

## THE CONCENTRATION OF THE CHEMICAL COMPOUNDS AND THE COLOR OF BERRY TO THE VARIETIES OF THE INTERSPECIFIC HYBRIDS TO THE VINES (*VITIS VINIFERA* L. X *MUSCADINIA ROTUNDIFOLIA* MICHX.).

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### Abstract

*The color of the berry vine is a very stable morphological character and some varieties can only be determined based on this indicator. The diversity of berry vine color is due to the biochemical characteristics of the juice berry. The concentration of resveratrol from the juice of the berry of interspecific hybrids of vineyards (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) is consistent with the color of the berry. So yellowish-green berry contain the 6.68 mg/l, berry rosy color - 9.3 mg/l and blue-violet berry - 14 mg/l of resveratrol. As a result of studies carried out it was found that hybrids from third (BC2) generation is characteristic of a higher concentration of diglucozid-3,5-malvidol and methyl anthranilate than hybrids from fourth generation (BC3). So it once the removal from the parental forms, the concentration of these chemical compounds in the juice of berry the interspecific hybrids of the vineyards (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) is decreasing.*

**Key words:** berry, chemical compounds, color, interspecific hybrid, polyphenols, resveratrol, vines.

### INTRODUCTION

The color of the berry vine represents a very stable morphological character. This index has the practical significance not only for winemaking but is also used for determining the character and classification of the species and varieties of vines, some of which are only distinguished by the color of berry [4, 7].

The varieties of the grapevine cultured the color of berry is very varied and rich in nuances. The diversity of the nuances of vines berry is due to the biochemical characteristics of the juice of the berry.

The berry because of the chemical composition represents a food product very valuable sanogenous. They contain many nutrients necessary for human body, such as sugars (glucose, fructose) - 12-25%, organic acids (tartaric, citric, malic) - 1-2% mineral salts (Ca, Fe, K, P, etc.) - about 1%, nitrogenous compounds - 0.15-0.2%, vitamins (C, B1, B2, PP, A, E), enzymes, polyphenols (anthocyanins, resveratrol, flavonoids), etc. Although the "vine" has been carefully

studied and multilateral however some aspects of the interdependence between of the various factors specific to this plant, are to be investigated and analyzed further [4, 6, 14].

### MATERIALS AND METHODS

As object of the study have served interspecific hybrids of vines *Vitis vinifera* L. x *Muscadinia rotundifolia* Michx. BC2; BC3. [1; 2].

The biochemical and uvological analyzes were used of the methods disclosed in the Reports of Methodes des analyzes des vins de l'Office International de Vigne et du Vin (Paris 2014), the Technical Regulations "Analytical methods in the manufacture of wines".

The determination of the quantitative and qualitative diglucozid-3,5-malvidol was performed according to qualitative and quantitative fluorimetric method. The determination of methyl anthranilate was carried out according to the gas phase chromatographic method. [8,9,14,15].

The total acidity was performed by titration acids from must with an alkaline solution with known titre in the presence of phenolphthalein indicator.

## RESULTS AND DISCUSSIONS

By analyzing the physical and chemical characteristics of the interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadina rotundifolia* Michx.) it was found that the concentrations of chemicals substances: phenolic substances, resveratrol, pectins, anthranilate de methyl, diglucozid-3,5-malvidol etc. varies depending on the color of of the berry.

The concentration of phenolic substances in the berry of interspecific hybrids of vines varies depending on their respective colors: the interspecific hybrids with berry green-yellowish contain phenolic substances within the limit of 268 mg/l, the interspecific hybrids with berry colored pink containing 597 mg/l and the interspecific hybrids with blue-violet berry contain 1970 mg/l.

The concentration of resveratrol, also the varies from 6.68 mg/l in berry of green-yellow, 9.3 mg/l in berry of pink color and 14 mg/l in berry of blue-violet (fig. 1.).

