

STUDY OF YEAST STRAINS SACCHAROMYCES VINI FROM WINE CENTRE "CRICOVA" ON THE TEMPERATURE FACTOR

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Abstract: Temperatura mediului este un factor important de existență a sușelor de levuri, care sunt folosite în oenologie și poate juca un rol decisiv în procesul de selecție și evidențiere a culturilor cu proprietăți tehnologice avansate. Intervalul de termotoleranță pentru diferite sușe de levuri este individuală, dar majoritatea dintre ele se pot dezvolta într-un interval destul de larg: de la 0...5 pînă la 30...40 °C, cu o valoare optimală între 20...30 °C. Din gama largă de indici biochimici și fiziologici, care caracterizează activitatea levurilor, temperatura este un factor cheie, studiul căruia are o importanță deosebită teoretică și practică.

Keywords: selection, wine yeast, temperature, fermentation

Introduction

The temperature of the natural environment is an important factor which determine the existence of the yeast and capable to influence on their natural selection. Usually microorganisms are divided into three categories according to their behavior in different temperature, which reflects the adaptability and stability of their enzymatic apparatus to this factor. Microorganisms can be psychrophilic, mesophilic or thermophilic, optimal development of which occurs at temperatures below 20 °C, between 20 and 45 and above 45 °C, respectively. Yeast belong to the first two categories.

Temperature is an important factor of life of all the yeast, and for each of the different functions of yeast cells: respiration, fermentation, growth - there are different optimal temperature conditions. In fact, these limits depend on the type of yeast, and even race, as well as aeration, medium composition, especially the presence of alcohol, and thus determine a more or less broad zone where possible reproduction of yeast and fermentation of sugars.

Aim of study - to test the effect of temperature on strains yeast *Saccharomyces vini*, isolated from the stum in a wine center «Cricova».

Materials and methods

We used six strains of yeasts isolated from the must in winemaking center «Cricova» (Table 1).

To establish the response of investigated yeast cells on the temperature, a 2-3- day cultures grown on grape must at 28 ± 1 °C and inoculated on a solid nutrient medium *grape must- agar* in Petri dishes and incubated 2-4 weeks within 1 ... 43 °C.

Table 1. Studied yeast strains

No	Title
1	CNMN-Y-26
2	Cricova Chardonnay(3)
3	Cricova Chardonnay(4)
4	1S
5	1VT
6	3VT

*The name of the yeast strains is conditional

Besides the ability to assimilate carbohydrates at different temperatures fermenting energy of yeast were studied. To do this, they were cultured on grape must, with a concentration of sugars 198 g / l in the range 15-40 ° C. The study was carried out in a glass container with a capacity of 200 cm³, equipped with a clog device consisting of a rubber tube with a drilled hole where the tube is inserted a few centimeters long with a finely drawn-out end of promoting the creation of anaerobic conditions. In 150 cm³ of must 3% of two-day yeast suspension were entered. Appreciation of the rate of fermentation was carried out by the quantity of released carbon dioxide. The quantity of gas was monitored by weighing.

Results and discussion

In assessing the response of investigated yeast cells on the temperature began to note the growth of the biomass at 5 ° C in the 10-12th day, depending on the strain. As the temperature of the medium in all variants of the experiment increased earlier and abundant growth of cells was recorded (for example, at 10 ° C, it was observed on day 5, and at 20 ° C and above is on the 2nd day). The maximum temperature of reproduction of yeast cells in which scant stroke was 39 ° C.

Table 2. Optimum temperature for the studied yeast strain

Name strain	CNMN-Y-26	Cricova Chardonnay(3)	Cricova Chardonnay(4)	1S	1VT	3VT
No	1	2	3	4	5	6
t, °C	5-39	10-35	10-35	10-35	6-36	8-38

Microscopic examination of yeast, cultured on agar medium at different temperatures showed that when the temperature changes, the elliptical shape of the cells, characteristic *S.vini*, is rounded, almost to the spherical (Fig. 1).

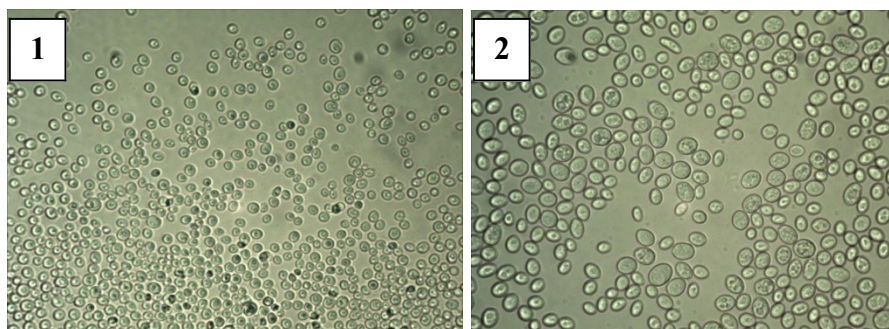


Fig. 1. Cells of strain CNMN-Y-26, grown in a medium grape must- agar at 15 (1) and 35 °C (2).

Table 3 presents the results of the investigation of the fermentation, the yeast strains isolated at different environmental temperatures.

Table 3. The rate of fermentation for different yeast depending on the temperature (G CO₂ per 24 hours)

Fermentation temperature, °C	Name of yeast strains					
	CNMN-Y-26	Cricova Chardonnay(3)	Cricova Chardonnay(4)	1S	1VT	3VT
15	5,5	3,1	3,4	3,8	5,4	5,1
20	7,6	5,8	5,7	6,0	7,7	6,8
25	9,8	7,6	7,7	7,3	9,8	7,3
30	10,2	8,4	8,5	8,2	10,3	8,5
35	11,7	9,0	9,1	9,0	11,5	9,8
37	10,5	8,1	7,9	8,1	10,8	8,8

Analysis of the data shows that the studied wine yeast are able to exhibit a high fermentative activity in the temperature range of 25-35°C.

The quantity of gassing carbon dioxide for the research strain is different and has a minimum of 3.1 g / L for strain Cricova Chardonnay (3), and a maximum of 11.7 g /L for strain CNMN-Y-26, but there is still rule that when the temperature raises the quantity of emitted gas increases too, and at maximum temperature its mass decreases. Mass concentration of sugars decreases with increasing temperature, and after 20 days for all the studied strains was at the level of 0.5-1 g / L at the temperature of fermentation - 35 °C and above 37 °C sugars are not fully fermented - 7-10 g / L.

If there are more favorable conditions for yeast metabolism, free access of oxygen and an increase in inoculated biomass, allowed to ferment at 37 °C for about 90-100% of sugars.

Conclusions

Thus, the study of the relationship of yeast *S. vini* to temperature, isolated in nature Wine Centre «Cricova», showed their tolerance in the range of 5 to 37 ° C.

The rate of fermentation of yeast increases with temperature up to 30 ° C, but at temperatures above 35 ° C, the rate of fermentation decreases.

Optimum temperature fermentation of sugars varies depending on the type of yeast, and ranges from 25 to 35 ° C. The ability of yeast fermentation to 90-100% of sugars at high temperatures suggests that it arises as a selective advantage due to temperature environment.

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