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## OPTIMIZING THE COMPOSITION OF THE BLENDS FOR WHITE SPARKLING WINES OBTAINED FROM GRAPES OF NEW SELECTION AND LOCAL VARIETIES

*In this study was studied the use of wines from new selection varieties as blending components with local varieties for the production of raw material wines for quality white sparkling wines. It has been established that the local variety Plăvaie is characterized by advanced foaming indices, which allows its use in blends with the Viorica, Floricica and Riton varieties for the production of quality white sparkling wines. As a result of the obtained researches, the optimal ratio of blends was established for the Viorica, Floricica and Riton varieties with the Plăvaie variety.*

**Keywords:** blends, white sparkling wines, new selection varieties, local varieties.

### INTRODUCTION

The requirements for the grape varieties used in the production of sparkling wines are quite strict and are expressed by the slow accumulation of sugars during ripening, as well as by the moderate splitting of titratable acids [1; 3]. In addition to this, for the production of white sparkling wines the vine varieties are recommended, which are characterized by a fine aroma.

It is known that such traditional grape varieties as Chardonnay, the Pinot group, Riesling de Rhin, Aligote, Feteasca albă, Sauvignon, Traminer rose are used in the production of quality sparkling wines. However, some of these varieties, for example, Chardonnay, the Pinot group are characterized by high demands on climatic and pedological conditions, because the incorrect choice of the region and pedoclimatic conditions lead to a decrease in the quality of wines, the raw material for sparkling wine [4]. At the same time, some of the indicated varieties of grapes are prone to various diseases and require a special agricultural technique for their cultivation [3].

In this sense, in recent years, in the field of sparkling wine production, emphasis has been placed on expanding the range of wine production and promoting new selection grape varieties for the production of high-quality sparkling wines [2, 5]. As a result of the studies carried out by Scientific-Practical Institute of Horticulture, Viticulture and Food Technologies (SPIHVFT) researchers, quality white sparkling wines have already been developed, based on the blending of the new selection varieties Viorica and Floricica with the European varieties Aligote and Chardonnay.

In 2021, studies were initiated regarding the use of the local grape variety Plăvaie for the production of quality white sparkling wines in blends with the new selection wines Viorica, Floricica and Riton.

### MATERIALS AND METHODS

The dry white raw material wines obtained from grapes of new selection varieties Floricica, Viorica and Riton and from the local variety Plăvaie (harvest of 2021) served as objects of research.

The raw material grapes were harvested from the vineyards of the "Base" category, free of viral diseases and bacterial cancer, of SPIHVFT and processed under microvinification conditions. In the technological process of manufacturing dry white wines, the process of crushing and destemming the grapes was used with the sulphitation regime of 70-80 mg/dm<sup>3</sup> for the varieties Viorica, Floricica and Riton and 50-70 mg/dm<sup>3</sup> for the local variety Plăvaie. After crushing, the must was subjected to the maceration process, with the use of pectolytic enzymes Zimopec PML (0,3 ml/dal). The obtained must was macerated for 2-4 h, depending on the variety, at a temperature of 14-16 °C. Next, the must was pressed in a semi-automatic pneumatic press, followed by gravity clarification of the must for 12–14 h. The clarified must was decanted from the sediment and inoculated with the dry active yeasts Oenoferm Freddo (2-3 g/dal) with addition as feed Actibiol (2-3 g/dal) and Ecobiol Pied de Cuve (1–2 g/dal). The fermentation temperature of the must was 14-16 °C, and the fermentation process lasted 10-15 days. At the completion of fermentation, the wines were removed from the lees and treated with Oxyless V (0,1 g/hl). After the post-fermentation process, the wines were treated, filtered and used as blending components for the production of sparkling wines.

In order to establish the optimal composition of the blends for the production of sparkling wines, based on the raw material wines obtained from new selection varieties Viorica, Floricica and Riton with the local variety Plăvaie, trial blends were made, in different ratios (50%:50%, 60 %:40%, 70%:30% and 80%:20%). In the blends obtained, foaming indices were determined, physico-chemical analysis and organoleptic evaluation were performed.

The physico-chemical indices were determined according to the standardized methods and the OIV methods. Determination of foaming indices of wines raw material for sparkling wines was carried out by the instrumental method ("Mosalux" installation)

### RESULTS AND DISCUSSION

The physico-chemical indices of the raw material dry white wines obtained from the local variety Plăvaie and from the new selection varieties are presented in table 1.

*Table 1*

**Physico-chemical indices of dry white wines obtained from grapes of new varieties and local selection**

The name of the vine	Alcoholic concentration, % vol.	Mass concentration of:						pH	Conductivity electric, μS/cm
		residual sugars, g/dm <sup>3</sup>	titratable asids, g/dm <sup>3</sup>	volatile acids, g/dm <sup>3</sup>	total SO <sub>2</sub> , mg/dm <sup>3</sup>	total soluble salts, mg/dm <sup>3</sup>	dry extract, g/dm <sup>3</sup>		
Plăvaie	9,9	0,4	7,8	0,53	127	596	17,1	3,12	1189
Floricica	13,1	4,1	7,7	0,59	109	520	19,4	3,05	1040
Viorica	11,4	0,4	7,7	0,46	132	575	18,9	3,13	1155
Riton	12,4	3,4	7,4	0,59	105	539	19,2	3,11	1077

Analyzing the results presented in table 1, it can be observed that the wine obtained from the grapes of local Plăvaie variety is characterized by a higher mass concentration of titratable acids and a lower alcohol concentration compared to the new selection varieties, characteristics that are of technological interest for the production of quality sparkling wines.