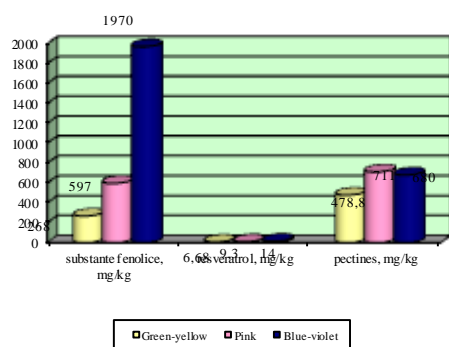


Fig. 1. The physico-chemical peculiarities depending on the color of berry of the interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadina rotundifolia* Michx.)

The total concentration of resveratrol from berry is in accordance with the color of the berry, so, according to a conventional system out of 10 units, blue-violet berry have the 10 units of resveratrol, berry pink color have the 2-3 units and the berry green-yellowish color have the 0.5-1 units. [11,12 16]

The pectin's concentration in berry varies from 478.8 mg/l in the color green-yellowish berry, 711 mg/l in the color pink berry and 680 mg/l in the blue-violet berry (Fig. 1).

According to the European Union requirements, the production of wine products, the chemical composition of the starting material must correspond to the strict requirements, for example diglucozid-3,5-malvidol should not exceed the limit of 15 mg/l. Recently the World Organization of Vine and Wine discussed the issue of reducing the index wines at the limit of 5 mg/l, fact which imposes the severe monitoring of the selection of interspecific hybridization to homologate only varieties with low diglucozid-3,5-malvidol.

Another important component of the juice of berry of the hybrids of any order, including the interspecific it is methyl anthranilate (3,4-benzoxazole), to whom the has the main role in establishing the taste and odor (aromas) of foxat (the naphthalene and/or phenol) [11].

As a result of the study on the presence of methyl anthranilate in the berry juice of the interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadina rotundifolia* Michx.), it was found that in green-yellow berry of this chemical varies from 0.08 mg/l (DRX-M4-502) to 0.17 mg/l (DRX-M4-571) (Fig. 2), and the red-violet berry of methyl anthranilate the concentration of the varies within the limits 0.20 mg/l (DRX-M4-665) to 0.24 mg/l (DRX-M3-3-1) (Fig. 3).

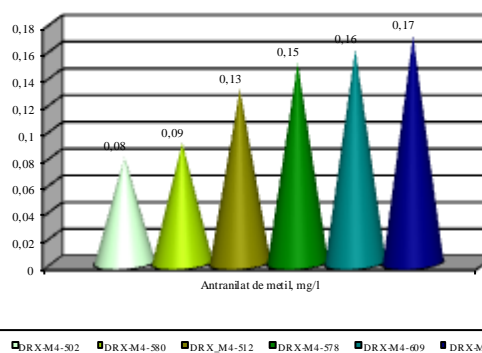


Fig. 2. The concentration of methyl anthranilate in the green-yellow berry of the interspecific hybrids (*Vitis vinifera* L. x *Muscadina rotundifolia* Michx.)

Methyl anthranilate represents a nitrogen compound from the group of benzoxazoles is

formed in the grapes (especially the hybrids direct producers) in amounts of from 0.2 to 3.5 mg/l of must (the juice). This is found in the wine along with the same concentrations of volatile aromatic another chemical component - isoamyl acetate [11], important chemical compound that contains in the juice of the berry interspecific hybrids new selection, to be determined, studied and taken as a criterion preselection.

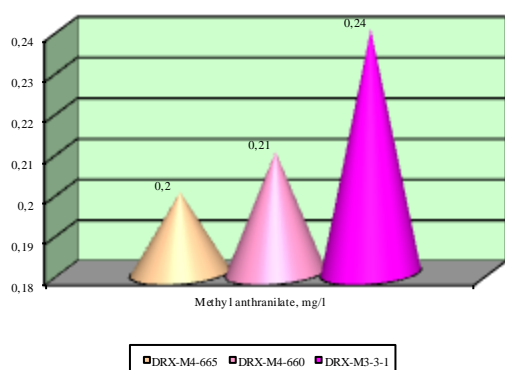


Fig. 3. The concentration of methyl anthranilate red-violet berries of the interspecific hybrids (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.)

By determining the concentration of methyl anthranilate of the berry of interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) it was found that third-generation hybrids (BC2) of methyl anthranilate limit hold approximately 0.24 mg/l (DRX-M3-3-1 etc.) and hybrids of generation the fourth (BC3) hold approximately 0.21 mg/l (DRX-M4-660 etc.) (fig. 4).

