RESEARCH REGARDING THE INFLUENCE OF BIOTECHNOLOGICAL FACTORS IN POLIPHENOLIC COMPOUNDS EXTRACTION AT RED WINE TECHNOLOGY

Giurgiulescu Liviu[1], Săvescu Petre[2]
[1]North University of Baia Mare, Victoriei street no. 76; [2]University of Craiova, A.I.Cuza street no. 13
E-mail: giurgiulescu@gmail.com

Abstract
Poliphenolic compounds from red wine present a special importance because of antioxidant proprieties with direct influence in human healthy. In technological process of obtaining red wines as well as sever control of biotechnological parameters, we can obtain wine with high concentration in these substances. Enzymatic activity favored tannins extraction, too, in special at bound tannins through hydrolyses of vacuoles walls and cells. Wine obtaining from enzymatic lots has superior values for all color compounds and in the same time have high quality tannins, less aggressive, less astringent which give the wine good quality a full taste. The favorable effects obtaining by using biotechnological factors are be prolong to the period of maturation and age wining. Knowledge of biological transformation which bring about by microorganisms and enzymes have an important place in modern enology. Bigger utilization of selective yeasts in general and dries active yeasts in special in maceration and fermentation technology based on a lot of advantages : easy application, quickly fermentation, contents in acetaldehyde and volatile acidity of wine is lower. Choosing the select yeasts for red wine making must be make with care because exist the yeasts who have the capacity to fix color and make abundant foam.

Keywords: polyphenolic compounds, selected yeasts, indigene yeasts, enzymes, microorganisms

1. INTRODUCTION

Actual wine making make a appeal at different biotechnological products who come in support of maceration fermentation process. [1]
Enzymatic activity favored tannins extraction, too, in special at bound tannins through hydrolyses of vacuoles walls and cells.[2]
Wine obtaining from enzymatic lots has superior values for all color compounds and in the same time have high quality tannins, less aggressive, less astringent which give the wine good quality a full taste. [3]
The favorable effects obtaining by using biotechnological factors are be prolong to the period of maturation and age wining. [2]
Knowledge of biological transformation which bring about by microorganisms and enzymes have an important place in modern enology.[4]
Bigger utilization of selective yeasts in general and dries active yeasts in special in maceration and fermentation technology based on a lot of advantages: easy application, quickly fermentation, contents in acetaldehyde and volatile acidity of wine is lower. Choosing the select yeasts for red wine making must be make with care because exist the yeasts who have the capacity to fix color and make abundant foam.
Diminution of anthocyans in time of maceration fermentation process are owe β glucosidases activity of yeasts and chose the yeasts with low β glucosidases activity reduced the loss in color.[5]

2. MATERIAL AND METHODE

The research was effectuated using Merlot grapes from Banu Măracine, Drăgăşani, Sâmbureşti Olt vineyards. It was study:

- the influence of sugar contents of grape juice of yeasts and enzymatic prepares on principal characteristics of wine.
- The influence of fermentation and maceration process on principal characteristics of wine, inclusive volatile acidity.

It was following the effects of this intervention on the next elements: maceration-fermentation duration, proportion of formed alcohol, residual sugar contents, glycerol contents and non reduced extracts.

3. RESULTS AND DISCUSIONS

Polyphenolic composition of red wines it was present in table 1,2,3 and in figure 1,2,3. When we utilisation the pectolitic enzymes for stimulation of maceration we have a good extraction of polyphenolic compounds from solid parts of grapes. In this way macerate variants in presence of pectolitic enzymes present high concentration in tannins and anthocyans. In conclusion, the concentration of total polyphenols is high in compare with variants macerated without pectolitic enzymes.

Table1 Polyphenolic composition of red wine obtaining with biotechnological factors

Variants	Total polyphenols (g/1)	Total tannins (g/1)
Indigene yeasts	1.8	1.45
Indigene yeasts+ Pectolitic enzymes	2.35	1.90
Selection yeasts	2.35	1.80
Selection yeasts.+ Pectolitic enzymes	2.60	2.00

The tannins in plus it was determinate of using pectolitic enzymes at 0,45 g in couple with indigene yeasts and 0,25 g/l in couple with select yeasts. Situation are similarly in anthocyans concentration, where using pectolitic enzymes lead to grow up in case of indigene yeasts – pectolitic enzymes pair (the grow up are equivalent with 100 mg/l) in compare to select yeasts.

