

# THE INFLUENCE OF USED ADJUVANTS OF FINING GRAPE MUST ON EXTRACT OF WHITE WINE

## INFLUENȚA UNOR ADJUVANȚI UTILIZAȚI LA LIMPEZIREA MUSTULUI ASUPRA EXTRACTULUI VINULUI ALB

**CIBUC Mariana<sup>1</sup>, OBADĂ Leonora<sup>1</sup>, RUSU E.<sup>1</sup>, GOLENCO Lidia<sup>1</sup>,  
NEMȚEANU Silvia<sup>1</sup>**  
e-mail: oenologie\_vdo@mail.ru

**Abstract.** An important indicator for quality of white wines are considered the unreducible dry extract that for these wines is at least 16.0 g/L. In this context in micro winemaking condition was experienced using different adjuvants to fining must of the variety Chardonnay grape harvest of 2011, namely: Trenolin opti pectolytic enzyme, Lalzime, Zimoclaire PG, bentonites Pluxbenton and Granubent, potassium caseinate Calcazein. Also activated carbon Granucol was used to the fermentation stage partial removal of phenolic compounds. Served as a witness clarified wort by static sedimentation. Research results have shown that the influence of adjuvants used to fining must on unreducible dry extract in raw wine is different, the index values ranging from 17.9 up to 21.7g/L.

**Key words:** adjuvants, enzyme, unreducible extract, degree of fining

**Rezumat.** Un indice important pentru calitatea vinurilor albe este considerat extractul sec nereducător, care pentru aceste vinuri este de cel puțin 16,0 g/L. În acest context în condiții de microvinificație s-a experimentat utilizarea a diferiți adjuvanți la limpezirea mustului din soiul Chardonnay, recolta anului 2011 și anume: enzyme pectolitice Trenolin opti, Lalzime, Zimoclaire PG, bentonitele Pluxbenton și Granubent, cazeinatul de potasiu Calcazein. De asemenea a fost utilizat și cărbunele activ Granucol la etapa de fermentare pentru înlăturarea parțială a compușilor fenolici. În calitate de martor a servit mustul limpezit prin sedimentare statică. Rezultatele cercetărilor au demonstrat că influența adjuvanților utilizați la limpezirea mustului asupra extractulu sec nereducător în vinurile brute este diferită, valorile acestui indice variind de la 17,9 g/L până la 21,7 g/L.

**Cuvinte cheie:** adjuvanți, enzime, extract nereducător, grad de limpezire

### INTRODUCTION

Forwarding wine export from CIS markets to the European and increasing the rate of Moldovan wines in this market requires a new concept of quality wines. In this context it is appropriate to improve the quality of wines, especially white wines. Extract content for white wine is considered a key indicator of quality. In some countries, such as Germany, France, Spain etc, extractivity of wine is a mandatory indicator for assessing the quality which is taken into account on his sale (Rusu, 2006). It should be noted that optimal content of unreduced extract for dry

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<sup>1</sup> Scientific-Practical Institute For Horticulture and Food Tehnologies, Republic of Moldova

white wines is 18 to 20 g / L but not less than 16 g / L. According Pomohaci et al (2001), dry extract of wine vary from the sanitary state of the crop, the type of wine and his age and this value allows us to detect falsification of wine. Typically, unreduced extract of white wines for current consumption should be, depending on the type of at least 14 to 16 g / L, and at the superior wines - 18-24 g / L (Cotea et al., 2009). G.G. Valuico (2001) believes that many modern technological processes as fining of musts, reduction of the doses of sulphitation, fermentation at low temperatures, early withdrawal from yeast sediment, treatment with stabilizing substances, lead to reduction of wine extractivity. In this context, a study of the influence of various adjuvants used in must fining on physico-chemical composition, mainly on unreduced extract of white wine was studied.

