Potravinarstvo, vol. 8, 2014, no. 1, p. 155-160
doi:10.5219/359
Received: 4 March 2014. Accepted: 6 March 2014.
Available online: 25 June 2014 at www.potravinarstvo.com

ISSN 1337-0960 (online)

RELATIONS BETWEEN MUST CLARIFICATION AND ORGANOLEPTIC ATTRIBUTES OF WINE VARIETES

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ABSTRACT

Blowdown musts is important operation performed in winemaking, which can have a major impact on the future quality of the wine. Blowdown of the wine removes components that may carry elements that negatively affect the hygienic and sensory quality of the wine. Fining of musts and wines is carried either by a static method or using different fining preparations. The aim of this work was to evaluate the effect of different methods of decanting on the wine quality varieties of Sauvignon. The overall sensory quality was evaluated (100 - points system, and semantic differential) and the aromatic profile (profile method). All sensory evaluations were practiced by skilled sensory panel in controled conditions of Faculty sensory lab. Wine samples were clarified by static manner or with the assistance of the preparation applied to the clarification of wine in two different doses. By the results and their visualization of flavour and smell profile by spider plots we could conclude that pure cultures have positive effect on processed wine. Based on the results we found a beneficial effect of clearing by the clarification of the preparation based on cellulose, polyvinylpolypyrrolidone, gelatin and mineral adsorbents at 100 g.100 L^{-1} of the sensory quality of the wine.

Keywords: must; wine; organoleptic attributes; Sauvignon

INTRODUCTION

The number of new trends in the processing of grapes plays a big role in the quality of the wine and then the attractiveness of wine to consumers worldwide **(Fotopoulos 2003)**. Wine quality is affected by the composition of grape juice, which changes during the ripening of grapes and this is determined by the complex bundle of environmental factors (soil, slope, climate, technology aside), the genetic material (grape variety) and also the oenological practices and microorganisms represented during fermentation **(Le Moigne, 2008, Callejon, 2010; Bindon et al., 2013)**. In traditional winemaking fermentation is spontaneous, carried through different types of yeast. Fermentation is carried out by wild asporogenous yeast forms *Kloeckera apiculata* a *Candida pulcherrima.* These yeasts with increasing concentration of ethanol die and are replaced by noble cultural yeast alcoholic fermentation *Saccharomyces cerevisiae* **(Zohre and Erten, 2002)**. Yeasts are used in wine making since the ancient times. In modern viticultural practice is now almost exclusively used controlled fermentation process using pure cultures of yeast. For the preparation of these cultures are used noble yeasts *Saccharomyces cerevisiae var. elipsoidesus* and *Saccharomyces oviformis.* Noble yeasts have a large number of strains that differ from each other mainly in physiological and biochemical properties. Worldwide is grown hundreds of yeast strains that are suitable for fermentation of musts and wines. They produce desirable aromas and flavors in wine, and therefore their choice is very important **(Patel and Shibamoto, 2003)**. Fragrance belongs among important organoleptic wine characteristics. Most of the flavors in wine originate just during must fermentation **(Regodón Mateos et al., 2006)**.

A very important role in winemaking is the removal of constituents and impurities that cause turbidity of the must and can be carriers of factors with a negative impact on wine quality. By blowdown the particles are being removed, which got there during the process processing of grapes, sludge particles get into the must even with rotten grapes. On sediment particles are trapped also chemical residues from vine plant protection spraying, which adversely affect the fermentation process. The fermentation process can be adversely affected by the microorganisms that are found on the impurities in the must. Blowdown partially eliminates undesirable microflora and oxidative enzymes. Musts are blowdown immediately after pressing before the start of the fermentation process **(Malík, 1996; Moio et al., 2004, Cosme et al., 2008)**. Based on the gravity takes place the static blowdown, which is carried out by cooling the must for several hours below 10 ˚C. The settled sludge must be cleaned curls and prepared for fermentation. **(Pintér, 2012)**.