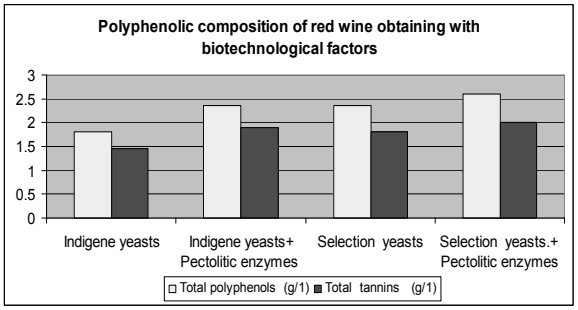

Figure 1 Polyphenolic composition of red wine obtained by biotechnology

Table 2 Polyphenolic composition of red wine obtaining with biotechnological factors

Variants	Antocyans (mg/l)	Catechinic Tanins
Indigene yeasts	330	1.530
Indigene yeasts+ Pectolitic enzymes	430	1.830
Selection yeasts	510	2.180
Selection yeasts.+ Pectolitic enzymes	570	2.730

This phenomenon are explain in fact that fermentation variant's with select yeasts present concentration higher in tannins and variants fermentation with indigene yeasts present concentration higher in anthocyans.

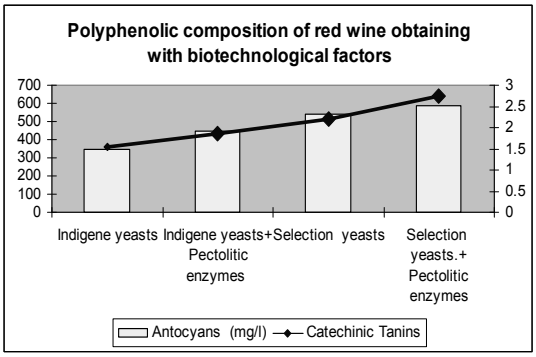

Figure 2 Polyphenolic composition of red wine obtaining with biotechnology factors

Chromatic structure of red wines is present in tables 3, 4, 5 and in figures 3,4,5 too. These results confirm that chromatic structure is influence by biotechnological and biochemist factors used in lead of fermentation and maceration process.

Table 3 Chromatic structure of red wine obtaining with biotechnological factors

Variants	D.O.(nm)		
	420	520	620
Indigene yeasts	0.271	0.329	0.051
Indigene yeasts+ Pectolitic enzymes	0.332	0.47	0.076
Selection yeasts	0.340	0.507	0.073
Selection yeasts.+ Pectolitic enzymes	0.335	0.507	0.073

D.O. – Optic density at various wave lengths

Table 4 Chromatic structure of red wine obtaining with biotechnological factors

Variants	Color intensity	Color tonality
Indigene yeasts	0.64	0.78
Indigene yeasts+ Pectolitic enzymes	0.84	0.69
Selection yeasts	0.90	0.65
Selection yeasts.+ Pectolitic enzymes	0.96	0.56

So, witness variant fermentation with indigene yeasts and maceration with pectolitic enzymes, present low color intensity and low concentration in anthocyans.

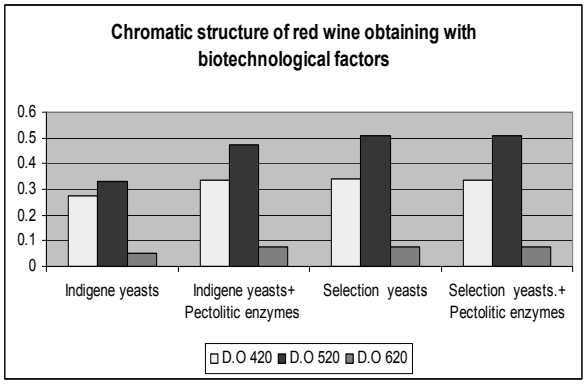

Figure 3 Chromatic structure of red wine obtaining by biotechnology

Add the pectolitic enzymes is determinate an increase of colorant intensity from 0.66 at 0.88 (approximately with 33.3%). It was extracted big concentration in yellow pigments, express through optical density at all wave lengths.

