INFLUENCE OF THE COMPOSITION OF THE CULTURE ENVIRONMENT ON THE FERMENTATION DYNAMICS OF THE SELECTION WINE YEASTS AT SEBES-APOLD VINEYARD

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REZUMAT. Drojdiile de vin Saccharomyces cerevisiae var. ellipsoideus sunt utilizate pentru a fermenta mustul de struguri, fermentația alcoolului fiind un proces anaerob de reducere a oxidului de hidraţi de carbon, prin care este metabolizată, ca urmare a acţiunii enzimei în principalele produse (alcool etilic şi dioxid de carbon), precum şi în produse secundare (alcooluri superioare, aldehidă, acid acetic, glicerol, acizi volatili şi altele). Agenţii de fermentație alcoolică tipici fac parte din genul Saccharomyces şi ca urmare a concentratiei de alcool etilic in mustul fermentat direct proporţională cu cantităţile de zahăr existente în mustul de struguri rezultat, dar agenţii pot aparţine, de asemenea, modului în care procesul tehnologic se desfăşoară.

Cuvinte cheie: Drojdie de vin, Saccharomyces cerevisiaevar, ellipsoideus, fermentatie vitamina, acetat de zinc

ABSTRACT. The Saccharomyces cerevisiae var.ellipsoideus wine yeasts have the purpose of fermentation the grape must, the alcohol fermentation being an anaerobic process of oxide reduction through which the carbohydrate is metabolised as a result of the action of the enzyme in the main products (ethyl alcohol and carbon dioxide) and in the secondary products (superior alcohol, aldehyde, acetic acid, glycerol, volatile acids and others). The typical alcoholic fermentation agents belong to the Saccharomyces genus and as a result of the grape must fermentation ethylic alcohol concentrations directly proportional with the quantities of sugar existing in the grape must result, but the agents can also belong to the way the technological process is conducted.

Keywords: Wine lees, Saccharomyces cerevisiaevar.ellipsoideus, fermentation, vitamine, zinc acetate

1.INTRODUCTION

The wine yeasts interfere in the spontaneous and controlled fermentation of the grape must, playing a definite role upon the qualities of the wine. Wine yeasts are included in the *Saccharomyces* genus and it has been established that they are the main alcoholic fermentation agent of the grape must. The selection of the strain that has superior biotechnological properties is based on the following particularities: alcoholic hold and the capacity of fermentation with biomass formation [2].

2. MATERIALS AND METHODS

- The selected and isolated Saccharomyces ellipsoideus yeast stains from "Feteasca alba", "Feteasca regala", "Chardonnay, "Sauvignon blanc", "Iordana" and "Muscat Ottonel" variety in the Sebes-Apold vineyard are noted SFA211, SFR 107, SCH 113, SSB214, SIO166, SMO220.
- Sartorius bioreactor endowed with temperature sensors, carbon dioxide, disengaged oxygen, dissolved oxygen, biomass.The fermentations have been monitored at 16°C in pasteurized grape must culture environment. The pasteurized grape must has

performed the following characteristics: sugar 146.7 g/l and dry substance 20.56%. The grape must has been seeded with cells of selected yeasts (1ml) with the aim of obtaining the natural fermentation evolution and then the result being enriched with a mix of vitamin B and Zn(CH3CO2)2 (Zn acetate): 1 ml/l, 2 ml/l, 3 ml/l, with the aim of optimising the fermentation process (M, M1, M2, M3) [1].

The resulted wines have been characterised by means of the Alcoholmeter for wine in combination with the dens meter DMA 35, ALCOLYZER, at a temperature of 20°C [3-5].

3. RESULTS AND DISCUSSIONS

As shown in fig. 1, the fermentation parameters vary based on the selected stem and the composition of the culture environment. It stands out that the best efficiency is given by the SMO220 strain on the 6th fermentation day on pasteurised grape must. The lag phase of the yeast is of about 3 days, easily waning up to the 9th day.

In the vitamins and Zn acetate 1 ml/l enriched environment, the best strain is SB215 (fig. 2), followed by strain SMO220. These two stems show a constant evolution during a 5-7 days interval, the fermentation being perceived at the maximum value.

In the vitamins and Zn acetate 2 ml/l enriched environment, the 6 yeast strains SFA211, SFR107, SCH113, SSB214, SIO166, SMO220 reach the culmination on the 6th day, the variations between them being very low. The maximum efficiency can be distinguished on strain SSB214, and the minimum one goes to strain SCH 113 (fig. 3).

