INFLUENCE OF STABILISATION TREATMENTS ON THE SENSORY CHARACTERISTICS OF WHITE WINES

INFLUENȚA DIFERITELOR TRATAMENTE ASUPRA CARACTERISTICILOR SENZORIALE ALE VINURILOR ALBE

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Abstract. *Wine requires special attention because it is known as one of the most refined pleasures of life. Wine tasting is not just a simple act of drinking; it involves appreciation, identification and meditation. Wine flavor and taste is formed by complex interactions of the volatile compounds formed as a result of grape ripening and winemaking process. The quality of the wine is assessed by sensory analysis, taking into account the fact that analyzes are performed in the laboratory of information on chemical composition, wine's health and its resistance to alterations, sensory analysis is used to assess and establish the quality of a wine. The aim of this research was to analyse the effect of different treatments on the sensory characteristics of white wines obtained from a blend of Muscat Ottonel and FeteascaRegala grape varieties. Forty-five variants treated with 6 % SO2 solution and dimethyl dicarbonate liquid solution in various ratios, were studied. Graphical representations of the sensory profiles including flavor and taste characteristics as diagrams by platting the average of the value obtained for the sensory descriptors.*

Key words: white wines, stabilization treatments, sensory characteristics, aroma, wines quality

Rezumat. *Vinul necesită o atenţie deosebită deoarece este cunoscut drept una dintre cele mai rafinate plăceri ale vieţii. Degustarea vinurilor nu reprezintă doar un act simplu de a bea, ea presupune apreciere, identificare şi meditare. Aroma şi gustul vinului se formează în urma interacţiunii dintre compuşii volatili formaţi în timpul maturării strugurilor şi cei apăruţi în urma procesului de vinificaţie. Calitatea vinului este apreciată printr-o singură metodă, şi anume "degustarea", ţinând cont de faptul că analizele realizate în laborator dau informaţii referitoare la compoziţia chimică, starea de sănătate a vinului şi rezistenţa la alterări, analiza senzorială este utilizată pentru aprecierea şi stabilirea calităţii unui vin. Scopul acestei cercetări presupune analizarea efectului diferitelor tratamente asupra caracteristicilor senzoriale ale vinurilor albe obţinute din cupajarea soiurilor de struguri Muscat Ottonel şi Fetească Regală. Au fost luate în studiu 45 de variante experimentale tratate cu soluţie de SO_2 6% şi soluţie lichidă de dimetil dicarbonat în diferite concentraţii. Graficele profilurilor senzoriale, include caracteristicile olfactive şi gustative*

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care au fost reprezentate ca diagrame ce indică media valorilor obținute pentru descriptorii senzoriali.

Cuvinte cheie: vinuri albe, tratamente de stabilizare, caracteristici senzoriale, aroma, calitate vinului

INTRODUCTION

Fining and stabilization represent the set of treatments and operations useful in winemaking, in order to ensure and maintain its cleanliness and protect wines' color, taste and odor until the moment of consumption (Cotea, 1988). Today's consumers demand high-quality foods to be additive-free, with an extended shelf life and fresh in flavor, microbiologically safe. U.S. Food and Drug Administration (FDA), since 1985 has required package labelling for most foods and beverages when sulphites are used as an additive.Sulphur dioxide (SO_2) is known to be the most versatile, useful and recommended preservative due to its antiseptic and antioxidant propertiesbut it has a sickly odor, it can irritate the eyes and lungs and it can be the cause for developing allergies (Ribéreau-Gayon *et al*., 2006).

A new challenge in winemaking is to reduce sulphur dioxide using other substances that plays a similar role in wines composition. Recently, a substance that has been used until now in the juice industry is tested in the wine industry: dimethyl dicarbonate (DMDC), known as yeast inhibitor and preservative for alcoholic beverages (Ough, 1975). It is a colorless liquid with a sharp odor. Dimethyl dicarbonate (DMDC) is an organic compound that is immediately decomposed into methanol and carbon dioxide, after its addition in wines, compounds that are already present in wines composition (Costa *et al*., 2008).

Besides the antiseptic and antimicrobial effects that the treatment with sulphurdioxide and DMDC manifests, showing an important role on sensory characteristics of smell and taste, improving the floral-fruity notes in wines.

In terms ofthe organoleptic profile of the samples, the wines are subjected to three successive examinations: olfactory, visual and taste through the human organs: eye, nose and mouth (Stoian, 2006). After receiving the stimulus using human biological sensors, information are sent to the brain, where they will be processed and saved (Băducă Cîmpeanu, 2008).