Evaluation of wine quality is based on sensory evaluation. Chemical analysis, however, are carried out in addition to explain some sensory observable changes **(Teissedre et al., 2011)**. Relationship between sensory evaluation and chemical compounds of wine is a crucial research subject of oenology **(Colagrande et al., 1988 a Girard et al., 2001)**. The aim is to determine which substances affect the sensory characteristics of the wine and how they relate to them **(Thorngate, 1997)**. Furthermore, the quantitative determination of certain chemical compounds represents the criterion of origin of the wine **(Chira et al., 2011)**.

The goal of this paper was using different methods of sensory analysis to determine the impact of different methods of decanting must on sensory quality and aroma profile of wine varieties of Sauvignon.

MATERIAL AND METHODOLOGY

The grapes for the production of test samples came from Nitra wine-growing region of Radošinské vineyard turf from year 2012.

Variant **Sauvignon X** was harvested on 4th of September 2012 and reached the sugar content in must 22 ˚NM, and the average yield per hectare of 1.9 t ha^{-1}, according to the Law no. 313/2009 Coll. meets the classification in the category of „late harvest“.

Variant **Sauvignon Y** was harvested seven days later than the first harvest, the sugar content reached 24 ˚NM, average yields per hectare of 1.8 t ha^{-1} and ripening is classified in category „selection of grapes“.

After harvesting the grapes were pressed and got rid of stems. Obtained must was divided into four equal homogeneous parts, of which we have prepared our own experimental samples.

Sample A - must without decanting, without the addition of yeast with spontaneous fermentation.

Sample B - must with static decanting for 12 hours, without adding clarifying preparations, with the addition of active dry wine yeasts *Saccharomyces cerevisiae.*

Sample C - must clarified by the clarification preparation at a dose of 100 g. 100 L^{-1} of must, representing the maximum dose of the clarification preparation. The preparation was applied directly to the must. Yeasts *Saccharomyces cerevisiae* were applied to the clarified must after the must turbidity.

Sample D - must clarified by the clarification preparation at a dose of 30 g. 100 L^{-1} must, with the addition of yeast *Saccharomyces cerevisiae.*

Clarification consisted of preparation of highly pure cellulose, polyvinylpolypyrrolidone, gelatin and mineral adsorbents.

The process of fermentation took place at a standard temperature of 15 °C for 14 days. After the fermentation completion the wine was added and subsequently clarified with bentonite. After clarification was coiled up, filtered, and after thorough preparation to be bottled.

Produced wines were evaluated after finishing of the wine by selected sensory methods - 100-point rating system, profile and semantic differential method.

The 100 point rating system assesses the appearance of wine (max. 15 points), smell (max. 30 points, taste of wine (max. 44 points) and overall impression of wine (max. 11 points).

Profile method is a special quantitative method of descriptive evaluation. It is characterized by the fact that each sample must be from a large number of descriptors defined ones that best match a given sample. Profile method results are the product of intensity scales, which are compiled either for a variety of descriptors or for individual characters.

Semantic differential is widely used technique for treatment of certain stimuli. In this method, in most cases are selected 3 factors: rating scale good - bad, activity on a scale active - passive and robustness on scale strong - weak **(Suzuki et al., 2005)**.

RESULTS AND DISCUSSION

In appearance evaluators followed the clarity and color of the samples, the intensity of its aroma, softness and quality and with smell its intensity, grade, quality of taste and persistence.

The fourth endpoint was overall impression of wine treated in evaluating on the evaluator.

Based on the results (Table 1) of the 100-point evaluation, we can conclude that the sensory evaluators for the best specimens identified production experimental technology sample C, in which the maximum dose used was the clarification preparation of fining agents in must and must was subsequently yeasted with pure culture yeast of Saccharomyces cerevisiae. The second best sample was sample D of Savignon Y with the minimum dose of fining agents. Based on the results we can focus on the fact that variant Sauvignon Y was of better quality for wine production compared to variant Sauvignon X. This argument is reflected in all tested samples.