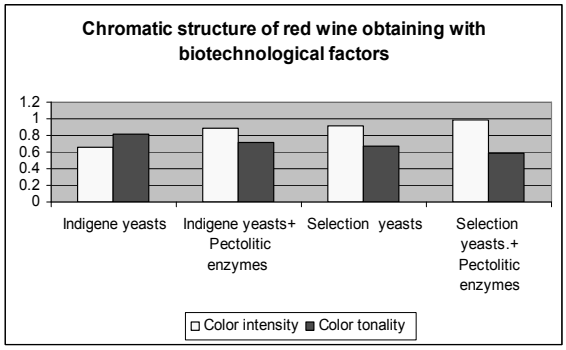

Figure 4 Chromatic structure of red wine obtaining by biotechnology methods

Table 5 Chromatic structure of red wine obtaining with biotechnological factors

Variants	% pigments		
	Yellow	red	Blue
Indigene yeasts	0.275	0.33	0.051
Indigene yeasts+ Pectolitic enzymes	0.332	0.47	0.076
Selection yeasts	0.34	0.507	0.071
Selection yeasts.+ Pectolitic enzymes	0.335	0.507	0.071

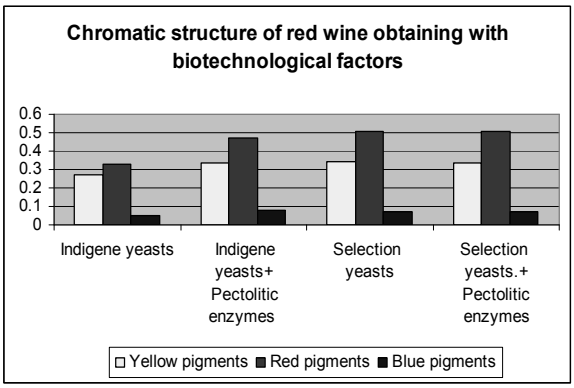

Figure 5 Pigments distribution at red wines obtaining by biotechnology

The most important increase it was at wave length of 520 nm who correspond to red pigments, from 0.332 at .0.472 (approximately 42.1%), which explain diminution of color tonality from 0.82 at 0.71 and modification of pigments structure, through diminution of yellow pigments participation at color intensity from 41.3% to 37.9 % in parallel with increase participation of red pigments from 50.3 at 53.6, the percent of violet pigments maintained constant at 8,5 %.

In all variants where we added pectolitic enzymes we recorded an increase at all of chromatic parameters. The wine obtaining by biotechnology present high color intensity and a low color tonality. The selected yeasts present the advantage to short the fermentation period, who lead at best results in red wine technology. Wines obtained with these methods have a high concentration in alcohol, substances who permit the conservation of color for a long periods. After, in the aging period, red wines accumulate the aromatic

compounds and finish them color. In these sense, the violet nuances specifics at the young wines will transform in red with brick color nuances specifics for a maturity wine.

4. CONCLUSIONS

1. When we utilisation the pectolitic enzymes for stimulation of maceration we have a good extraction of polyphenolic compounds from solid parts of grapes. In this way macerate variants in presence of pectolitic enzymes present high concentration in tannins and anthocyans. In conclusion, the concentration of total polyphenols is high in compare with variants macerated without pectolitic enzymes.
2. Add the pectolitic enzymes is determinate an increase of colorant intensity from 0.66 at 0.88 (approximately with 33.3%). It was extracted big concentration in yellow pigments, express through optical density at all wave lengths.
3. In all variants where we added pectolitic enzymes we recorded an increase at all of chromatic parameters. The wine obtaining by biotechnology present high color intensity and a low color tonality. The selected yeasts present the advantage to short the fermentation period, who lead at best results in red wine technology.
4. The chromatic structure is influence by biotechnological factors used in lead of fermentation and maceration process.

5. REFERENCES

[1]. BANU C.,Biotehnologii în industria alimentară, Editura Tehnică, Bucureşti, 2000
[2]. BOSSO A., Extraction of polyphenolic compounds and color stabilization during ageing in different red winemaking procedures.XXVIII OIV Congress, Viena 2004
[3] GHEORGHIȚĂ M., şi colab. Oenolologie, Editura Sitech, Craiova, 2002
[4]. GIURGIULESCU L.,Research regarding biotechnological possibility to reduce volatile acidity in wines, Cercetări ştiinţifice, Procese şi Tehnologii Agroalimentare, Timişoara, 2005
[5]. ȚÎRDEA C., Tratat de oenologie, Editura Ion Ionescu De La Brad, Iaşi, 2000