INFLUENCE OF THE PULP MACERATION TEMPERATURE ON WINE RAW MATERIAL QUALITY FOR ROSE SPARKLING WINES PRODUCTION

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Abstract

In the article the comparative assessment of different pulp maceration temperatures on the chromatic characteristics and foaming properties of wine raw material for sparkling rose wine production was carried out.
Based on the conducted study the influence of different pulp maceration temperatures (16, 20 and 24ºC) on the quality of raw materials for rose sparkling wines was established. All wines were obtained at different temperatures with maceration for 6 hours from Merlot grape variety, harvested at SPIHFT plantations and processed under microvinification conditions, as well as standard parameters and chromatic indices such as the concentration of phenolic substances, the concentration of anthocyanins, color intensity, hue and foaming properties (maximum height of foam (HM) mm, height of foam stabilization (HS) mm and stabilization time (TS), s) characterizing the composition and quality of raw material for rose sparkling wines were determined. Sensory appreciation and physical-chemical analyzes showed that the pulp maceration temperature significantly affects the aroma, flavor, color and foaming properties of rose wine materials for sparkling wines production. According to the obtained results, it was found that pulp maceration temperature of 16ºC allows obtaining of high quality raw rose wine for sparkling wines production.

Key words: rose wine material, temperature, phenolic compounds, anthocyanins, foaming properties

According to investigations, one of the most important operations in the technological scheme for obtaining of raw rose wine material is the duration time of pulp maceration, which allows enrichment the wine with phenolic compounds, organic acids, minerals, aromatic substances, nitrogen and together with other components, which participate in the formation of quality indicators (color, aroma, taste and foaming properties).

Color, flavor and foaming properties are the most important characteristics of raw material for sparkling wines. The rose wines color are influenced both by temperature as well as the duration of contact of the must with the solid phase, directly depending on parameters such as anthocyanins extracted from the skin of the grape during short maceration and reactions involving these compounds and other compounds phenolic during vinification.

Rose wine production is difficult because of a minimum color extraction with a maximum of flavor in a short time. However, an optimal content of phenolic compounds and an improved flavor can be achieved by controlling both the duration and the temperature of the maceration process.

The main objective of this research was the optimization of maceration process for obtaining high quality rose raw material for sparkling wines

The present document is arranged so that it can be used as a model. It is also a template on which you can work directly by replacing the corresponding paragraphs.

MATERIAL AND METHOD

In order to establish the influence of the pulp maceration temperature for rose raw material wine production, different temperatures of pulp maceration (16, 20 and 24°C) for 6 h were studied. In this study raw material was obtained from Merlot grapes, harvested from the SPIHFT plantations and processed under microvinification conditions. As a control the feedstock rose wine obtained by the free flow of wort was used.

In the research the standard methods for determining the physical and chemical indices, specific (phenolic substances, anthocyanins, tone and color intensity) and foaming properties as according to OIV requirements were applied

RESULTS AND DISCUSSION

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Physical and chemical indices of rose wines obtained at different maceration temperatures are shown in *table 1*.

Table 1

Physical and chemical indices of Merlot rose raw material wines obtained at different maceration temperatures

N.	Maceration temperature	Alcoholic concentration, % vol.	Mass concentration of:			pH	OR potential, mV	Organoleptic evaluation, points
			sugars, g/dm^3	Titratable acids, g/dm^3	Volatile acids, g/dm^3			
1.	Control	11.6	2.0	6.1	0.26	3.14	194	7.8
2.	16ºC	11.6	2.0	6.4	0.26	3.39	192	8.15
3.	20ºC	11.3	2.1	6.7	0.33	3.33	193	8.0
4.	24ºC	11.4	2.5	7.0	0.39	3.31	199	7.9

As shown in *table 1*, increase of pulp maceration temperatures lead to a lower alcoholic strength in obtained wines which varies from 11.6 up to 11.3% vol. and increase of titratable acids concentration from 6.4 to 7.0 g/dm^3 compared to the control sample. Simultaneously with the increase in pulp maceration temperature in studied rose wines a decrease in pH from 3.39 up to 3.31 was observed.

Sensory appreciation of rose raw material for sparkling wines obtained at different temperatures of pulp maceration showed a significant influence of this factor on the quality of wines. Conducted organoleptical analysis allowed to emphasize the rose wine produced by pulp maceration at 16ºC, which was appreciated at maximum of 8.15 points and is characterized by a pink color, clean aroma with notes of exotic fruits, the taste is full and balanced. Rose wines obtained by pulp macerating at 20ºC and 24ºC were appreciated with 8.0 and 7.9 points, respectively, and are characterized by a dark rose color, clean flavor with notes of red fruits, but with more extractive and harsh taste. Rose wine obtained by the free flow of wort was characterized as pale rose, with simple flavor, sweet taste, being appreciated with 7.8 points.

For further analysis of the influence of the pulp maceration temperature on the quality of obtained wines the concentrations of anthocyanins and phenolic substances were determined and results are presented in *figure 1*.