For the evaluation of the profile method we used descriptors of smell typical for the variety Sauvignon. Wines made from Sauvignon varieties are characterized by distinctive sensory properties. For these wines are characterized fruit and vegetable tones **(Parr et al., 2007; Cozzolino et al., 2011)**. They can contain herbal tones, gooseberry, grapefruit, green pepper, red pepper and also tomato leaf **(Pulko et al., 2012)**. **Swiegers et al. (2009)** argues that the typical Sauvignon aromas are of green pepper, tomato leaves, asparagus, grapefruit, gooseberry and fruit extracts. These tones can be described as green and tropical. **Parr et al. (2007)** found that the variety Sauvignon, the most common descriptors determining were green pepper, herbal and grassy notes. They argue that these so called green tones are an important feature in the evaluation of wines, but should not dominate. These so called green tones dominate especially at lower sugar content, while at higher sugar content are dominated by fruity notes and tropical fruit. Sauvignon varieties are sometimes considered to be simple and non flower white varieties **(Parr et al., 2010)**.

Table 1 Results of sensory evaluation of samples obtained by one hundred point wine rating system

	Sample A	Sample B	Sample C	Sample D
Sauvignon X	79,0	79,2	83,2	78,2
Sauvignon Y	82,0	82,2	85,4	83,2