Fragrance plays a key role in food and beverage quality, the interaction of the senses of smell and taste with aromatic substances leads to consumer acceptance or rejection (Apostu and Naghiu, 2008).Wine is an alcoholic beverage made up ofwater (80% to 85%),alcohols (mostly ethanol, 9% to 15%), and a variety of minor constituents (~3%). Such minor constituents include sugars, phenols, enzymes, organic acids, nitrogenous compounds, lipids, vitamins, anions and cations, and a large number of volatile compounds (Hui *et al*, 2010; Ribéreau-Gayon *et al*., 1976).

Wine flavouris a complex mixture of taste and aroma attributes; the first is made up of a subtle balance of sweet (sugars), bitter/astringent (polyphenols) and sour (organic acids), taste attributes; the second is made up of a large number of

volatile compounds belonging to alcohol classes (lower and higher), volatile organic acids, organic esters, lactones, phenols, aldehydes, sulphur-containing compounds, norisoprenoids, ketones, methoxypyrazines, and terpenes all of which contribute to wine aroma (Torrens *et al*, 2004).

The aroma and the various aromatic notes depend on the management of the winemaking process (Culea *et al*, 2015).Understanding the chemical nature of a wine aroma demands the quantitative determination of quite a large number of odorous active compounds (Aznar *et al.,* 2001).In this case, the sensory analysis with gas chromatography analysis of wine samples is avery important tool, useful for quality control and wine classification (Blank *et al*., 1997).

The main porpose of this research was to analyze the effect of different stabilization treatments (DMDC and SO_2) on the sensory characteristics of white wines obtained from a blend of Muscat Ottonel and FeteascaRegalagrape varieties.

MATERIAL AND METHODS

Grape samples and winemaking. Muscat Ottonel and FeteascaRegala grapes were harvested in autumn of 2018 from Iasi vineyard and experimental samples were obtained by using the classic method for producing white wines in the Oenology Laboratory of the Faculty of Horticulture from Iaşi. Forty-five samples treated with 6 % SO_2 solution and dimethyl dicarbonate liquid solution in various ratios, were studied. After this stage, the wine was divided into three aliquots, in which different amounts of sulphur dioxide were administered: 40, 80, and 160 ppm. *Brettanomyces spp.* and *Schizosaccharomyces pombe spp.* were inoculatedin various amounts (30 mg/L and 100 mg/L). The resulted blend was filtered using sterile filters, bottled into 750 mL glass bottles and then different amounts of dimethyl dicarbonate (100 or 200 mg/750 mL) were added in each one bottle. After these stages, the resulted samples were stored in controlled conditions of humidity and temperature.

Sensory characteristics.Sensory profile of wines is done through the tasting processand is considered very important to the evaluation of wines quality.The panel was composed of members of the laboratory or external tasting specialists, persons with innovative theory training on the fundamental concepts related to taste. The organoleptic analyze was performed by 10 tasters in the tasting room of the Oenology Research Center in Iaşi, according to the evaluation method proposed by International Union of Oenologists.The selected sensorial itemsare specific for white wines, such as honey, wild flowers,overripe fruits, mango, grapefruit, peaches, etc. The parameters were evaluated with ratings from 0 to 5 and the means were calculated. Graphical representations of the sensory profiles including flavor and taste characteristics that are presented as diagrams by plotting the average of the values obtained for each sensory descriptor.Regarding the wine tasting, it should be noted that temperature is a factor of major importance. White wines were served at temperatures of 7-10 ºC.

RESULTS AND DISCUSSIONS

Comparative organoleptic graphics of wine samples treated with different concentration of sulphur dioxide and sulphur dioxide + DMDC.