Foaming indices were determined in dry white wines obtained from the grapes of the new selected varieties and the local variety Plăvaie, and the results are presented in table 2.

Table 2

**Foaming indices of wines raw material for sparkling wines obtained from grapes of new varieties and local selection**

The name of the wines	Foaming indices:		
	maximum foam height, mm	foam stabilization height, mm	Stabilization time, sec
New selection varieties			
Floricica	152	68	38
Viorica	146	64	35
Riton	138	44	36
Local variety			
Plăvaie	189	89	47

From the data presented in table 2, it can be seen that the foaming indices of the investigated wines are high and vary in fairly small intervals. The maximum height of the foam was the highest in the dry white wine obtained from the local variety Plăvaie (189 mm), followed by the dry white wine Floricica which has a height and a maximum foam stabilization time (15 mm and 38 sec, respectively). The lowest foaming properties among the analyzed wines were determined in the raw material wine obtained from the Riton variety, where the maximum foam height was 138 mm, and the foam stabilization height was 44 mm. The high values of the foaming indices of wines from new selection and local varieties allow their use in the production of quality white sparkling wines with advanced foaming properties.

In order to establish the optimal composition of the blends based on the wines obtained from new selection varieties with the local variety Plăvaie, trial blends were made, in different ratios. The blends obtained were subjected to organoleptic assessment at the Sensory Analysis Commission of SPIHVFT, and the results are presented in table 3.

Table 3

**Organoleptic evaluation of different blends of raw material wines for sparkling wines, obtained on the basis of new selection and local varieties**

The composition of the blend	The % ratio of the components	Organoleptic note, points	The characteristic of the blend
Floricica + Plăvaie	50:50	7,98	Fine, floral, intense aroma, thin, acidic, harsh
	60:40	8,01	Fine, floral, more intense aroma, fuller, fresh
	70:30	8,08	Fine, floral, intense aroma, fuller, harmonious
	80:20	8,10	Fine, floral, intense aroma, fuller, harmonious
Viorica + Plăvaie	50:50	7,96	Clean, typical basil aroma, clean, thin, acidic
	60:40	7,96	Clean, typical basil aroma, clean, fresh, acidic
	70:30	7,98	Clean, typical basil aroma, clean taste, less acid
	80:20	8,03	Clean, typical basil aroma, clean, less acidic
Riton + Plăvaie	50:50	7,94	Clean, melon aroma, clean, acidic taste
	60:40	8,01	Clean, melon aroma, clean taste, fruity nuances
	70:30	7,97	Clean, melon aroma, clean, neutral, fresh taste
	80:20	7,95	Clean, melon aroma, clean, neutral, fresh taste

From the data presented in table 3, it can be mentioned that among the blends obtained from the new selection variety Floricica and from the local variety Plăvaie, the blends with the highest

organoleptic notes were mentioned, where the percentage content of the Floricica variety was in the range of 70-80% of the total volume. It is observed that with the increase in percentage concentration of the Floricica variety in the blend, the aroma intensifies, and the taste becomes more harmonious, fuller.

If we refer to the blends obtained between the Viorica and Plăvaie variety, the same tendency is observed. With a more harmonious taste and a richer aroma, with specific nuances of basil, typical of the Viorica variety, it stands out, the blends with the percentage content, Viorica and Plăvaie of 70:30% and 80:20%. With the increase in the percentage concentration of the Viorica variety in the blend, from 50 to 80%, the intensification of the varietal aroma of this variety is observed, the sensation of acidity decreases and the organoleptic note of the blend increases (by 0,05 points).

Among the blends obtained from the new selection variety Riton and from the local variety Plăvaie, the most successful is the blend of Riton + Plăvaie wine (60:40%), which is characterized by a more balanced taste, with nuances of fruit, fresh, harmonious.

Table 4 shows the basic physico-chemical indices of the wine blends for sparkling wines obtained from new selection and local varieties.

Table 4

**Physico-chemical indices of the blends obtained from dry white wines from grapes of new selection and local varieties**

The composition of the blend	The composition of the blend	Alcoholic concentration, % vol.	The mass concentration of: g/dm <sup>3</sup>			pH
			residual sugars	titratable acids	volatile acids	
Floricica + Plăvaie	50:50	11,8	2,9	8,0	0,51	3,13
	60:40	11,9	3,1	7,9	0,53	3,12
	70:30	12,1	3,5	7,9	0,53	3,11
	80:20	12,3	4,0	7,9	0,53	3,11
Viorica + Plăvaie	50:50	11,3	1,7	7,8	0,50	3,16
	60:40	11,3	1,7	7,8	0,50	3,16
	70:30	11,4	1,6	7,8	0,50	3,17
	80:20	11,6	1,9	7,8	0,50	3,16
Riton + Plăvaie	50:50	11,7	3,0	8,0	0,54	3,16
	60:40	11,8	3,1	7,9	0,56	3,16
	70:30	11,9	3,1	7,9	0,56	3,17
	80:20	12,1	3,3	7,9	0,58	3,18

As can be seen from table 4, the physico-chemical indices are within the limits established for raw material wines intended for the production of white sparkling wines.

