

## Characterization of Rosé Table Wines made in Planalto Norte Catarinense, harvest 2022

*Caracterização de Vinhos de Mesa Rosé elaborados no Planalto Norte Catarinense, safra 2022*

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### RESUMO

A realização de análises físico-químicas é necessária para se ter avaliação dos padrões adequados dos vinhos. Nesse contexto, tem-se como objetivo desse trabalho realizar a caracterização físico-química de amostras de Vinhos de Mesa Rosé elaborados no Planalto Norte Catarinense. O presente trabalho foi realizado com vinhos elaborados na safra 2022, no Laboratório de Fruticultura do Instituto Federal de Santa Catarina – Campus Canoinhas, sendo realizada a caracterização físico-química. Ao todo coletou-se oito amostras de vinhos dessa categoria, provenientes dos municípios de Itaiópolis, Canoinhas, Papanduva e São Bento do Sul. Avaliou-se: acidez total (meq L<sup>-1</sup>), pH, densidade relativa, sólidos solúveis (°Brix), intensidade de cor e tonalidade de cor. Os dados foram digitados, tabulados e com auxílio do software Excel 2010 realizou-se a elaboração das tabelas para a realização de uma análise descritiva dos dados obtidos nas amostras avaliadas. Os dados referentes à caracterização do perfil físico-químico de Vinhos de Mesa Rosé, demonstram o potencial do Planalto Norte Catarinense para a elaboração de vinhos. Os valores observados estão em acordo com a legislação vigente, contudo, faz-se necessário aperfeiçoar métodos de elaboração, especialmente relacionado a intensidade e tonalidade de cor dos vinhos, que no presente estudo apresentaram uma elevada desuniformidade entre as amostras.

**PALAVRAS-CHAVE:** *Vitis labrusca* L.; qualidade do vinho; processamento de uvas.

### ABSTRACT

Carrying out physical chemical analyzes is necessary to have an idea of the adequate standards of the wines. In this context, the aim of this work is to carry out the physical-chemical characterization of samples of Rosé Table Wines produced in the North Plateau of Santa Catarina. The present work was carried out in the 2022 harvest, at the Fruticulture Laboratory of the Federal Institute of Santa Catarina - Campus Canoinhas, and the physicochemical characterization. In all, eight samples of wines of this category were collected from the municipalities of Itaiópolis Canoinhas, Papanduva and São Bento do Sul. It was evaluated: total acidity (meq L<sup>-1</sup>), pH, relative density, soluble solids (°Brix), color intensity and color tone. The data were typed, tabulated and with the help of the Excel 2010 software, the tables were prepared to carry out a descriptive analysis of the data obtained in the evaluated samples. The data referring to the characterization of the physical-chemical profile of Rosé Table Wines, demonstrate the potential of the Planalto Norte Catarinense for the elaboration of wines. The observed values are in accordance with the current legislation; however, it is necessary to improve elaboration methods, especially related to the intensity and color tone of the wines, which in the present study showed a high unevenness between the samples.

**KEYWORDS:** *Vitis labrusca* L.; wine quality; grape processing.

## INTRODUCTION

Over the past two decades, Brazil has experienced a significant increase in wine sales, with table or common wines dominating the market. These wines account for approximately 90% of the total wine volume sold in the country, with red wines being particularly prominent. In contrast, rosé wines represent the smallest segment of the Brazilian wine market (WURZ 2018).

The expansion of viticulture plays a crucial role in sustaining rural households across various Brazilian regions (SILVA et al. 2019), where according to WURZ et al. (2021), viticulture in the Northern Plateau region offers a diversification opportunity for rural properties, particularly for family farms, with the potential to generate employment and income. WURZ & JASTROMBEK (2022) demonstrated that the North Plateau region produces American grape varieties, notably Bordô, Niágara Branca, Isabel, and Concord, as reported by BRIGHENTI et al. (2018), are varieties that still have increasing demand in the state of Santa Catarina.

It is noteworthy that the North Plateau of Santa Catarina possesses ideal edaphoclimatic conditions, making it particularly well-suited for viticulture, especially American grape varieties used for fresh consumption, juice production, and table wine production. (2020). However, as table wine production gains prominence and visibility in the region, it becomes necessary to monitor the quality of the products elaborated there, aiming to obtain distinctive products that comply with current Brazilian legislation.

Conducting physicochemical analyses is essential for verifying wine quality standards and optimizing production processes to yield products with desirable characteristics for consumers (JANSEN et al. 2023). The physicochemical composition of table wines ensuring their quality must comply with Normative Instruction No. 14, issued on February 8, 2018, by the Ministry of Agriculture, Livestock, and Supply (MAPA), as amended by MAPA Normative Instruction No. 48/2018. This regulation applies to wine and grape-derived products marketed throughout Brazil, whether domestically produced or imported (BRAZIL 2018). Specifically, the quality of a wine can be determined by its physicochemical composition (RAPOSO et al. 2018), which can be directly influenced by the sanitary conditions of the grape, the winemaking technology used, soil, climatic conditions and vine management (LEE et al. 2006, CHAVARRIA et al. 2008).

