

RESEARCH REGARDING THE INFLUENCE OF BIOTECHNOLOGICAL FACTORS IN RED WINE TECHNOLOGY PROCESS

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Abstract

The effectuated research shows that the next biological factors have an important place in obtaining of red wine: the temperature, the SO₂ concentration, the enzymes, the selected yeasts, fermentation operation and after fermentation. These biotechnological factors determined an amelioration of gustative characteristics and a strong extractability of polyphenolic compounds. It was obtaining in this way the rich color wine with higher organoleptic characteristics than the other which haven't control process. Knowledge of biological transformation which bring about by microorganisms and enzymes have an important place in modern enology. Enzymatic activity favored tannins extraction, too, in special at bound tannins through hydrolyses of vacuoles walls and cells. Wine obtaining from enzymatic lots have 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 an full taste. 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.

Keywords: biotechnology, enzymes, polyphenolic compounds

1. INTRODUCTION

The temperatures had an important role in the extraction process. When the temperature is higher the extraction process is very good. The cellular walls are destroyed very quickly; when the temperature is high and the extraction of color pigments is better. Higher temperature between 30-32⁰C favored antocyanic extraction and polyphenols compounds.[4] The influence of SO₂ on phenolic substances extraction depends by sulphitation level.

If it put SO₂ at primary vinification, before start of alcoholic fermentation make possible higher or lower activities on structure of cellular walls. It is possible a soluble of some components cellular wall and it appears the pores. In this way smaller molecule as antocyanics and tannins less polymerization pass in exterior liquid.

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Wine obtaining from enzymatic lots have 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 an full taste. [2]

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2. MATERIAL AND METHOD

The research was effectuated using Merlot grapes from Banu Măracine, Drăgășani, Sâmburești 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 these intervention on the next elements : maceration-fermentation duration, proportion of formed

alcohol, residual sugar contents, glycerol contents and non reduced extracts.

3. RESULTS AND DISCUSSIONS

Table1 Influence of sugar contains from grape juice about principal compounds from wine

Residual sugar in grapes juice g/l	Yeasts	Total acidity g/l H ₂ SO ₄	Volatile acidity after fermentation g/l H ₂ SO ₄
178	Indigene yeasts	4.84	0.50
	Selection yeasts	4.70	0.45
193	Indigene yeasts	4.86	0.54
	Selection yeasts	4.72	0.42
207	Indigene yeasts	4.60	0.52
	Selection yeasts	4.53	0.45
252	Indigene yeasts	4.32	0.53
	Selection yeasts	4.56	0.46

For their superior fermentative power, selected yeasts left in wine less residual sugar, but residual sugars from wine for identical type of yeasts vary in function by choose fermentation activator, which suggest that chemical composition parameters vary after yeasts which realized the fermentation and after stimulation process of this (Figure 1).

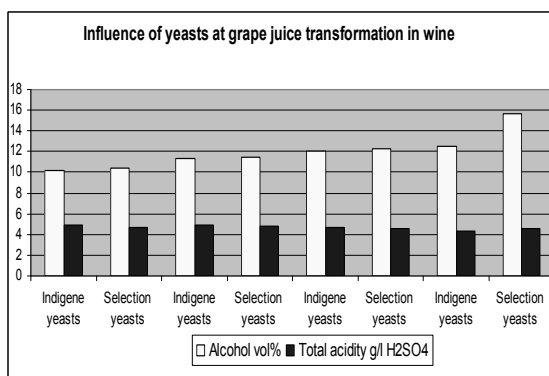


Figure 1 Influence of yeasts in alcohol and total acidity transformation at red wine

If selected yeasts don't let in wine more than 6.5 g/l the indigene yeasts let 8.2 g/l residual sugars.

Actibiol product through its chemical compounds (ammonium phosphate 23%, ammonium sulphate 63%, chlorhydrate of thiamine 0,2 %) have a strong stimulative activity for yeasts reproduction and fermentative capacity (figure 2).

Table 2. Influence of sugar contains from grape juice about principal compounds from wine

Residual sugar in grapes juice g/l	Yeasts	Alcohol vol. %	Volatile acidity after 6 months of fermentation g/l H ₂ SO ₄
182	Indigene yeasts	10.2	0.64
	Selection yeasts	10.4	0.58
197	Indigene yeasts	11.3	0.60
	Selection yeasts	11.5	0.51
211	Indigene yeasts	12.0	0.62
	Selection yeasts	12.3	0.55
256	Indigene yeasts	12.5	0.61
	Selection yeasts	15.7	0.52

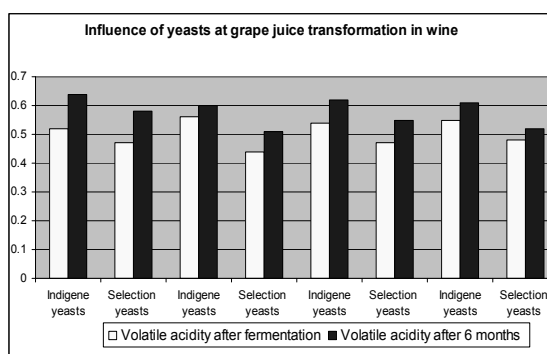


Figure 2 Influence of yeasts about volatile acidity of red wines evolution after fermentation and after 6 months from finished fermentation

In these figures it can be seen that indigene yeasts have a little influence in red wine acidity evolution comparative with selection yeasts, who stopped the negative processes which

determinate the bioaccumulation of volatile acidity.