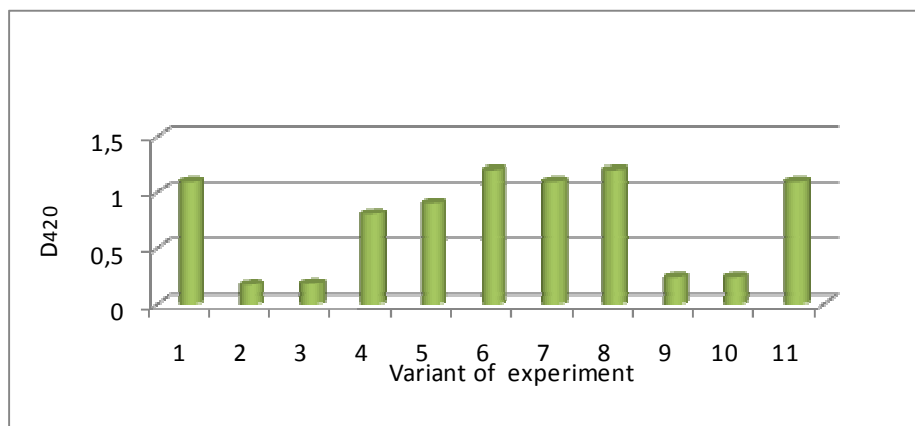
## MATERIAL AND METHOD

Were subjected to research grape must and dry wines made from Chardonnay variety using different adjuvants in the clarification step of must, in total 11 variants:

V1 (control) - clarification by gravity sedimentation, V2 and V3-rinse using pectolytic enzymes Trenolin opti and Lalzime MMX , V4 and V5 fining using bentonite Pluxbenton and Granubent , in dosage - 1 g / L, V6 - fining with caseinate Cal-casein in dose 0.2 g / dal, V7 - gravitational rinse with adding active charcoal Granucol during tumultuous fermentation, 0.5 g / L, V8 - gravitational sedimentation with separation of heavy sediment, V9 - using pectolytic enzymes PG Zimoclaire with subsequent administration of bentonite Pluxbenton to remove the enzyme, V10-clearing using enzyme Zimoclaire PG, V11- gravitational sedimentation with administration of bentonite Pluxbenton during the fermentation. Experimental samples and the control were prepared in season of 2011 in the wine section of Practical Scientific Institute of Horticulture and Food Technology according to the following to the next technological scheme: destemming and crushing grapes → administration of sulfur dioxide up to 50-75 mg / kg (total) → separation of must rava and pressing → fining grape with using different adjuvants and gravitational sedimentation → inoculate dry active yeast → fermentation at temperature 16-18 ° C → decanting must in fermentation from coarse yeast sediment → postfermentation → keeping wine on fine yeast sediment within 30 days for making batonage every 10 days → drawing wine from the lees. Physico-chemical analyzes were performed in the laboratory Oenology and Wine with Denomination of Origin in the same institute as authorized methods recommended by the OIV.

## RESULTS AND DISCUSSION

Must of Chardonnay variety that has undergone to clarification by using different adjuvants, is characterized by the following main physico-chemical: carbohydrates - 215 g / L, titratable acidity - 7.8 g / L, pH - 3.20, total dioxide sulfur - 75mg / L. In grape must and experimental wine was determined optical density at a wavelength of 420 nm (D420), which served as an index of the degree of clarification and is inversely proportional to clarity of product. Figure 1 presents the results on the influence of adjuvants on the degree of clarification of the must (D420) compared to the control.