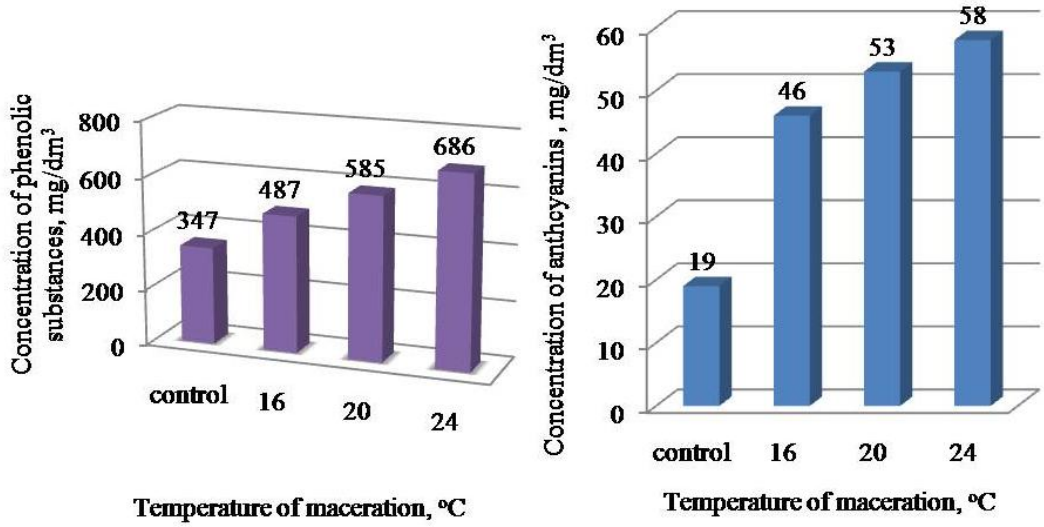

Figure 1 **Influence of pulp maceration temperatures on concentrations of anthocyanins and phenolic substances**

According to results shown in figure 1, it can be mentioned that the pulp maceration temperature contributes to anthocyanins and phenolic substances extraction. The temperature of 16ºC for pulp maceration contributed to an increase of phenolic substances concentration with 140 mg/dm^3 and maceration temperatures of 20 ºC and 24ºC contributed to increase the concentration of phenolic substances with 238 mg/dm^3 and 339 mg/dm^3 respectively in comparison with control.

The same regularity and for anthocyanin content was highlighted. Thus, at the pulp maceration temperature of 16ºC an increase in the concentration of anthocyanins of 27 mg/dm^3 was observed and temperature of pulp maceration of 20ºC and 24ºC contributed to the increase with 34 mg/dm^3 and 39 mg/dm^3 respectively of the antocyanins concentration in comparison with the control obtained by the free flow of wort.

Furthermore, the intensity and shade of color were investigated and obtained results are presented in *figure 2*.

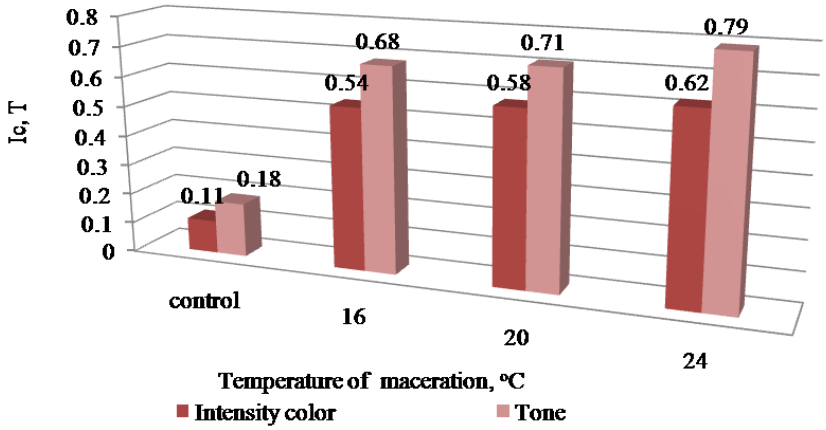

Figure 2 **Influence of pulp maceration temperature on the intensity and color tone in rose raw material wines**

The data presented in Figure 2 indicate that the pulp maceration temperature of 16°C contributed to obtaining of raw material wine with light shades of rose color and maceration temperatures of 20°C and 24°C have contributed to production of raw material wine with dark shades of the pink color. Wine obtained by the free flow of worth was characterized by pale rose color.

A particular interest presents the studies relating to the determination of the influence of different pulp maceration temperatures on foaming properties of obtained raw material for rose sparkling wines production. The foaming properties were determined using up-to-dated equipment "Mossalux" (France).

In *table 2* foaming properties of rose wines at different temperatures of pulp maceration are shown.

Table 2

Influence of pulp maceration temperature on the foaming properties of rose wines

Maceration temperature	Foaming indices			Note*
	Maximum height, (HM), mm	Height of stabilization, (HS), mm	Time of stabilization, (TS), s	
control	50	29	19	+
16°C	66	49	38	+++
20°C	60	41	29	++
24°C	56	35	26	+

Legend: +++ maximum foam; ++ medium foam; + minimum foam

According to results presented in *table 2* can be concluded that pulp maceration temperature influences the foaming properties of raw material rose wines. Thus, the temperature of 16°C contributed to producing of raw materials wine with the highest values of foaming indices, where the maximum height of foam (HM) is 66 mm and the height of foam stabilization (HS) is equal to 49 mm, followed by temperatures of 20ºC and 24ºC, which have contributed to obtaining of raw material rose wines with values of maximum height of foam equal to 60 mm and foam stabilization - 41 mm respectively, HM – 56 mm şi HS – 35 mm. The lowest values of foaming indices were detected in rose wine obtained by the free flow of worth.

The analysis results indicate that increasing the pulp maceration temperature contributes to reduction of foaming properties in studied rose wines.

Therefore, according to obtained results it is arguable that pulp maceration temperature has a significant influence on organoleptic characteristics, extraction of phenolic substances and anthocyanins, foaming properties of rose raw material for sparkling wines production.

In order to obtain the raw material for rose sparkling wines with high foaming properties, it is recommended to perform the pulp maceration process at 16ºC.

CONCLUSIONS

The influence of different pulp maceration temperatures on the quality and

physical and chemical indices of raw material for rose sparkling wines.

On the base of obtained results, in order to obtain the raw material for rose sparkling wines with high foaming and organoleptic properties, it is recommended to perform the pulp maceration process at 16ºC.

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