovak wines were also evaluated after five months from the first observation. The results of that testing did not point to any major changes in the analytical indicators (table 3 a)) and not in the sensory indicators (figure 5).

Table 3a) Comparison sample of Slovak wines without geographical indication II. observation

	alcohol	non-sugar Extract	residual sugar	Acid titer	Acetic acid	Free SO ₂	Total SO ₂
White wines	10.5	16.0	3.0	6.3	0.65	18	145
Red wines	11.5	18.2	3.5	5.2	0.70	21	122

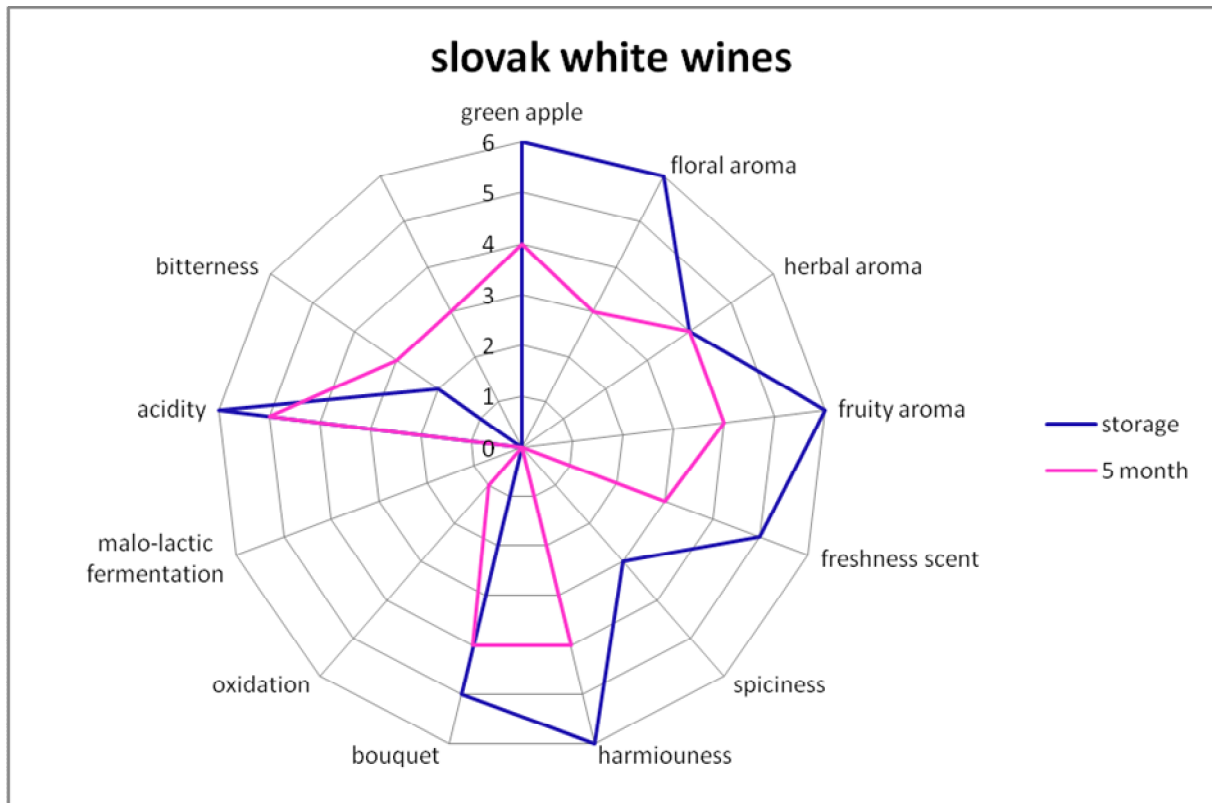


Figure 5 Comparison of Slovak white wines quality

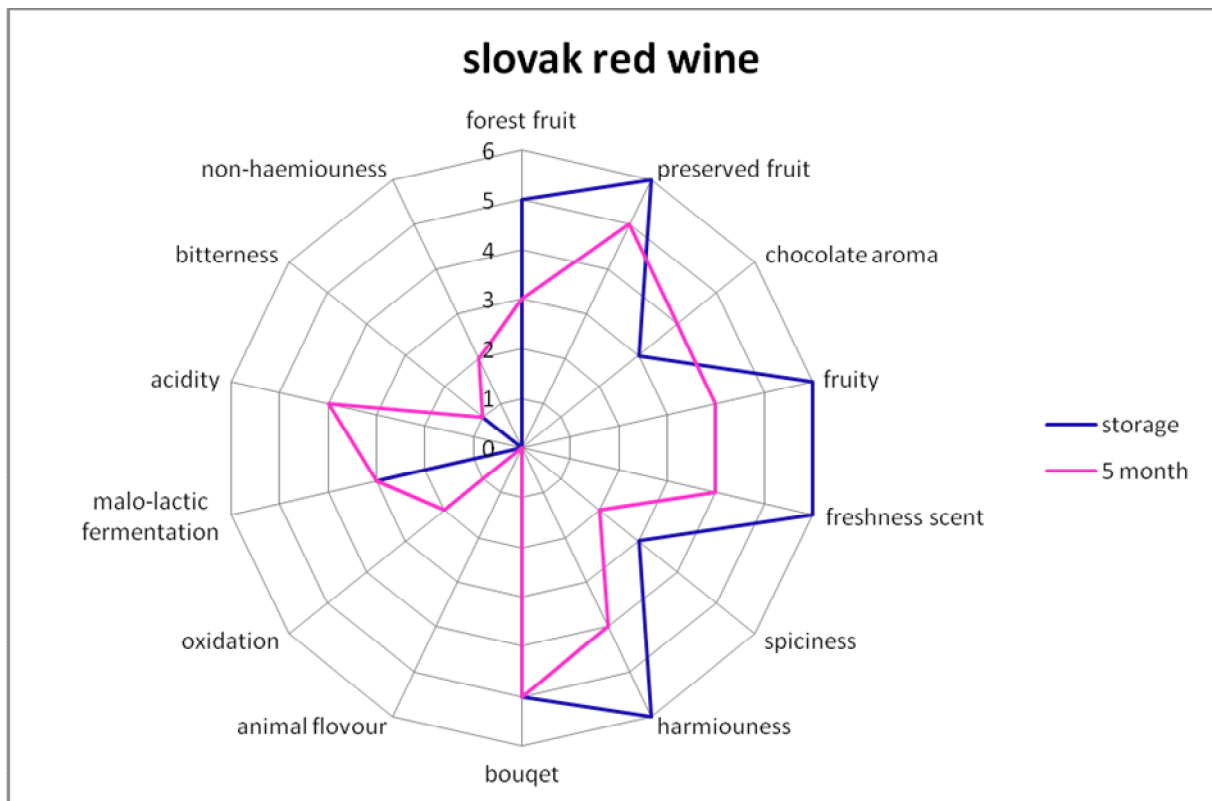


Figure 6 Comparison of Slovak red wines quality

CONCLUSION

White wine

On the basis of described observations we can state that within the low content of freeform sulphur dioxide, low acids and low non-sugar extract, the wine in the bottle does not have what to keep in good reduction condition, thus immediately degrades bouquet of wine as well as the overall character of the wine, and the wine will then have to be withdrawn from the sale. The dosage of sulfur dioxide cannot be increased the dose of his freeform to the required level of about 35 mg/l, as the wine would be sensory unacceptable for its very distinctive sulphur dioxide odor. When compared with Slovak samples of white wines that have a higher alcohol content, titration acids and freeform of sulphur dioxide, compared Slovak wines are even after five months in good condition and they can continue to be sold and offered to consumers.

Red wine

In the case of foreign red wines there was not detectable muted fall in the quality of wine within the second observation, as the anthocyanin dyes and tannins provide higher reduction environment compared to white wines. But when compared with Slovak red wines that have a higher alcohol content, non-sugar extract and SO₂, uniquely international wines after five months have lagged in the overall shape of a sensory profile. In the foreign red wines, in the second observation odoursness of animality have been presented, which can be caused by a reduction in freeform content of sulphur dioxide and reproduction of yeast genus *Bretanomyces*.

A significant impact on major changes in the quality of tested wines within a short period of storage in a bottle has except for the described analytical indicators also the use of agglomerate cork stoppers, which in increased content releases oxygen into wine, thus enabling sooner wine oxidation and its deterioration.