**Fig. 1** - Degree of clarification of the musts from Chardonnay variety with using different adjuvants and gravitational sedimentation

From the presented data it can be seen that the highest degree of clarification of must are registered in variants using with pectolytic enzyme V2, V3, V9 and V10, and the  $D_{420}$  is between 0.18 and 0.25, followed by those with administration's of pectolytic enzymes V4 and V5 - between 0.80 and 0.90. In other variants of the experiment this index values between 1.10 and 1.20. The grape must sample (V1) - with clarification by gravity sedimentation the degree of must fining is 1.10. The results of physico-chemical investigations of Chardonnay dry white wines obtained by using different adjuvants for fining of must are presented in table 1. The data of table 1 shows that in wines subjected to research the alcoholic degree is found to be 12.5 to 12.7% vol, residual sugars do not exceed 3.3 g / L, and the titratable acidity varies from 7.4 up to 8.3 g / L. pH index of investigated wines reaches values between 3.11 and 3.22, volatile acidity not exceeding 0.33 g / L, representing the optimal content for young dry white wines.

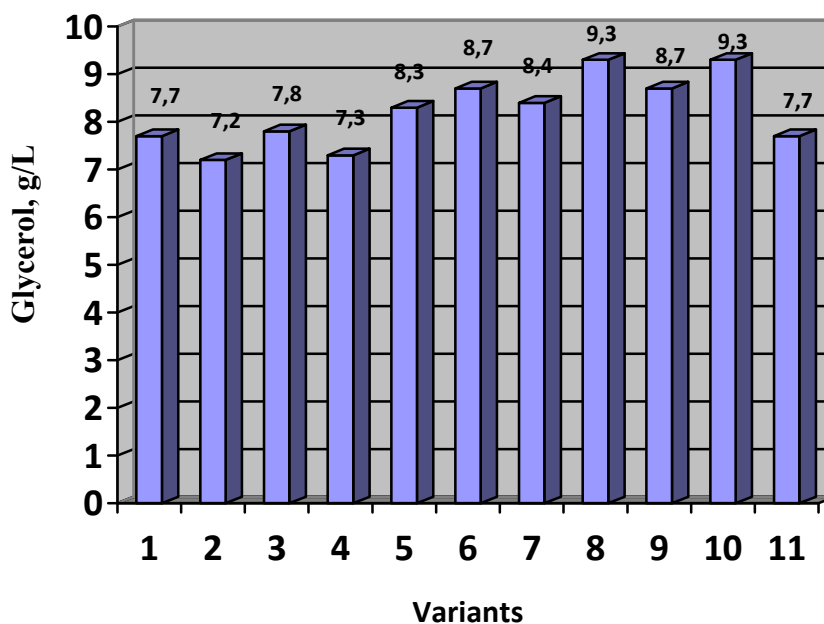
From the results shown in table 1 it can be seen that the content of phenolic substances varies and is wider from 247 up to 405mg / L. The lowest values of this index is found in the wines obtained from clarified must using bentonite Pluxbenton (247 mg / L), the enzyme Trenolin opti and activated carbon Granucol to fermentation (268 mg / L) and enzyme Lalzime MMX (288 mg / L). Mentioned that the highest content of phenolic substances was determined in variant 10 (using enzyme Zimoclaire) - 405 mg / L, followed by variant 9 (using the same enzymes and administration of bentonite Pluxbenton after rinsing to remove enzyme) - 375 mg / L.

Wines subjected to investigation is characterized by different values of the degree of clarification  $D_{420}$ . The lowest value of the optical density at a wavelength of 420nm - 0,065 is documented in three variants (Lalzime) and V7 (charcoal Granucol to fermentation), which means that these wines have the highest degree of clarification. Higher values of  $D_{420}$  are recorded in variants 4 (bentonite Pluxbenton) and 11 (gravitational sedimentation with administration of

bentonite Pluxbenton to fermentation) - 0,115 and 0,100 respective. In control wine (V1) the degree of clarification is lower than in the most investigated wines (0.095). Interest the results of determination of unreduced extract in experimental wines.