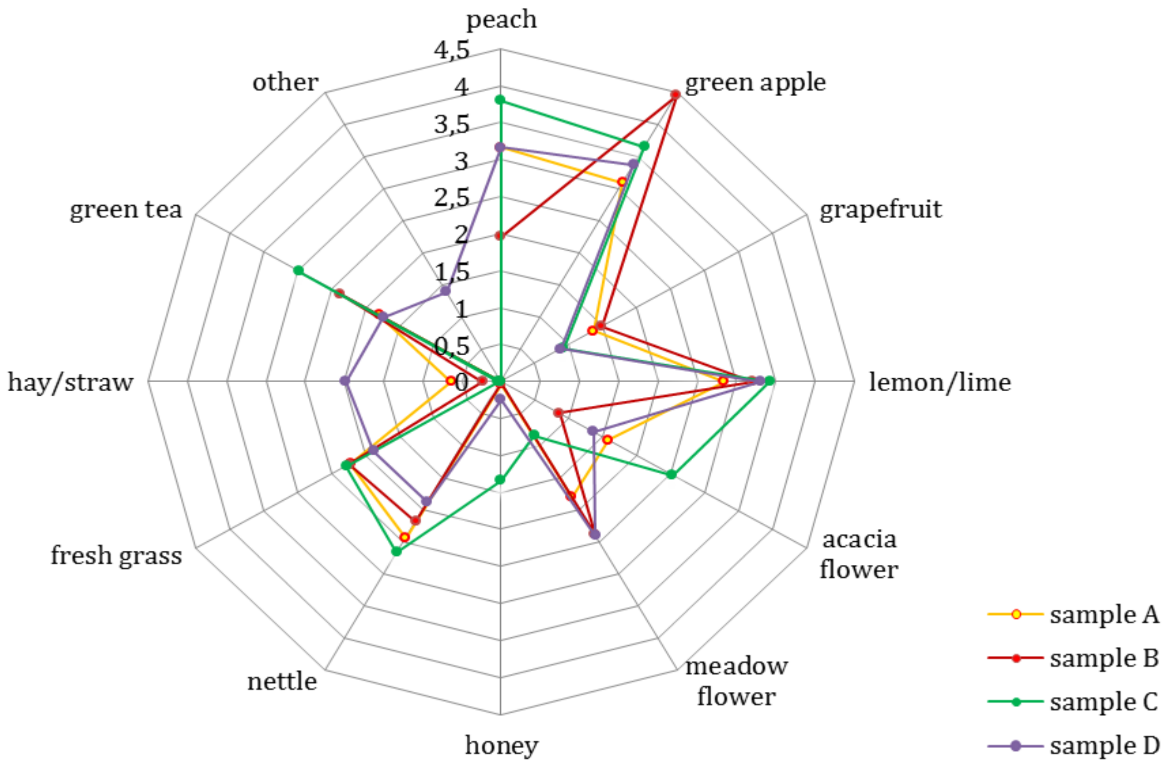

Fig. 1 The sensory profile of wine Sauvignon X variation

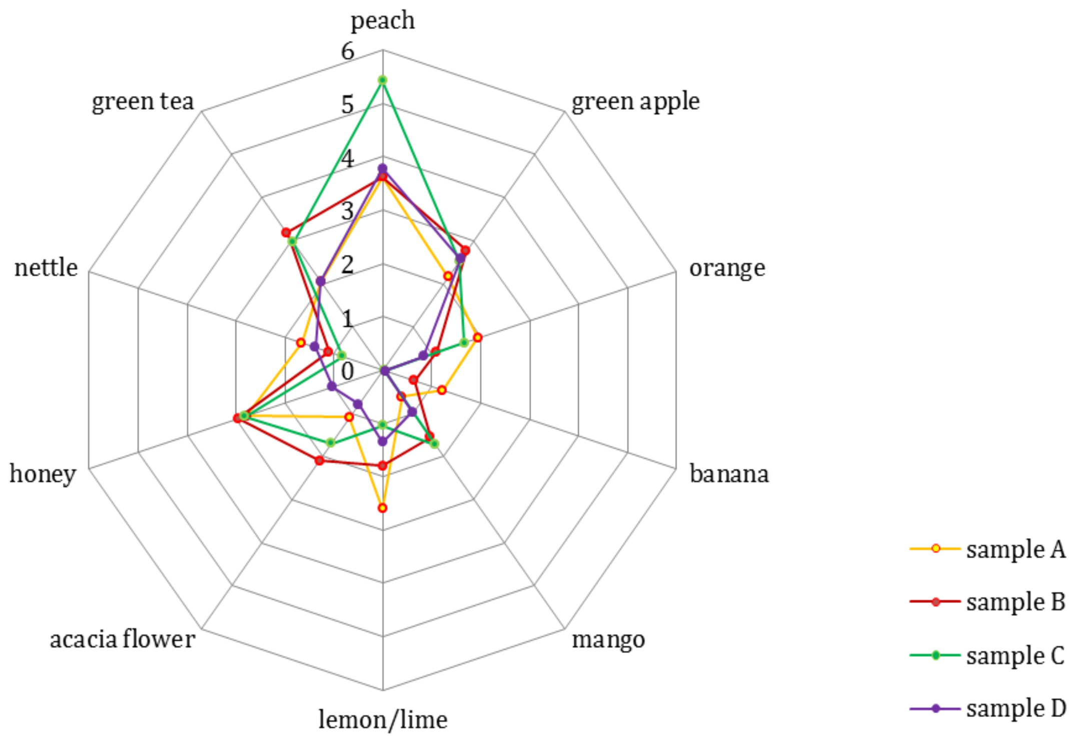

Fig. 2 The sensory profile of wine varieties of Sauvignon harvest Y

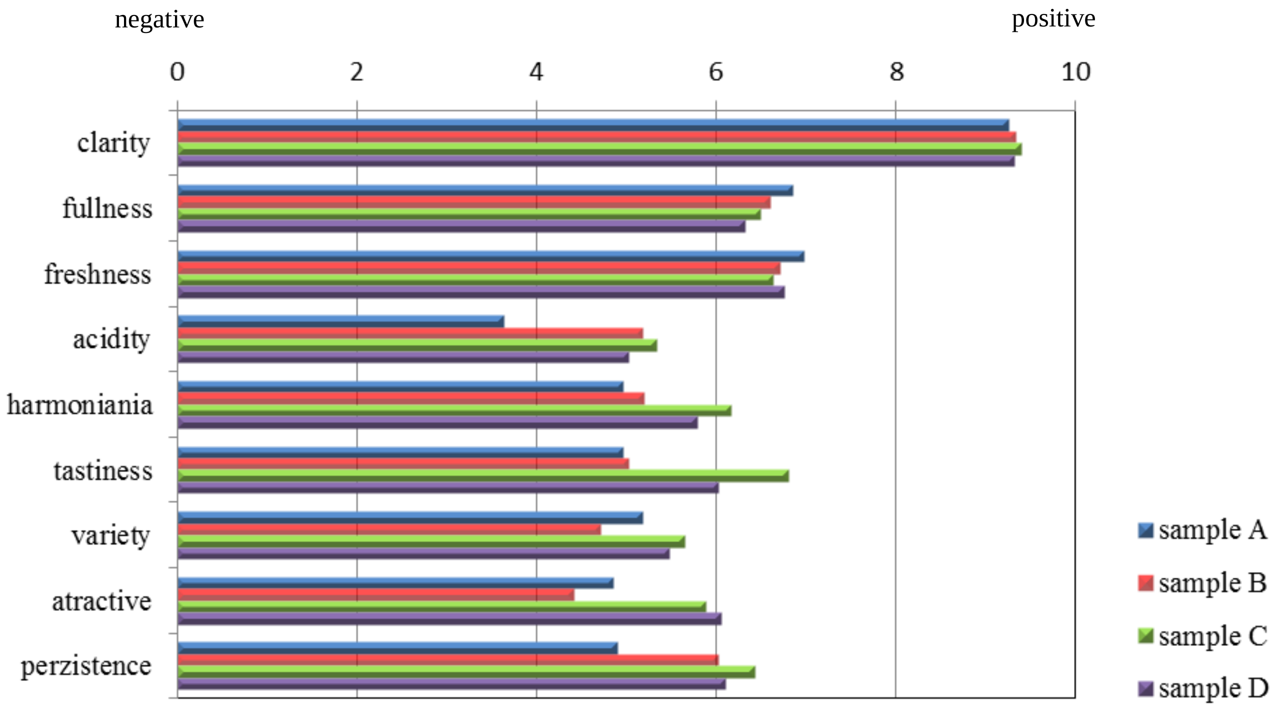

