

FOAMING PROPRIETIES – IMPORTANT FACTOR AT ESTABLISHING BLENDING PARTNERS FOR RED SPARKLING WINES PRODUCTION.

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Abstract: At formation of foaming properties are participating a whole range of a chemical compounds, content of which largely depends of grape variety, cultivation area, technology of sparkling wines production, etc.. Foaming properties of the wines also are related not only to the composition and quantity of the chemical compounds, but also is influenced by interaction of these substances.

This factors may increase or decrease foaming properties after blending wines from different grape varieties. From these reasons, study was conducted on different raw red wines, from classical European varieties Cabernet Sauvignon, Merlot and Pinot Franc, comparing the influence of different composition of red wines blends on the foaming parameters. In result where established composition of raw red wines blends which improve basic foaming parameters for increase this qualitative parameter at red sparkling wines production.

Keywords: Red sparkling wine, blend, Red classical varieties, phenolic substances, foaming properties.

Introduction

Wine is a beverage exclusively obtained by alcoholic fermentation of grape must. Nowadays requires particular attention to the production of blending process at red sparkling wines production, blending allows to improve flavor and color, may modify pH, titratable acidity, phenolic, anthocyanins and tannins content also foaming properties. Therefore this operation is widespread in modern winemaking[1].

From the literature it is known that the main factors which contribute to improve the pearling and foaming properties in sparkling wines are surface-active substances such as proteins, pectins, amino acids, phenolic substances and so on, which through hydrogen bonds with carbon dioxide, ensuring long pearling and foaming of sparkling wines[2].

Taking into account that foaming properties of red sparkling wines depends essentially on the characteristics of raw wines and grapes, which in turn depend on climatic factors that are variable for each year, there is need to develop new technologies that will allow getting lots of qualitative red sparkling wines with stable organoleptic, foaming and physico-chemical properties[2].

Due of using different blending partners with different foaming properties we could manipulate this parameter for obtaining red sparkling wines with higher foaming parameters.

At developing of this research, the main goal was to optimize the blends components of red raw material wines for the production of red sparkling wines with stable foaming parameters. Red raw material wines were studied from classic European

grape varieties Merlot, Cabernet-Sauvignon and Pinnot Noire, and in their base where formed 13 experimental blends of raw red wines. In obtained blends where examined the physico-chemical parameters, color, foaming and organoleptic indices. Following comparative investigation and analysis of complex data were established the optimal blending schemes that improve quality and foaming proprieties of raw red wines with potential for red sparkling wines production.

Materials and Methods

The research was conducted in the laboratory of "Biotechnology and Microbiology of wine" and "Micro-winemaking" section from Scientific-Practical Institute of Horticulture and Food Technology (SPIHFT) in 2013-2014 years. As objects of research where used dry red wines produced from Merlot, Cabernet Sauvignon and Pinot Franc varieties and in their base where formed 13 experimental blends of raw red wines. In obtained blends where examined the physico-chemical parameters, color, foaming and organoleptic indices, using methods of analysis recommended by the International Organization of Vine and Wine and those elaborated or modified at the SPIHFT [3].

Results and Discussion

In 2013, in the laboratory, of "Biotechnology and Microbiology of Wine" and "Micro-winemaking" section from "SPIHFT", have been harvested grapes from European classical grape varieties: Merlot, Cabernet Sauvignon and Pinnot Noir at technological maturity for production of experimental parties of raw red wines for sparkling wines. Raw red wines been produced in the same technological conditions and where left for 6 moth of storage and have been treated with same adjuvant materials. Basic quality parameters of raw red wines are represented in table 1.

Table 1. Physico-chemical indices of raw red wines (h. y. 2013)

Name	Wines raw material 6 months of storage					
	Alcohol concentration, % Vol.	Mass concentration of		pH	Red-ox. Potential, mV	Organoleptic note
		titratable acidity, g/dm ³	volatile acidity, g/dm ³			
Merlot	12.5	6.075	0.36	3.3	190.6	7.95
Cabernet-Sauvignon	11.8	7.125	0.26	3.2	210.1	7.85
Pinnot Noire	13.1	5.7	0.33	3.4	193.8	7.8

Analyzing physico-chemical and organoleptic indices from Table 1, have revealed that produced raw red material wines for sparkling wines, are of high quality, which is confirmed with enhanced organoleptic notes. Alcohol concentration ranging

from 11.8 up to 13.1% vol. in dependence of grape used variety, with maximum registered in red wines from Pinot Noire variety where alcohol concentration exceeding the standard 0.6% vol. 12.5% vol. PH and red-ox potential is within acceptable limits for this category of wines. Concentration of of titratable acidity is in the range of from 5.7 up to 6.9 g/dm³ g/dm³. Mass concentration of of volatile acidity in the samples investigated varies with the limits for raw wine not exceeding 0.33 g/dm³. Analyzed data on organoleptic note we highlight red wine from Merlot grape variety.

Also in raw material red wines were determined concentration of phenolic substances and anthocyanins. Results are represented in Figure 1.