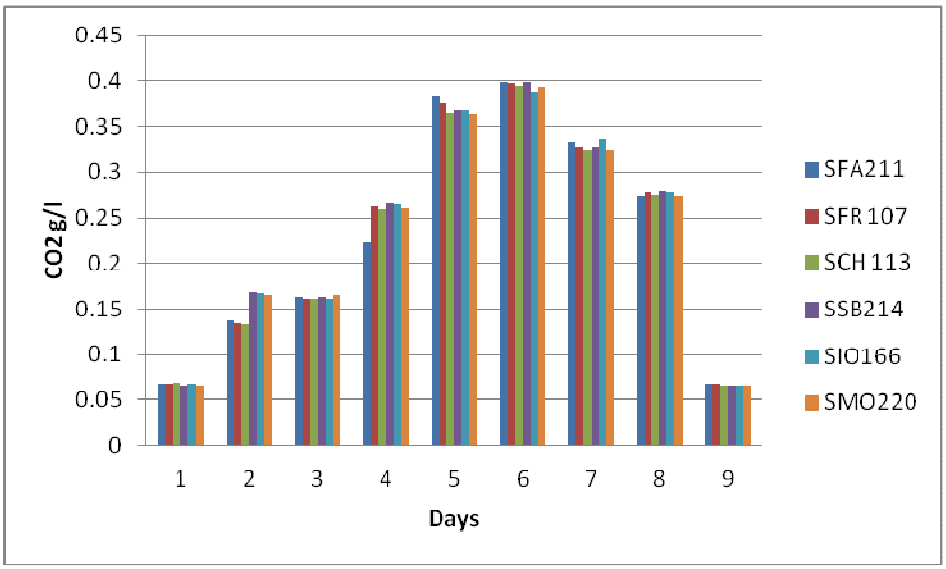

Fig. 1. *Variation of parameter at the 6 fermented strains of yeast in must in a period of 9 days*

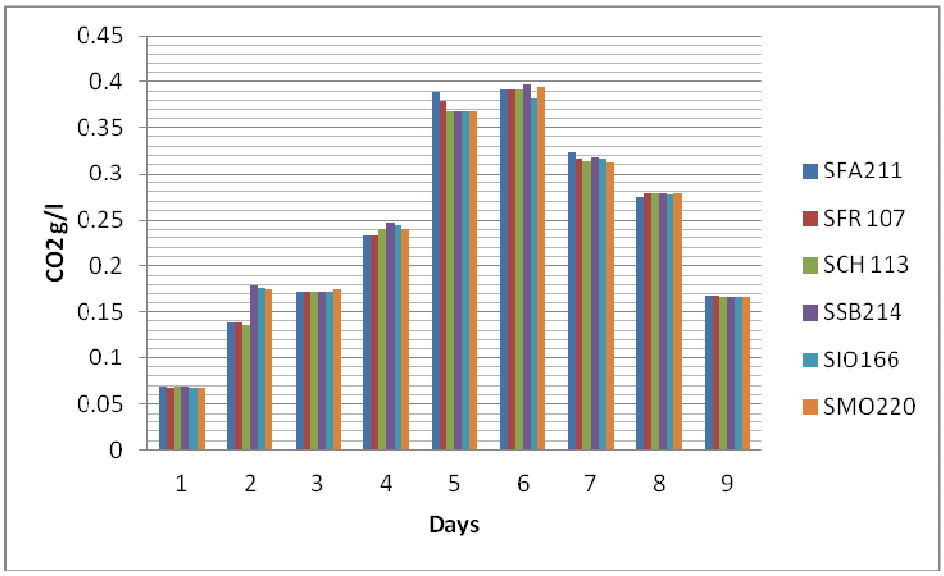

Fig. 2. *Variation of parameter at the 6 fermented strains of yeast in must, vitamins and acetate of Zn: 1ml/l in a period of 9 days*

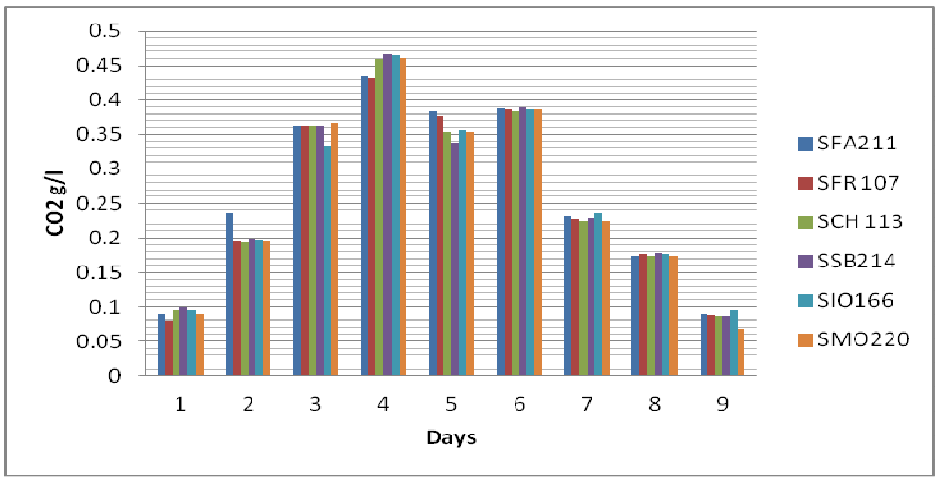

Fig. 3. *Variation of parameter at the 6 fermented strains of yeast in must, vitamins and acetate of Zn: 2ml/l in a period of 9 days*

In the environment where a quantity of 3 ml/l Zn acetate and vitamins have been introduced, a rapid evolution of the fermentation process in the presence of yeast SFA211 and SSB214 can be observed, followed closely by strain SFR107, as shown in (fig.4).