The values of this index varies between 17.9 and 21.7 g / L, the minimum value of this index are registering in variant 3 - using enzyme Lalzime MMX, and the highest - in variant 10 (enzyme Zimoclaire PG). High value of unreduced extract is observed in variant 8 too (gravitational sedimentation with separation of heavy sediments) - 20.5 g / L, which confirmed the presence in must of the light fragments of pulp and skin is a source of potentiating extractivity of wine (Pomohaci et al., 2001). In control wine the unreduced extract is also high and is 19.8 g / L.

Values slightly lower than in control, but much higher than the minimum permissible for dry white wines, is observed in variants using enzyme Trenolin opti, bentonite Pluxbenton and potassium caseinate - 19.0 to 19.3 g / L. It should be noted that in the investigated wines has been determined the glycerol content too, which is a main constituent of the extract of wine. Figure 2 presents the content in this compound in Chardonnay wines, ranging from 7.2 up to 9.3 g / L, higher amounts are determined in the variants with the highest unreduced extract content (V10, V9 and V8).



**Fig. 2** - The content of glycerol in Chardonnay wines (variants 1-11) obtained by using different adjuvants for fining of must.

Table 1

**Physico-chemical indices of dry white wines Chardonnay obtained by using  
different adjuvants for fining of must, vintage year 2011**

Variant nr.	Used adjuvant	Alcohol, % vol.	Sugar, g/L	Titrateable acidity (in tartaric acid), g/L	pH	Volatile acidity, g/L	Sulfur dioxide total / free, mg/L	Phenolic substances, mg/L	D <sub>420</sub>	Unreduced extract, g/L
1	Fining by gravity sedimentation (control)	12,6	2,1	7,7	3,20	0,26	77/9	319	0,095	19,8
2	Enzymes Trenolin opti, 0,2 g/dal	12,6	3,3	7,4	3,22	0,20	87/8	268	0,085	19,3
3	Enzymes Lalzime MMX, 0,2 g/dal	12,6	2,2	7,7	3,20	0,20	83/10	288	0,065	17,9
4	Bentonite Pluxbenton, 1g/L	12,5	2,2	7,7	3,20	0,20	74/9	247	0,115	19,2
5	Bentonite Granubent, 1 g/L	12,6	2,8	7,7	3,20	0,20	79/8	288	0,075	19,9
6	Cal – Cazein, 0,2g/dal	12,5	1,1	7,8	3,16	0,20	70/9	278	0,095	19,0
7	Gravity fining + active charcoal Granucol, 0,5 g/L to fermentation	12,6	1,2	8,3	3,12	0,33	72/10	268	0,065	19,7
8	Gravity sedimentation with separation of heavy sediments	12,6	1,9	8,1	3,20	0,33	81/9	360	0,085	20,5
9	Enzymes Zimoclaire PG, 0,1 g/L + Pluxbenton, 1g/L	12,6	1,5	7,9	3,17	0,20	83/9	375	0,075	21,2
10	Enzymes Zimoclaire PG, 0,1 g/L	12,6	2,3	8,3	3,11	0,20	81/9	405	0,095	21,7
11	Gravity sedimentation + Pluxbenton to fermentation	12,7	0,3	7,9	3,19	0,20	78/8	330	0,100	19,8

## CONCLUSIONS

The clarification degree of must of the Chardonnay variety is different depending on the adjuvants used in fining him. More effective action on the this degree exercise pectolytic enzymes Trenolin opti, Lalzime MMX, Zimoclaire PG and bentonite Granubent.

Glycerol content of Chardonnay wines from the harvest of 2011 obtained using different adjuvants of fining must have large enough values and are between 7.2 and 9.3 g / L.

The investigated wines distinguish between them by unreduced extract content, which reaches values between 17.9 and 21.7 g / L.

The highest content of unreduced extract is recorded in wines obtained using pectolytic enzyme of must fining Zimoclaire PG, bentonite Granubent, as well gravitational sedimentation with separation of heavy sediments. In control wine also content of unreduced extract is quite high and is 19.8 g / L. The lowest value of unreduced extract is in wine obtained using enzyme Lalzime MMX for clarification must.

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