Fig. 3 Semantic differential of Sauvignon X

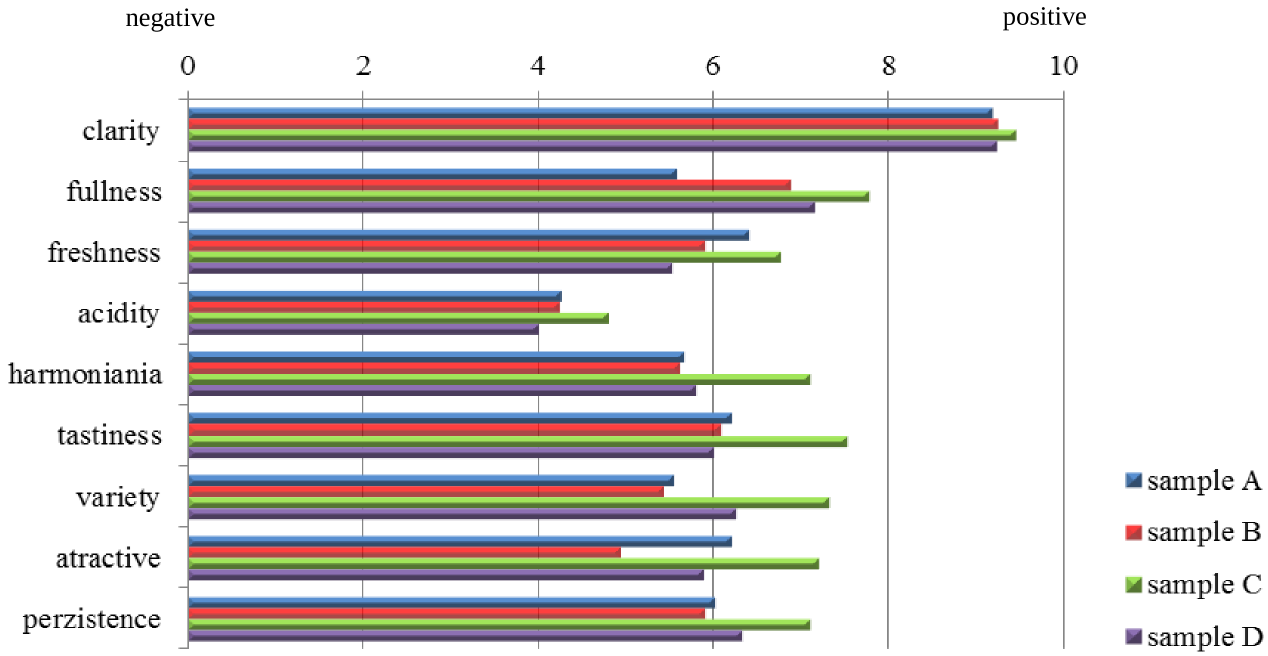

Fig. 4 Semantic differential of Sauvignon Y

Decisive influence on varietal wines Sauvignon have aromas of yeast strain selection and fermentation temperature **(Masneuf - Pomarede et al., 2006)**.

