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	GIF (Australia) = 0.564	ESJI (KZ) = 8.100	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2025 **Issue:** 02 **Volume:** 142

Published: 07.02.2025 **http://T-Science.org**

Issue Article

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STUDYING THE AGING POTENTIAL OF WINE MADE FROM SAPERAVI GRAPES IN KINDZMARAULI MICRO ZONE

Abstract: *The article concerns studying the physicochemical characteristics and aging potential of dry wine produced from Saperavi grape variety grown in Kindzmarauli micro zone. In the years of 2023 – 2024 grapes picked at technical ripeness in Kindzmarauli micro zone were processed in the experimental wine cellar of Telavi State University using classical red wine technology. The concentration and antioxidant activity of phenolic compounds of wine (phenolic acids, flavonoids, catechins, anthocyanins, etc.) were studied using the spectrophotometric method for our study.*

The study showed that the aging potential of wine produced from Saperavi grapes grown in Kindzmarauli micro zone is largely provided by its extractive substances, tannins and phenolic compounds. These compounds play an important role in preserving and developing the organoleptic properties and color of wine. The given data create the reason for an in – depth study of the aging process of Saperavi dry wine in Kindzmarauli zone and to emphasize the uniqueness of the wine in this micro zone.

Key words: *Saperavi, Kindzmarauli, Dry wine, Aging.*

Language: *English*

Citation: Papunashvili, T., Buishvili, G., & Kalandia, A. (2025). Studying the aging potential of wine made from Saperavi grapes in Kindzmarauli micro zone. *ISJ Theoretical & Applied Science, 02 (142),* 17-20.

Soi: https://s-o-i.org/1.1/TAS-02-142-4 ***Doi***: https://dx.doi.org/10.15863/TAS.2025.02.142.4

Scopus ASCC: *1100.*

Introduction

Out of 29 registered wine designations of origin in Georgia, 19 are produced in Kakheti region. Among red grape varieties Saperavi is the most widespread in this region. It is considered to be the material for almost all types of wine, however, it reveals its best qualities in the soil and climatic conditions of its specific macro and micro regions. Kindzmarauli zone is one of them which belongs to these micro zones.

Saperavi grape variety is used to make both qvevri and European style of wines. Excellent rose and sparkling wines can also be made from Saperavi grapes. (www.wine.gov.ge)

Saperavi grown on the left side of Alazani valley, in the foothills of the Caucasus, mainly in medium alluvial – carbonate and alluvial – non – carbonate soils produce comparatively softer, Bordeaux – type, full – bodied, harmonious, velvety wines. These include: Kvareli (Kindzmarauli), Napareuli, Sabue, Artana (training) and high quality red wines of other designations of origin. (Ampelography of Georgia)

Based on the data 2023 of the National Wine Agency, Kindzmarauli is considered to be the largest exported wine of protected designations of origin – 17418683 bottles. (National Wine Agency). It should be noted the given figures are more than the amount of wine exported in the previous year and it is increasing yearly.

The above data also show that the interest in Kindzmarauli as a naturally semi – sweet wine is particularly high in the world wine market, however, it is no less interesting for us to see what special properties the dry wine made from Saperavi grapes harvested from the same micro zone may be distinguished with. It should be noted that there is no data found on the aging potential of the dry wine made from Saperavi grown particularly in this micro zone.

The goal of this research was to study the physicochemical and biochemical transformations that were carried out in wine made from Saperavi grapes harvested in Kindzmarauli micro zone, as well as its aging potential.

The research object was the Saperavi grape variety grown in the viticulture of Kindzmarauli micro zone in 2023 – 2024. After determining the vintage time, the grapes were collected in technical ripeness and processed in the wine cellar of Iakob Gogebashvili Telavi State University. The grapes were processed using the classical red winemaking technology. For this purpose, the grapes were placed in a crushing press, and the crushed dregs were transferred to a fermentation tank. Before fermentation, grapes and must samples were taken. The self – flowed and pressed fractions of the must were also taken.

As a research method we chose a spectrophotometric method for determining total phenols, phenolic acids, total flavonoids, catechins, total anthocyanins (monomeric, leucoanthocyanins) and antioxidant activity at a wavelength of 540 HM.