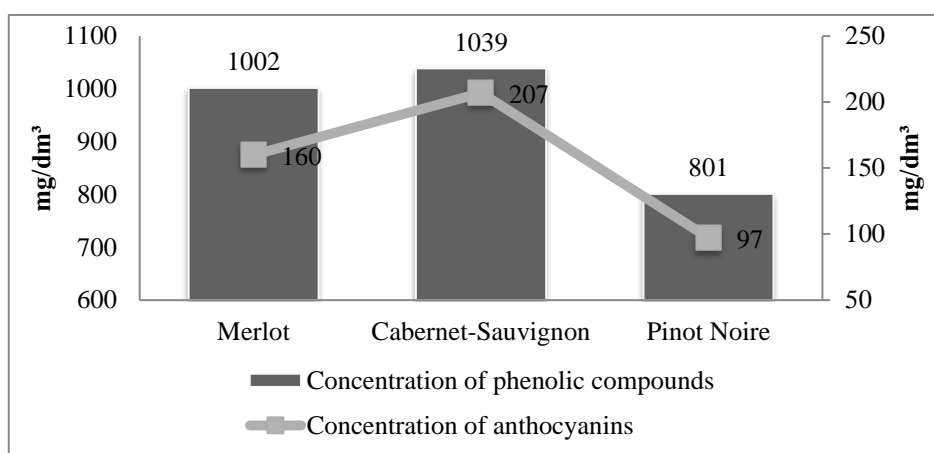


Fig. 1. Concentration of anthocyanins and phenolic substances in raw material red wines (h. y. 2013).

According to obtained results raw material red wines from Cabernet-Sauvignon and Merlot grape variety produced in 2013 have concentration of phenolic substances with 40-50% lower to normal content (1400-1500 mg/dm³). These deviations are caused by specific climatic conditions, grape maturity and used production technology. Only wines obtained from from Pinot Noir grape variety have appropriate to normal content of phenols.

According to physico-chemical and organoleptic analysis of red wines where established 13 blending scheme, and formed experimental micro bleedings. Blending schemes are presented in Table 2.

Table 2. Bending scheme

Wine grape variety	Raport of wines in blends, %,vin												
	Blend 1	Blend 2	Blend 3	Blend 4	Blend 5	Blend 6	Blend 7	Blend 8	Blend 9	Blend 10	Blend 11	Blend 12	Blend 13
Merlot	70	30	70	30	-	-	50	-	50	33	50	30	20
Cabernet-Sauvignon	30	70	-	-	70	30	50	50	-	33	30	50	30
Pinot Noire	-	-	30	70	30	70	-	50	50	33	20	20	50

In each obtained blend was determined content of phenolic substances, anthocyanins, chromatic indicators, organoleptic and foam properties, the results are presented in Table 3.

Table 3. Physico-chemical and organoleptic indices of wine blends produced from red wines (v.y. 2013)

Name	Amount of phenolic compounds, mg/dm ³	Anthocyanins concentration, mg/dm ³	Color Intensity, (Ci=A _{420nm} +A _{520nm} +A _{620nm})	Hue, (Nc= A _{420nm} /A _{520nm})	Foaming proprieties, S	Organoleptic note
Merlot	1010	154	8,9	0,6	232	7,90
Cabernet-Sauvignon	1039	205	9,8	0,5	228	7,85
Pinot Noire	801	96	4,6	0,7	137	7,80
Cupaj 1	1016	194	8,2	0,6	204	7,93
Cupaj 2	1035	199	9,3	0,4	226	7,85
Cupaj 3	932	140	7,7	0,6	186	7,83
Cupaj 4	866	119	6,2	0,7	131	7,80
Cupaj 5	938	164	8,3	0,6	183	7,85
Cupaj 6	878	124	6,0	0,6	192	7,80
Cupaj 7	1028	181	7,7	0,4	175	7,84
Cupaj 8	926	141	7,9	0,6	127	7,83
Cupaj 9	854	126	6,7	0,7	146	7,75
Cupaj 10	956	145	7,9	0,5	222	7,91
Cupaj 11	980	168	7,9	0,6	178	7,90
Cupaj 12	998	154	8,6	0,6	170	7,86
Cupaj 13	884	129	6,8	0,6	124	7,75

Analyzing the data from Table 3 was highlight that raw material red wines obtained after blending process have concentration of phenolic substances ranging from 866 to 1035 mg/dm³.

Chromatic indices are more advanced in raw material red wines obtained with using as blending partner red wines from Cabernet-Sauvignon grape variety. Nc parameter varies between 0.4-0.7 and is characteristic to yung red wines which affirms that wines have retained the same ratio of components with spectral absorbance 520_{nm} and 420_{nm}.