The most striking peach aroma had wine samples C, which were produced under the maximum clearing technology of must using yeast, contrary to the lowest level occurred in the sample B produced by static blowdown using yeast. In the sample B prevailed scent of green apple. Grapefruit has been identified in all samples at low intensity, strongest is in the sample B. Other citrus fruits such as lemon and lime dominated in the sample C produced using the maximum fining agents in must, for which dominated also the smell of acacia flowers. Meadow flowers predominated in the sample D, in which the minimal dose clarified fermentation was used using pure yeast culture. In the sample C evaluators also identified honey aroma, which almost did not occur in other samples. In the same sample were set at a higher level and nettle tones, fresh grass and green tea. Tones of hay and straw, as well as other flavorings prevailed in the sample D, these did not almost occur in other samples almost.

In samples of wines dominated peach flavor, which was most pronounced in the sample C, in the other samples, this was balanced flavor, moderate. Green apple fragrance was present in all samples, this aroma, which was noticeable at a lower level. Citrus notes such as orange, lemon and lime were evident in the sample A and in that sample was present banana aroma, but just like the smell of other citrus fruits was low. Scent of acacia flowers and the scent of green tea was also prevalent in the sample B. Honey scent is equally strong in all samples, except for sample D, which occurs only at very low levels. Nettle tones were present in all samples at very low levels.

Semantic differential is a simpler method of sensory evaluation of wines. The method is derived from a 100 point system, while we determine the intensity of each evaluation descriptors.

Character clarity of wine in all samples was evaluated very positively. All samples were evaluated as sparkly, differences between the samples were minimal. Similarly, in characters fullness and freshness of the samples were balanced.

Significant differences in the quality the evaluators found in the characteristics of acidity, flavor, variety, attractiveness and persistence. Least acidic was sample A, the most pronounced acidity was found in the sample C. All samples except sample A had a pleasant acidity.

The harmony of taste and flavor were the most valuable specimens, which was used for Ciriaco, settling material. Variety for all variants was set at a moderate level n terms of attractiveness for consumers were the best samples C and D blowdown with the help of the clarification plant. Shortest persistence was determined for sample A. The longest persistence had sample C.

When evaluating samples of Sauvignon Y reached the best quality in all the characteristics the sample C, i.e. sample, which was clarified before fermentation using a maximum dose of the clarification plant. Rated variants surpassed in all respects, most notably it was in harmony characteristics, palatability, variety, attractiveness and persistence.

CONCLUSION

The goal was to assess the effect of clearing on the sensory profile of wine varieties Sauvignon. We used two variants with different sugar content of must and 4 different ways of must clarification. Based on the evaluation results, we can conclude that the wines from both alternatives had a very good sensory quality. On the basis of a 100 point system was as a better sample identified the one from a late harvest, which reached a higher sugar content, but also better overall sensory profile of the characteristics flavor.

By evaluation sample profile method, we focused on monitoring the aromatic profile of wines. We found that for evaluators were most attractive wine samples, which musts were before fermentation clarified by the clarification formulation at a dose of 100 g.100 L^{-1} and then leavened by pure culture yeast. These samples were characterized by strong peach flavor and aroma of green apples, which were gently completed by the scent of citrus fruits, acacia flowers and honey. Significant differences in scent-profile were found between samples variation Sauvignon X. Samples Sauvignon variant Y were in the fragrance of wine more balanced.

By semantic differential we evaluated the wines based on the complex sensory site, in more detailed way than the 100 - points system. We found that samples which musts were before fermentation clarified with the help of the clarification plant were better evaluated in palatability traits, harmony, variety and persistence. Samples Sauvignon variant Y also in fullness and attractiveness.

Based on the results of the sensory evaluation methods of wine, we can conclude that the clarification and then fermenting of musts for using pure cultures of yeast has a beneficial effect on the sensory character and overall attractiveness of wine.

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Acknowledgments:

This work was co-funded by European Community under project no 26220220180: Building Research Centre “AgroBioTech”.

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