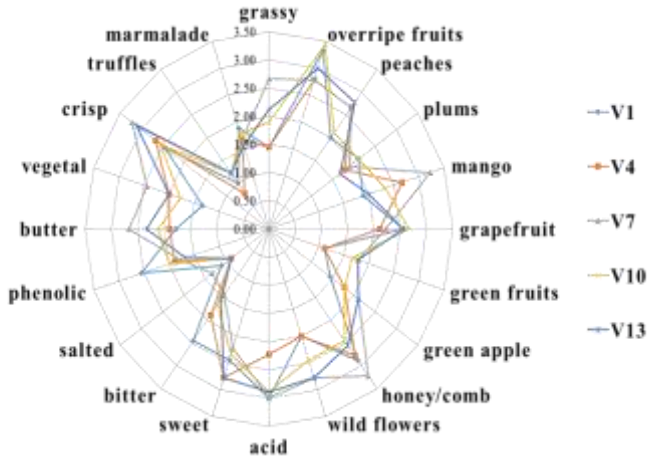

Fig. 1 Samples treated with 40 ppm. SO_2

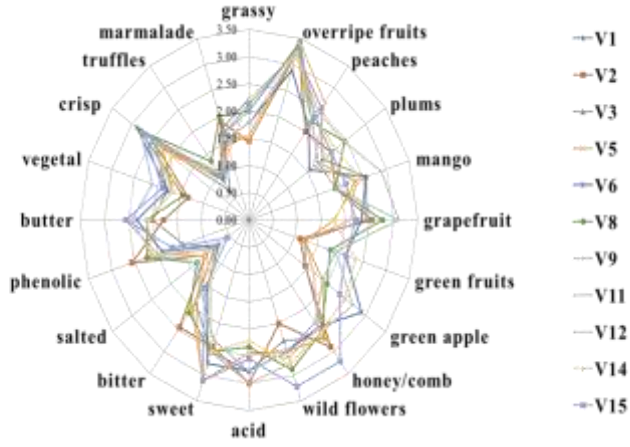

Fig. 2 Samples treated with 40 ppm. SO_2 and DMDC

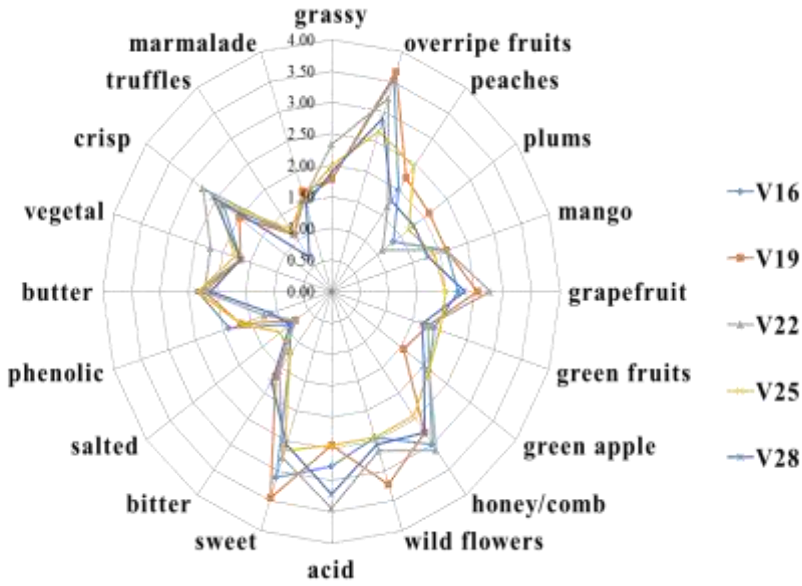

Fig. 3 Samples treated with 80 ppm SO_2

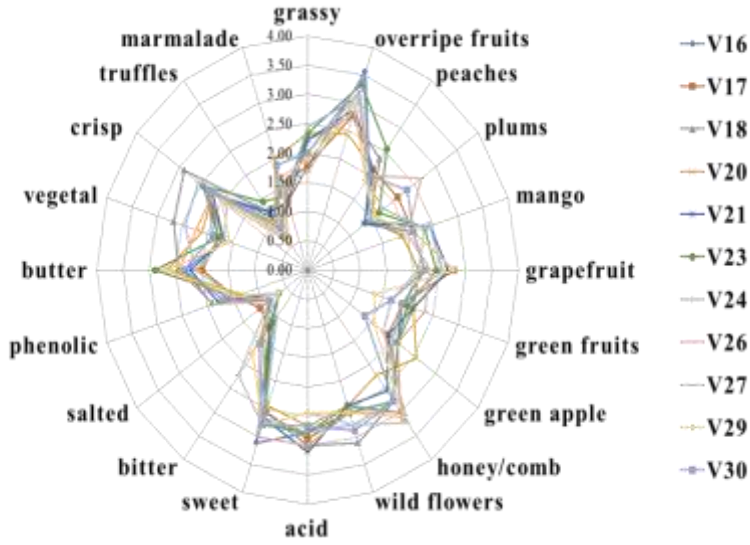

Fig. 4 Samples treated with 80 ppm SO_2 and DMDC

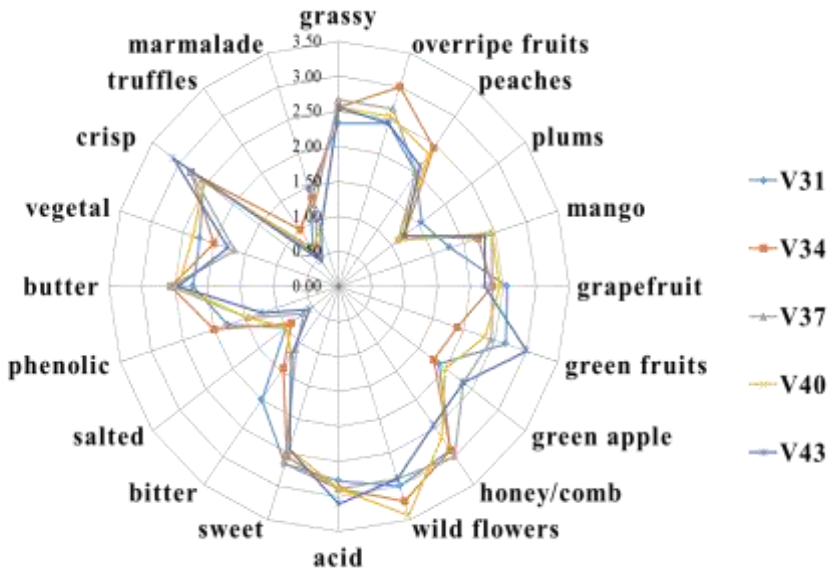

Fig. 5 Samples treated with 160 ppm SO_2

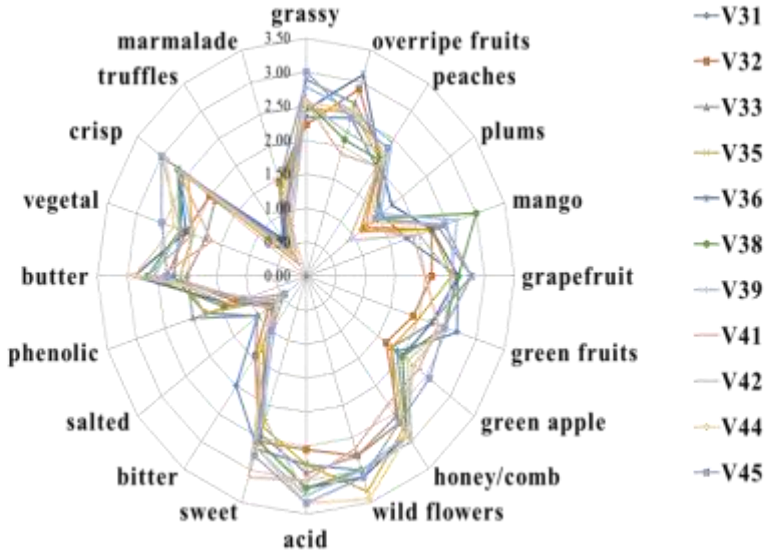

Fig. 6 Samples treated with 160 ppm SO_2 and DMDC

Fining and conditioning treatments used in winemaking, act differently, separately, or together, determining some changes in winemaking.

The sensory profiles and quality ratings of resulted white wines were determined by descriptive analysis and expert panels, respectively.

In figures 1, 2, 3 were represented the wine samplestreated only with sulphur dioxide, noted with aromas such as overripe fruits, mango, grapefruit, and peaches.

As the concentrations of DMDC increase (observed in fig. 2, 4, 6), the aromatic profile is enriched, resulted wines arefresher and 'clean', the fruity and floral notes (tropical fruits, overripe fruits, honey and wild flowers) being more expressive compared to samples treated only with SO_2.

Delfini C. *et al* (2002) confirm that dimethyl dicarbonate can be used to partially replace SO_2 being as well preservative useful against pathogen microorganism which are responsible for undesirable aromas in wines.

Threlfall *et al* (2002) shows the advantage of using DMDC that it does not generate odors or unpleasant flavors in wine, even at the maximum dose of 200 mg/L, authorized by the International Organization of Vine and Wine.

The obtained results are due to the potential of DMDC to improve and conserve the wine quality and mainly to maintain the aromatic profile.

CONCLUSIONS

This research confirms that sulphur dioxide and dimethyl dicarbonate contribute positively to some modifications in wine composition, color and sensory characteristics.

Following the sensory analysis, the samples treated with sulphur dioxide were noted as having a richer aromatic profile with notes of honey, wild flowers and mango.

Due to the synergetic activity between SO_2 and dimethyl dicarbonate, the sensory profile reveals the variety specificity, the analysed samples being balanced in taste, with intense aromas of overripe fruits, peaches, grapefruit, mango and honey, treatments representing a good alternative for modern winemaking.

This work highlights the importance of choosing references and performing adequate training on the various descriptors to be able to get relevant results for the sensory profile.

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