The sensory characteristics, including flavor, aroma, texture, and visual appeal, are determined by the wine's chemical composition and the complex interplay among its constituents (OLIVEIRA et al. 2011), and according to STEIDEL et al. (2023) parameters such as pH, total acidity and relative density are important for determining the quality of wines, and BRITO et al. (2020) color intensity and hue represent crucial sensory attributes perceived by consumers.

Regarding viticulture in the North Plateau region of Santa Catarina, according to STEIDEL et al. (2023), data on the physicochemical profile indicate the region's potential for producing Rosé Table Wines. The objective of this study is to conduct a physicochemical characterization of Rosé Table Wine samples produced in the Northern Plateau of Santa Catarina from the 2022 harvest, thereby monitoring the quality of products from this region.

## MATERIAL AND METHODS

This study was conducted during the 2022 harvest season at the Fruit Science Laboratory of the Federal Institute of Santa Catarina - Canoinhas Campus, where physicochemical characterization was performed through laboratory analyses. Two 750 ml bottles were collected from each producer and coded to ensure anonymity during laboratory analysis. These were stored in the Fruit Laboratory of IFSC Canoinhas Campus under controlled temperature (16°C) and relative humidity (75%) conditions, shielded from light to prevent alterations in their physicochemical composition.

A survey of wine producers in the North Plateau region of Santa Catarina was conducted, and they were invited to provide samples of Rosé Table Wine for physicochemical characterization. A total of eight wine samples from this category were collected, originating from the municipalities of Itaiópolis (1 sample), Canoinhas (1 sample), Papanduva (1 sample), and São Bento do Sul (5 samples).

In September 2022, the physicochemical characterization of the received samples was conducted. The analyses were performed in triplicate, assessing relative density, total titratable acidity (meq L<sup>-1</sup>), soluble solids (°Brix), pH, color intensity, and hue. Relative density, titratable acidity (TA), soluble solids, and pH were determined using official methodologies from the International Organisation of Vine and Wine (OIV 2012). Total titratable acidity was determined by titrating the wine with standardized 0.1N sodium hydroxide solution, using bromothymol blue as an indicator, with results expressed in meq L<sup>-1</sup>. The hydrogen potential (pH) was

measured using an Ion Phb 500 benchtop potentiometer, calibrated with standard buffer solutions of pH 4.0 and 7.0. The soluble solids content (SSC) was measured using an Atago digital sugar refractometer. The instrument was calibrated using distilled water, and the sample was then placed on the prism. The reading was taken directly in °Brix.

Wine color was analyzed using spectrophotometry at wavelengths of 420 nm, 520 nm, and 620 nm, following the method described by RIZZON (2010). The color was measured by the parameters of intensity and color tone, obtained through the formulas: Intensity = 420 + 520 + 620 nm and Hue = 420/520 nm.

Tables were constructed using the collected data, with samples numbered 1 to 8, displaying individual values for assessed variables, along with mean, standard deviation, and coefficient of variation (%). Os dados foram digitados, tabulados e com auxílio do software Excel 2010 realizou-se a elaboração das tabelas para a realização de uma análise descritiva dos dados obtidos nas amostras avaliadas.

## RESULTS AND DISCUSSION

The total titratable acidity of the 2022 vintage Rosé Table Wines produced in the Northern Plateau of Santa Catarina averaged 111.5 meq L<sup>-1</sup>. Only samples 2 and 4 exhibited values below 100 meq L<sup>-1</sup>, with 83.1 and 92.0 meq L<sup>-1</sup>, respectively. Sample 6 displayed the highest total titratable acidity at 133.8 meq L<sup>-1</sup>, as shown in Table 1.

Table 1. Total titratable acidity, relative density, soluble solids and pH of samples of Rosé table wines produced in Planalto Norte Catarinense, harvest 2022.

Sample	Total Acidity (meq L <sup>-1</sup> )	Relative Density	Soluble Solids (°Brix)	pH
1	100.2	0.990	7.0	3.25
2	83.1	0.996	4.2	3.59
3	131.4	0.994	6.6	3.44
4	92.0	0.990	7.0	3.38
5	102.2	0.992	5.4	3.20
6	133.8	0.993	5.2	3.24
7	117.9	0.990	5.9	3.28
8	131.8	1,008	8.0	3.24
Mean	111.5	0.994	6.2	3.33
Standard Deviation	19.8	0.006	1,2	0.13
CV (%)	17.8	0.6	19.8	4.0

Brazilian legislation (BRASIL 2018) establishes a minimum of 40 meq L<sup>-1</sup> and a maximum of 130 meq L<sup>-1</sup> for table wines. Therefore, three samples exhibited total acidity levels exceeding regulatory requirements. In relation to the 2021 harvest, an average increase in acidity values was observed, as work carried out by STEIDEL et al. (2023), with samples of Rosé Table Wine, the mean value of total acidity was 99.6 meq L<sup>-1</sup>. This disparity may be directly attributed to vintage effects, as grape pH increases and total acidity decreases exponentially during vine maturation. Furthermore, according to SCHMIDT et al. (2022), only 42.3% of wine producers in the Northern Plateau region of Santa Catarina monitor and evaluate grape maturation.