The least expensive wine from the category of wines without geographical indication on the sale to the final consumer should be clearly labelled with the indication of the period of minimum durability of prepackaging (DMT). DMT, according to the results of testing should not be longer than 6 months from bottling of wine.

REFERENCES

- BENÍTEZ, P. – CASTRO, R. – NATERA, R. – BARROSO, C.G. 2006. Changes in polyphenolic and volatile content of fino sherry wine exposed to high temperature and ultraviolet and visible radiation. In *European Food Research and Technology*, vol. 222, 2006, p. 302–309
- BONILLA, F. – MAYEN, M. – MERIDA, J. – MEDINA, M. 2001. Yeasts used as fining treatment to correct browning in white wines. In *Journal of Agricultural and Food Chemistry*, vol. 49 2001, no. 4, p. 1928–1933
- D'AURIA, M. – EMANUELE, L. – RACIOPPI, R. 2009. The effect of heat and light on the composition of some volatile compounds in wine. In *Food Chemistry*, vol. 117, 2009, no. 1, p. 9–14
- DÍAZ, C. – CONDE, E. J. – MÉNDEZ, J.J. – PÉREZ TRUJILLO, J. P. 2003. Volatile compounds of bottled wines with Denomination of Origin from the Canary Islands (Spain). In *Food Chemistry*, vol. 81, 2003, no. 3, p. 447–452
- ESCUADERO, A. – ASENSIO, E. – CACHO, J. – FERREIRA, V. 2002. Sensory and chemical changes of young white wines stored under oxygen. An assessment of the role played by aldehydes and some other important odorants. In *Food Chemistry*, vol. 77 2002, no. 3, p. 325–331
- FERREIRA, V. – ESCUDREO, A. – FERNÁNDEZ, P. – CACHO, J.F. 1997. Changes in the profile of volatile compounds in wines stored under oxygen and their relationship with the browning process. In *Zeitschrift fuer Lebensmittel-Untersuchung und-Forschung A-Food Research and Technology*, vol. 205, 1997, no. 5, p. 392–396
- LI, H. – GUO, A. – WANG, H. 2008. Mechanisms of oxidative browning of wine. In *Food Chemistry*, vol. 108, 2008, no. 1, p. 1–13
- SCHNEIDER, V. 2001. Microoxidation. I. Behaviour of red wines treated by over-oxidation. In *Deutsche Weinmagazin*, vol. 3, 2001, p. 30–34
- SILVA FERREIRA, A. C. – GUEDES DE PINHO, P. – RODRIGUES, P. – HOGG, T. 2002. Kinetics of oxidative degradation of white wines and how they are affected by selected technological parameters. In *Journal of Agricultural and Food Chemistry*, vol. 50, 2002, no. 21, p. 5919–5924
- SIOUMIS, N. – KALLITHRAKA, S. – TSOUTSOURAS, E. – MAKRIS, D.P. – KEFALAS, P. 2005. Browning development in white wines: Dependence on compositional parameters

and impact on antioxidant characteristics, In *European Food Research and Technology*, vol. 220, 2005, no. 3-4, p. 326–330