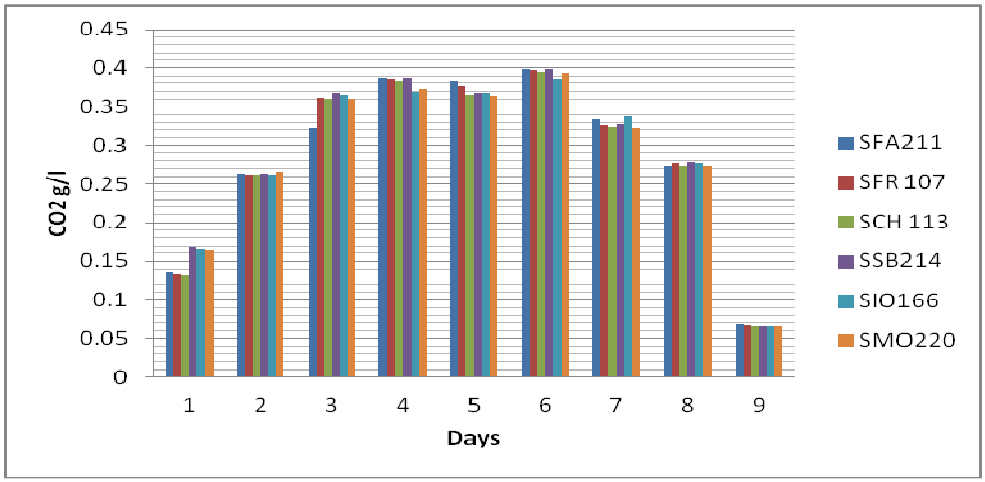

Fig. 4. *Variation of parameter at the 6 fermented strains of yeast in must, vitamins and acetate de Zn: 3ml/l in a period of 9 days*

The biomass accumulation is quicker in environment M3, related to the number of days, and the most valuable strain is SFA211. In the case of the strain isolated in Iordana soil, modest evolutions on all monitored parameters can be observed.

Table no. 1 present the characteristics of the resulted wines, as a result of alcoholic fermentation in pasteurised grape must. To be observed that strain SFA211 leads to a greater accumulation of alcohol compared to the other strains. In the environment that has been enriched with vitamins and Zn acetate 3 ml/l, the alcohol accumulation of this strain reaches 14.14% V/V.

Table 1. *Characterization of the wine resulted after the alcoholic fermentation in grape must*

Parameters	SFA211	SFR 107	SCH 113	SSB214	SIO166	SMO220
Density [g/cm^3]	0.915	1.031	0.950	1.007	1.044	1.018
Alcohol content in volume percent [% v/v]	8.12	7.46	7.77	7.6	7.06	7.9
Alcohol content in weight content [% w/w]	8.41	6.65	6.96	6.39	7.07	7.8
Relative density of the sample	0.917	1.033	0.952	1.008	1.045	1.020
Relative density of extract	0.924	1.038	0.959	1.016	1.051	1.027
Total extract [g/l]	194.16	100.0	105.58	43.48	134.57	71.76

Table 2.*Characterization of the wine resulted after the alcoholic fermentation in grape must enriched with vitamins and Zn acetate: 3ml/l.*

Parameters	SFA211	SFR 107	SCH 113	SSB214	SIO166	SMO220
Density [g/cm^3]	0.915	1.031	0.950	1.007	1.044	1.018
Alcohol content in volume percent [% v/v]	14.14	12.49	11.73	11.64	12.6	14.0
Alcohol content in weight content [% w/w]	8.1	7.62	8.16	8.41	9.97	13.2
Relative density of the sample	0.917	1.033	0.952	1.019	1.045	1.020
Relative density of extract	0.924	1.038	0.959	1.016	1.051	1.027
Total extract [g/l]	194.22	110.2	105.76	43.56	134.91	71.82

4. CONCLUSIONS

After monitoring the fermentation processes in the given conditions it is observed that the selected wine yeast strains in Sebes-Apold vineyard present different biotechnological characteristics, with a specific behaviour based on the genus from which they have been isolated, but also the composition of the used culture environment. A culture environment that has been enriched accelerates the fermentation process and a result, a shorter and more intense fermentation time, while a classical environment offers a slower process, without spectacular evolutions, during longer times. The resulted wines showed an accumulation of alcohol that is superior to the classical fermentation, so that the selected strains can be considered as being starter cultures, with superior fermentation capacities.

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