Diglucozid-3.5-malvidol also varies depending on the degree of distancing from of initial the species. In the result of studying interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) it was found that third-generation hybrids (BC2) containing diglucozid-3.5-malvidol in the limit of 9.3 mg/l (DRX -M3-3-1 etc.), and the fourth generation hybrids (BC3) contains 7.7 mg/l diglucozid-3.5-malvidol (DRX-M4-660, etc.) (fig. 5).

Analyzing the interspecific hybrids the titratable acidity in the berry of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) In comparison with to their respective colors,

we find out that the green-yellow berry the titratable acidity is in the limit of 6.26 mg/l, the color pink berry is 7.2 mg/l and blue-violet berry of 8.1 mg/l. (Fig. 6).

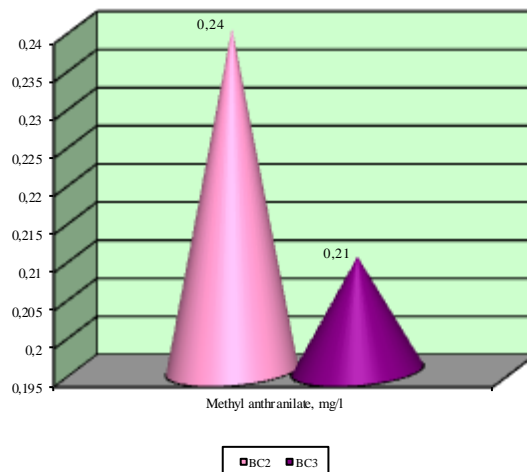


Fig. 4. The concentration of methyl anthranilate interspecific hybrids berries of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.)

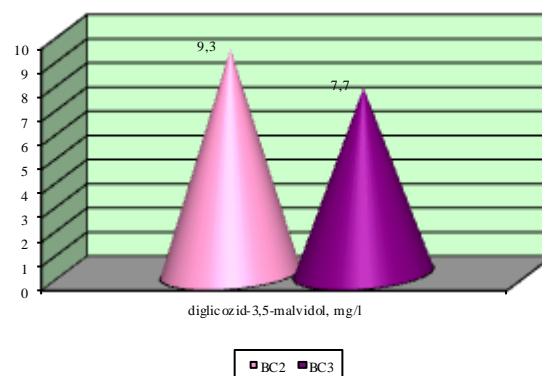


Fig. 5. The concentration of diglucozid-3.5-malvidol in berry of the interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.)

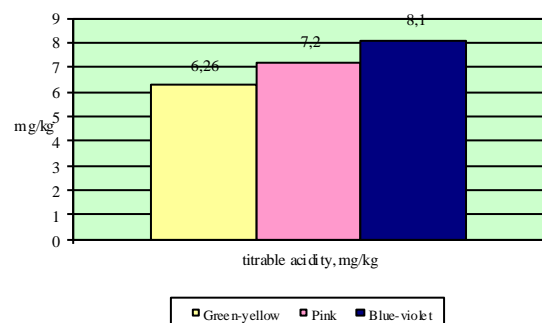


Fig. 6. The titratable acidity of the juice berry of interspecific hybrids of vines berry in relation to color.

## CONCLUSIONS

Depending on the degree of distancing from initial the species, the concentration of diglucozid-3,5-malvidol and methyl anthranilate from the juice of berry of the interspecific hybrids of grapevine (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) decreases. It was found that the hybrids from third generation (BC2) contain higher concentrations of diglucozid-3.5-malvidol and methyl anthranilate than hybrids in fourth generation (BC3). So it once the removal from the parental forms, the concentration of diglucozid-3.5-malvidol and methyl anthranilate from the juice of the berry of interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) is decreasing.

The total concentration of the resveratrol from the juice of the berry of interspecific hybrids of vines (*Vitis vinifera* L. x *Muscadinia rotundifolia* Michx.) is consistent with the color of berries. Thus, if conventional blue-violet berry possess 10 units of resveratrol, then color pink berry have the 2-3 units, and the green-yellowish 0.5-1 units.

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