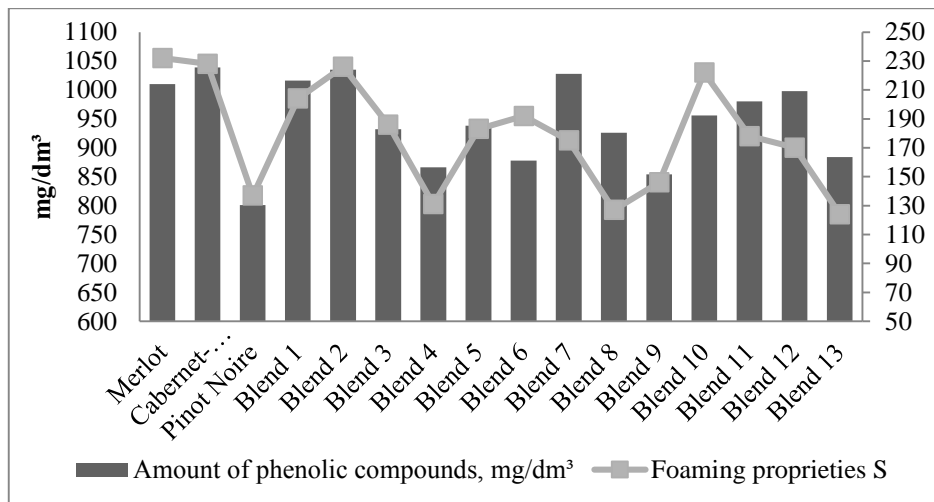


Fig. 2. Concentration of phenolic substances and foaming proprieties in blends obtained from raw material red wines (h. y. 2013).

Analyzing data from Figure 2 which referred to foaming properties and phenolic compounds content of blends obtained from red raw wines, highlight blend: 2 (30% Merlot 70% Cabernet Sauvignon) 1 (70% Merlot 30% Cabernet Sauvignon) and 10 (33% Merlot 33% Cabernet Sauvignon 33% Pinnot Noire) which possesses the highest foaming indices 225, 204 and 197 respectively, these blending schemes have potential of use in red sparkling wines production. Lowest foaming properties possess blends 4, 9 and 13 and have low potential at red sparkling wines production. According to obtained data there in the most cases with rise of phenolic compounds foaming proprieties have increase but there is not a direct connection between these parameters, mostly because foaming proprieties depend from a large group of substances.

The results of the organoleptic indexes can are presented in a diagram which allows performing a comparative analysis of formed blends and highlighting those with better potential for red sparkling wines production (Figure 2).

According to organoleptic analysis of obtained blends are highlights raw material red wines obtained by using blending scheme 1 which consists of: 70% Merlot 30% Cabernet Sauvignon; Blend 10: 33% Merlot 33% Cabernet Sauvignon 33% Pinnot

Noire and where appreciate with 7,93-7,91 points being appreciated with balanced taste, fruit and floral nuances, clear deep ruby color.

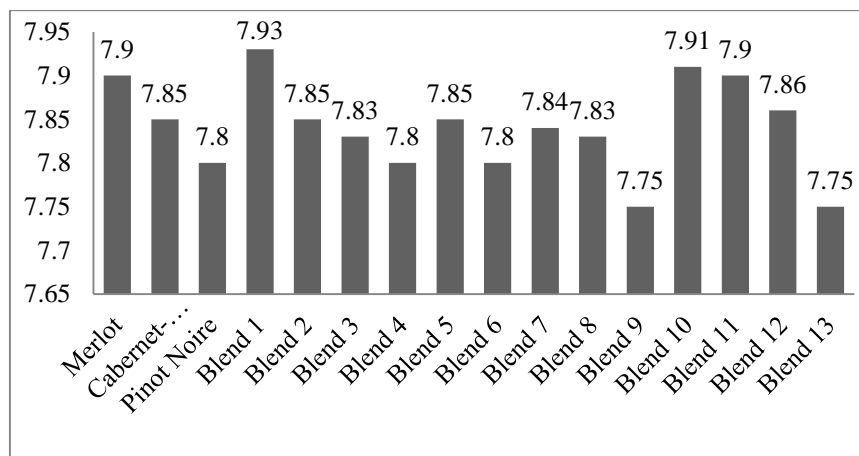


Fig. 3. Organoleptic appreciation in blends obtained from raw material red wines (h. y. 2013).

And the lowest marks have obtained blend 13 made formed 20% Merlot + 30% Cabernet Sauvignon + 50% Pinnot Noire and blend 9 formed from 50% Merlot + 50% Pinnot Noire. They haven't accumulated enough points and can not be used to produce red sparkling wines. Analyzing data on organoleptic note we highlight that came Merlot partner in blend No 1 and 10 that accumulated the highest organoleptic notes.

Conclusions

The investigations on foaming parameters permit to reveal raw material red wines obtained under blending schemes № 2 (30% Merlot 70% Cabernet Sauvignon), № 1 (70% Merlot 30% Cabernet Sauvignon) and № 10 (33% Merlot 33% Cabernet Sauvignon 33% Pinnot Noire), who obtained high values foaming index S and potential for use in the production of red sparkling wine with advanced foaming and pearling parameters.

From these research where determinate blending schemes № 1 (70% Merlot 30% Cabernet Sauvignon) and № 10 (33% Merlot 33% Cabernet Sauvignon 33% Pinnot Noire) that have high foaming potential and advanced organoleptic parameters and are recommended for red sparkling wines production.

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