Table 3 Influence of yeasts at grape juice transformation in wine

Yeasts category	Alcohol vol. %	Total acidity g/l H ₂ SO ₄
Indigene yeasts	11.5	0.57
Selection yeasts without killer factor	11.7	0.41
Selection yeasts with killer factor	12.0	0.34

These things determine faster start of fermentation then in non additional variants and no matter by using yeasts types.

Table 4 Influence of fermentation activators at grape juice transformation in wine

Variants yeasts + enzymes	Alcohol vol. %	Total acidity g/l H ₂ SO ₄
Actibiol+ Selection yeasts	14.0	5.48
Actibiol + Indigene yeasts	13.2	5.41
Cell Walls + Selection yeasts	14.1	5.46
Cell wals + Indigene yeasts	13.6	5.59
Selection yeasts	14.0	5.41
Indigene yeasts	12.1	5.56

The fermentation will be ready quickly. (1-5 days for LSA variants and 1-6 days for indigene yeasts).

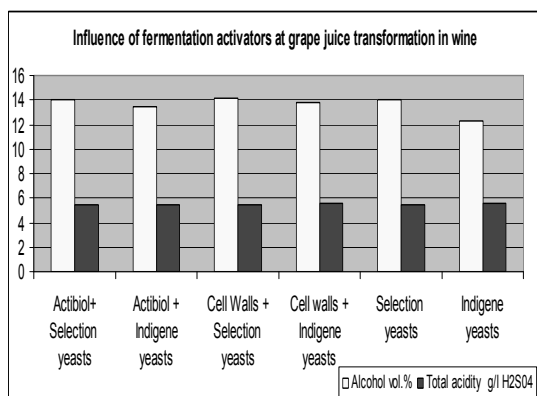


Figure 3. Influence of fermentation activators at grape juice transformation

Cell Walls products recommended by specialty literature for specific proprieties for protection the yeasts against toxic activities of some yeasts inhibitors (fats acids with medium catena C₈. C₁₀. C₁₂) action different from another activator (Actibiol) in the end of fermentation. when the condition from fermentation environment became very non favorable for the life of yeasts.

Table 5 Influence of fermentation activators at grape juice transformation in wine

Variants yeasts + enzymes	Fermentation duration (days)	Volatile acidity g/l H ₂ SO ₄
Actibiol+ Selection yeasts	14	0.23
Actibiol + Indigene yeasts	18	0.45
Cell Walls + Selection yeasts	15	0.45
Cell walls + Indigene yeasts	17	0.29
Selection yeasts	18	0.26
Indigene yeasts	21	0.39

Variants in which was used these activator present highest alcohol contents and smallest in residual sugars (figure 3).

That it's happened because yeasts support better the difficult condition of the end of fermentation in presence of cells walls product. The fermentation of these variants during more then one day that additional variants with Actibiol it was explain through different activities of booth fermentation activator; Actibiol products influences the grown up of yeasts and faster start of fermentation and cells walls influence the life of yeasts determining the fermentation of last sugar rests in function of alcohol power.

In all variants where we used selection yeasts and enzymes we can see an increase of alcohol concentration compare with variants without these activators.

Regard the variants with selected yeasts with or without enzymatic activators we can remarked that the variants selected yeasts and enzymes lead to variants with high alcoholic degree in compare with the variants that contain only selected yeasts. These process can be explain by the enzymatic activity who determine one the

part the increase of extraction speed of sugars from the grapes and on the other part the a high ferment power of the selected yeasts.

4. CONCLUSIONS

1. Selected yeasts with high fermentative power left in wines low concentration of residual sugar. In function with used in wine making of enzymatic preparations we can obtained a high concentration in alcohol degree and low concentration in volatile acidity.

2. In years with low temperature in the period when fermentation processes start, it can recorded accidents in technological process. By utilization the selected yeasts and enzymatic preparations, it can be eliminate these phenomena.

3. Actibiol products influences the grown up of yeasts and faster start of fermentation and cells walls influence the life of yeasts determining the fermentation of last sugar rests in function of alcohol power.

4. Cell walls are recommended for protection of the yeasts against toxic activities of some yeasts inhibitors (fats acids with medium catena C₈. C₁₀. C₁₂) action different from another activator (Actibiol) in the end of fermentation, when the condition from fermentation environment became very non favorable for the life of yeasts.

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