It can also be observed that the mass concentration of titratable acids, volatile acids and the value of the pH index of the blends are quite close and do not differ essentially. With a higher alcohol concentration, the blends obtained based on the Floricica variety are distinguished, which are within the limits of 11.8–12.3% vol., followed by the blends obtained on the basis of the Riton variety, with an alcoholic concentration of 11.6–12.1% vol.

Next, foaming indices were determined in the blends obtained, and the results obtained are presented in table 5.

From the data presented in table 5, it can be observed that the highest values of the foaming indices are found in the mix of Floricica + Plăvaie wines (50:50), where the maximum foam height reaches 197 mm, the foam stabilization height – 48 mm, and the foam stabilization time is 28 sec.

With the decrease in the percentage ratio of the Plăvaie variety, the values of the foam height and stabilization time decrease.

Based on the fact that, according to the results of the organoleptic assessment, the blends with the percentage content of the Floricica variety in the range of 70-80% of the total volume were the most successful, it was established that the optimal ratio of the Floricica + Plăvaie blend is in the range of 70: 30%, which was characterized by high organoleptic qualities and high foaming index values, namely 195 mm foam height and 45 mm foam stabilization height.

Blends based on the Riton variety are also characterized by high foaming index values. The maximum foam height reaches on average 162 mm, the foam stabilization height – 44-50 mm and the foam stabilization time is 25-42 sec. The Riton + Plăvaie blend (60:40%) is characterized by a high value of the maximum height of the foam, and the stabilization height and the stabilization time of the foam have the maximum values and are 50 mm and 42 sec, respectively. Namely, this blend was rated the highest from an organoleptic point of view and is recommended as optimal for the production of sparkling wines based on the new selection variety Riton and the local variety Plăvaie.

Table 5

**Foaming indices of wine blends for sparkling wines, based on wines obtained from grapes of new selection and local varieties**

The composition of the blend	The % ratio of the components	Foaming indices:		
		maximum foam height, mm	foam stabilization height, mm	Stabilization time, sec
Floricica + Plăvaie	50:50	197	48	28
	60:40	162	38	26
	70:30	195	45	27
	80:20	162	36	25
Viorica + Plăvaie	50:50	145	46	25
	60:40	140	46	26
	70:30	138	45	26
	80:20	107	44	26
Riton + Plăvaie	50:50	162	44	25
	60:40	160	50	42
	70:30	162	47	27
	80:20	162	49	28

Regarding the wine blends made from the Viorica and Plăvaie varieties, they also have high foaming indices, but slightly lower than the blends based on the Floricica and Riton varieties. It was established that with the increase in the percentage ratio of the Viorica variety, the values of the maximum height of the foam decrease, and the height of the stabilization of the foam decreases insignificantly. Taking into account both the results obtained when determining the foaming indices and the organoleptic analysis of the blends analyzed, the optimal ratio of the Viorica blend + Plavaie is in the range of 70:30%. The selected blend is characterized by special organoleptic qualities and high foaming index values, namely 138 mm foam height and 45 mm foam stabilization height.

## CONCLUSIONS

The optimal wine blends for white sparkling wines were developed based on new selection and local varieties: Viorica + Plăvaie (70:30 %), Floricica + Plăvaie (70:30 %) and Riton + Plăvaie (60:40 %), carese characterized by high organoleptic notes and physico-chemical indices, which correspond to the requirements for white sparkling wines. The optimal blends are characterized by high foaming indices, which demonstrate their perspective for the production of quality white sparkling wines.

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## ОПТИМІЗАЦІЯ СКЛАДУ КУПАЖІВ ДЛЯ БІЛИХ ІГРИСТИХ ВИН, ОТРИМАНИХ З ВИНОГРАДУ НОВОЇ СЕЛЕКЦІЇ ТА МІСЦЕВИХ СОРТІВ

*У роботі досліджено використання виноматеріалів із нових селекційних сортів як компонентів купажу з місцевими сортами для виробництва винної сировини для якісних білих ігристих вин. Встановлено, що місцевий сорт Плавай характеризується підвищеними показниками піноутворення, що дозволяє використовувати його в купажах з сортами Віоріка, Флорічіка та Рітон для виробництва якісних білих ігристих вин. У результаті проведених досліджень встановлено оптимальне співвідношення купажів сортів Віоріка, Флорічіка та Рітон із сортом Плавай.*

**Ключові слова:** купажі, білі ігристі вина, сорти нової селекції, місцеві сорти.

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