The relative density variable exhibited the lowest standard deviation among the quantified variables in the wine samples, with a mean value of 0.994. Only sample 8 showed a value exceeding 1.000. Wines with high sugar content have a density greater than 1.000 (COSTA 2017).

Although it is a variable that is rarely assessed in wines, in this study the soluble solids content of the samples received for analysis was quantified, as it could be indicative of whether any of the samples received might have higher levels of residual sugar, as according to WURZ & JASTROMBEK (2021), this variable can help identify samples of wines classified as soft. The mean soluble solids content among the evaluated samples was 6.2 °Brix, ranging from 4.2 to 8.0 °Brix. The sample exhibiting the highest soluble solids content also demonstrated the highest relative density.

Regarding pH, minimal variation was observed among samples, as evidenced by the low coefficient of variation (4.0%). The mean pH value was 3.33, with samples ranging from 3.24 to 3.59. The optimal pH values range from 3.00 to 3.60 (MORAES & LOCATELLI 2010).

Both total acidity and pH can be directly influenced by the winemaking process and the use of different

grape varieties in wine production (JACKSON 2000). Although Brazilian legislation does not stipulate minimum pH values, this parameter significantly influences anthocyanin content, free and bound SO<sub>2</sub> levels, and microbial growth throughout the winemaking process (BENDER et al. 2017).

Table 2 presents the color-related variables of the evaluated samples. The high coefficient of variation for the color intensity variable stands out, with a value of 58.4%, standing out among all the variables analyzed. The color intensity exhibited a mean value of 0.64, with fluctuations ranging from 0.25 to 1.44, representing a 58.4% variation in this variable's values.

Table 2. Color intensity and color tone of samples of Rosé table wines produced in Planalto Norte Catarinense, vintage 2022.

Sample	Color Intensity (Abs 420+520+620)	Color Tone (Abs 420/520)
1	1.44	0.74
2	0.76	1.85
3	0.53	2.13
4	0.50	1.77
5	0.42	1.58
6	0.82	0.77
7	0.42	2.36
8	0.25	1.68
Mean	0.64	1.61
Standard Deviation	0.37	0.59
CV (%)	58.4	36.4

Despite a lower coefficient of variation of 36.4%, color tonality exhibited a wide range of values, with a mean of 1.61 and observed values ranging from 0.74 to 2.36. Wine maturity can be indirectly assessed through color intensity. As wines age, their color evolves from deep red to a more amber hue (RIBÉREAU-GAYON et al. 2002).

Color intensity and hue parameters are crucial sensory attributes perceived by consumers. The large variation in the values obtained reinforces the lack of identity of the region's wines (BRITO et al. 2020). The color intensity and hue are crucial characteristics of wine, providing insights into its quality and potential flaws (FREITAS 2006). The observed variations in wine color parameters may be directly linked to vinification techniques. According to WURZ & JASTROMBEK (2021), factors such as maceration duration and pump-over frequency can significantly influence the extraction of pigments from grape skins, ultimately affecting the final color intensity and hue of the wine samples.

Regarding the evaluated data, analyses of relative density, titratable acidity, pH, and soluble solids show standardization, with minimal variation among samples. These values align with current legislation, indicating the potential of the Northern Santa Catarina Plateau region for wine production.

However, regarding wine coloration, a crucial variable for Rosé Wines, a lack of standardization was observed among the evaluated samples, with significant differences between them. According to WURZ et al. (2022), grape processing occurs without any technical supervision or assistance, or without proper training, and is mostly carried out empirically, based on knowledge passed down through generations. Data published by SCHMIDT et al. (2022) report that only 48.7% of rural wine producers in the Northern Santa Catarina Plateau have undergone any training or courses on the subject, which may directly impact the observed values for color intensity and hue in this study.

## CONCLUSION

Os dados referentes à caracterização do perfil físico-químico de Vinhos de Mesa Rosé, demonstram o potencial do Planalto Norte Catarinense para a elaboração de vinhos. Os valores observados estão em acordo com a legislação vigente, contudo, faz-se necessário aperfeiçoar métodos de elaboração, especialmente relacionado a intensidade e tonalidade de cor dos vinhos, que no presente estudo apresentaram uma elevada desuniformidade entre as amostras.

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