AROMATIC POTENTIAL AS AN ALTERNATIVE METHOD FOR CHARACTERIZATION OF YEAST STRAINS

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Abstract: În ultimul timp, consumatorii consideră că aromă şi gustul vinului sunt principalele caracteristici care determină calitatea şi valoarea produsului. Aroma vinului este un amestec unic de compuşi volatili provenit din strugurii iniţiali (arome varietale), produse secundare formate în timpul fermentaţiei mustului (arome fermentative) şi de maturare (arome post-fermentative).
În scopul studierii influenţei suşelor de levuri asupra potenţialui aromatic al vinurilor albe seci au fost determinate unele substanţe volatile, prin metoda cromatografiei gazoase. Rezultatele obţinute demonstrează că conţinutul substanţelor volatile a vinurilor albe seci variază în dependenţă de suşa de levuri utilizată.
Keywords: aroma of wine, yeast strain, volatile substances

Introduction

Previous studies have shown that yeast strains have a large impact on wines chemical complex and found that the volatile composition could be an alternative method for characterization of yeasts used in wine production .

Some authors use synthesis of different amounts of acetylmethylcarbinol, 2,3-butadiene or acetic acid as a base for studying the genetic strains variability of the genus Saccharomyces, which can serve as a way to improve the quality of wine or fermentative properties of yeasts.

During alcoholic fermentation yeasts form and other alcohols, except ethanol, so-called higher alcohols, mainly represented by n-propanol, isobutanol, isopentanol etc. They may derive directly from the corresponding amino acids or sugars in the environment. Each strain of yeast Saccharomyces genus has its own capacity to produce these secondary compounds of fermentation. Yeast strains producing of higher alcohols behave differently depending on musts studied.

Esters formation in wine is made in two ways: biological esterification occurs during alcoholic fermentation, malolactic and / or esterification of acetic by chemical or enzymatic reactions that occurs very slowly during storage / aging of wine. Both ways may occur depending on the technological and almost equal participation in the formation of esters in wine.

Materials and methods

Strains of yeast. In the present paper were studied local yeast strains (Cricova Ch (2),Cricova Ch (3), Cricova Ch (4), 1S, 1VT, 3VT), allocated in the wine center "Cricova". Studies performed on the morphological, cultural and physiological-biochemical properties permitted, using identifier by Kudreavţeva, establishing that yeast strains identified belong to the species Saccharomyces vini. As a control were studied industrial dry active yeast: LittoLevureChardonnay (France), yeast selected from the National Collection of Microorganisms for the Wine Industry: strain no. 29.

As a raw material was used grape must of the variety Chardonnay harvest of 2011. Initial physico-chemical characteristics of the grape are presented in Table 1.

Table 1. Physico-chemical characteristics of the grape (harvest 2011)

grape variety and conditions	**sugar, g/ L**	**Titratable acidity, g/L tartaric acid**	**pH**	**Potential OR, mV**
Chardonnay (microvinification)	195	8,8	3,09	216,9

Determination of volatile substances was performed by gas chromatography method.

Results and discussions

Comparative analysis of aromatic content of Chardonnay dry white wine (harvest 2011) achieved by classical technology using different yeast strains allowed the establishment of significant differences. The results obtained are shown in Table 2.

Table 2. Content of volatile substances in fermented dry white wine different strains of yeast (mg / L).

Substance	***Yeast strain***							
	Cricova Ch(2)	***Cricova Ch(3)***	***Cricova Ch(4)***	***1S***	***1VT***	***3VT***	***Nr.2 9***	***LittoLevure (France)***
Acetic aldehyde	4,8	3,4	2,5	2,7	3,4	18,9	2,1	15,6
ethyl acetate	24,9	23,4	20,4	22,6	19,8	23,7	25,8	16,7
isoamyl acetate	0,53	0,42	0,38	0,40	0,55	0,45	0,47	0,38
methyl alcohol, g/L	0,02	0,02	0,02	0,02	0,01 5	0,02	0,01	0,02
Higher alcohols								
2-butanol	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5
n-propanol	15,1	9,9	10,0	12,9	10,1	7,4	6,0	10,1
Isobutanol	20,3	20,9	32,4	31,3	23,0	30,4	30,9	23,8
n-butanol	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5	<0,5
Isopentanol	141,1	171,9	155,6	171, 1	148, 0	169, 2	167,0	187,0
sum of higher alcohols	177,5	203,7	199,0	216, 3	182, 1	208, 0	204,9	186,6

The results presented in Table 2 demonstrate that the content of volatile substances in dry white wines Chardonnay (harvest 2011) varies depending on the strain of yeast used.

Acetic aldehyde concentration limit values vary from 2.1 up to 18.9 mg / L. Obviously yeast strain has a significant influence on the content of acetic aldehyde, which

can be explained by the specific characteristics of each yeast strain to eliminate relatively large or small quantities of this substance.

For example: the use of yeast strain No.29 acetic aldehyde concentration is 2.1 mg / L (minimum), and the use of yeast strain 3VT acetic aldehyde concentration is 18.9 mg / L (maximum).

A less significant influence yeasts have studied the content of n-butanol and 2-butanol,where the determined values were below 0.5 mg / L.

Isobutanol concentration in dry white wines vary depending on the strain type of yeast used and the variation range of values is quite wide and is up from 20.3 to 32.4 mg / L. Maximal concentrations of isobutanol have been established in yeast strain used CricovaChardonnay (4).

Changes in concentrations of n-propanol in wine raw material is within the range 6.0 to 15.1 mg / L. Isopentanol concentration in dry white wines studied is about 60% of the sum of the higher alcohols, and the difference value is 45.9 mg / L. The highest concentration of isopentanol was found in wine achieved with dry active yeast strain (LittoLevure).

Isoamyl acetate content, that gives a hint of banana, varies slightly between 0.38 to 0.55 mg / L.

Another important component that forms the must fermentation is ethyl acetate, which directly influence the organoleptic properties of wine obtained.

It is known that ethyl acetate is part of the group mean fatty acid esters, and most of the ester group enanthic assign a strong sense of fruit wine.

Therefore, ethyl acetate directly participates in the formation of wine aroma obtained. In addition, ethyl acetate affect the taste of wine. At concentrations higher than the olfactory perception, he gives a stringent flavor. All wines contain healthy ethyl acetate, formed during fermentation, up to 160 mg / L.

In our case, values of ethyl acetate are in the range of 16.7 to 25.8 mg / L, respectively lowest concentration was found in wine obtained by using active dry of yeasts(LittoLevure) and highest in wine obtained by using yeast strain No. 29, but this difference is insignificant in this period.

The analysis of complex volatile dry white wines studied, we can conclude that in all wines the methyl alcohol content is about 0.02 mg/dm^3, which proves that nature of yeast does not affect methyl alcohol concentration.

Conclusions

1. Higher alcohols, esters, aldehydes, volatile acids and other substances formed during fermentation of must in the manufacture of dry white wine contribute to the formation of complex flavors.

2. Specified yeast strains are able to positively or negatively influence the aromatic content of wines.

3. Our results show that knowledge of the biochemical properties of yeast strain used for producing dry white wines can have a decisive role.

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