The aging potential of wine is mostly determined by the content of extractive substances including the amount of tannins and phenolic compounds, especially in red wine. The anthocyanins in red wine are extracted from the grape skin. During the aging process, it goes into reaction with other compounds in the wine to form polymeric pigments due to which their concentration is reduced and color of wine is changed. Color is mostly determined by wine acidity and pH.

Another important component in red wine aging is tannins, which are flavan – 3 – O polymers that give wine astringent and dry taste. The changes in the structure of tannin molecules play a crucial role in wine aging.

For experimental research and in order to study the aging potential of dry wine made from Saperavi grown in Kindzmarauli micro zone, we started research by studying the chemical (phenolic compounds) composition of the grapes grown in the same zone in 2022 – 2023. The research conducted on the spectrophotometer revealed different data. See the data in Table 1.

Table 1. Content of total phenols and phenolic acids in Saperavi grain, must and wine in 2023 – 2024

Sample	Total phenols mg/ml (Calculated based on chlorogenic acid)	Phenolic acids mg/ml (calculated based on caffeic acid)
Whole grain	6.304	1.233
pomace	60.111	6.530
Juice	1.626	0.258
wine	1.716	0.671

The Table 1 shows that total phenols mg/ml (calculated based on chlorogenic acid) turned out to be high in the pressed fraction 60.111, and low in juice – 1.621. Similar attitude is observed for phenolic acids mg/ml (calculated based on caffeic acid), which turned out to be the highest in the pressed fraction 6.530, and the lowest in juice – 0.258.

Total flavonoids, catechins, total anthocyanins (monomeric, leucoanthocyanins) and antioxidant activity were also studied in experimental samples. See the data in Tables 2 and 3.

Table 2. Content of total flavonoids and catechins in Saperavi grain, must and wine in 2023 – 2024

Sample	Total flavonoids mg/ml (calculated based on quercetin)	Catechins mg/ml (calculated based on D catechin)
Whole grain	5.039	2.482
pomace	50.042	23.940

juice	1.313	0.471
wine	1.031	0.297

Table 3. Determining the content of total anthocyanins and antioxidant activity in Saperavi grain, must and wine in 2023 – 2024

	Total anthocyanins mg/ml (calculated based on cyanidin 3-O glucoside chloride)	Monomeric Anthocyanins mg/ml (calculated based on malvidin 3-O glucoside)	Leucoanthocyanins per leucoanthocyanidin mg/ml	Antioxidant activity - 50% inhibition of DPPH radical by mg sample
Saperavi				
Whole grain	0.316	0.257	0.747	6.676
Pomace	4.821	3.903	4.416	0.780
Juice	0.048	0.038	0.124	94.064
Wine	0.047	0.038	0.401	10.400

Table 2 and 3 show that the content of total flavonoids mg/ml (calculated based on quercetin) turned out to be the highest in the pressed fraction – 50.042, and the lowest in wine – 1.031 mg/ml. The content of catechins mg/ml (calculated based on D catechin) turned out to be the highest in the pressed fraction – 23.940, and the lowest in wine – 0.297.

Total anthocyanins mg/ml (calculated based on cyanide 3-O glucose chloride) turned out to be the highest in pomace – 4.821, and the lowest in wine – 0.047. Monomeric anthocyanins mg/ml (calculated based on malvidin 3-O glucoside) was found to be the highest in pomace – 3.903, and the lowest and equal at the same time in wine and juice – 0.038. Leucoanthocyanins per leucoanthocyanidin mg/ml was found to be the highest in pomace – 4.416, and the lowest in self – flowing juice – 0.124. Antioxidant activity – 50% inhibition of DPPH radical by mg sample – turned out to be the highest in pomace – 0.780, and the lowest in juice – 94.064.

Conclusions: Although the total phenols, phenolic acids, total flavonoids, catechins, total anthocyanins (monomeric, leucoanthocyanins) and antioxidant activity are higher in the pressed fractions than in self – flowing must, the content of these substances in the self – flowing fraction is quite sufficient for the aging potential of Saperavi dry wine.

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