

Technologies For Processing Grape Antioxidative Protection With Antioxidant Activity Of Wines.

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Annotation: In the technological chain of wine preparation, oxidative processes begin immediately after the grape harvest, which, in accordance with the recommendations must be protected with sulfur dioxide (SO₂).

Studying the state of the antioxidant protection system during grape processing and when obtaining wine materials is of particular interest and will make it possible to regulate the degree of protection of the must and wine materials from oxidative stress, which is especially important when processing grapes into slightly oxidized table wines. Using the redox potential value, you can characterize the degree of oxidation of wine and control the production of various types of wines

Key words. Enzymes, antioxidant protection, catalase, superoxide dismutase, peroxidase, oxidation, dismutation, sulfitation, oxygen.

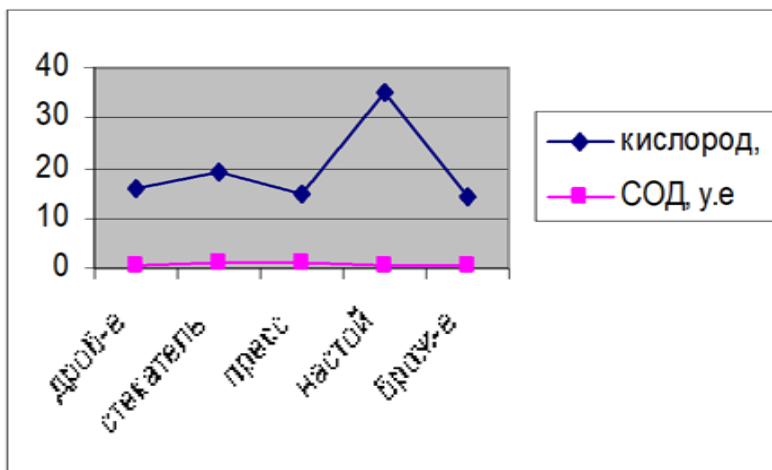
Introduction. It is known that white and red wines differ in both qualitative and quantitative composition. Considering that antioxidants are all easily oxidized components of wine and the possible presence of radicals, reactive oxygen species, predetermines their interaction, it seems relevant to study antioxidant protection enzymes and compare their behavior when carrying out technological methods for processing differently colored wines.

Studying the technology of processing red grape varieties. presence of antioxidant protection. The main directions of development of the national economy of Uzbekistan include expanding the range and improving the quality of food products, including wine. The magnitude of the rare potential of wine, which is influenced by many factors, is determined by the ratio of oxygen concentrations [1] and reducing agents. But, at the same time, various effects on wine (for example, the introduction of SO₂) will cause a simultaneous change in both the concentration of O₂ and the concentration of reducing agents, and it is not always possible to establish a connection between the value of the redox potential and the quality of the wine. Oxygen in wine is weakly active and must be activated to initiate oxidation. In wine, iron ions serve this purpose. Hydrogen peroxide is a relatively weak oxidizing agent in relation to the components of wine, but in the presence of iron it is reduced to a hydroxyl radical, a very strong oxidizing agent. The hydroxyl radical is capable of oxidizing any organic substrate, and its high reactivity explains the possibility of oxidizing even alcohol in the presence of antioxidants such as SO₂ or phenolic compounds. [2]

Research methods. A mixture of both white and red wine grape varieties, sulfated to 150 mg/dm³, was analyzed. Starting from the moment of acceptance of the grapes, right up to the receipt of wine material, before and after each technological operation, the concentration of oxygen and the activity of the enzymes superoxide dismutase (SOD), peroxidase and catalase, which are part of the antioxidant defense system (AOD), were determined.

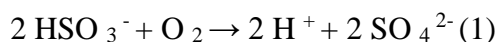
SOD activities were determined by a method based on its ability to inhibit the reduction reaction of nitrotetrazolium blue; activity .

Analysis and discussion of research results .



Most easily tied oxygen ionic forms and mainly SO_2^- Sulfuric acid suppresses the actions of oxidative enzymes and prevents the oxidation of polyphenols and other substances. SO_2 reacts directly with oxygen and protects polyphenols and other components from oxidation and the main function of SO_2 is to remove hydrogen peroxide formed during the oxidation of polyphenols.

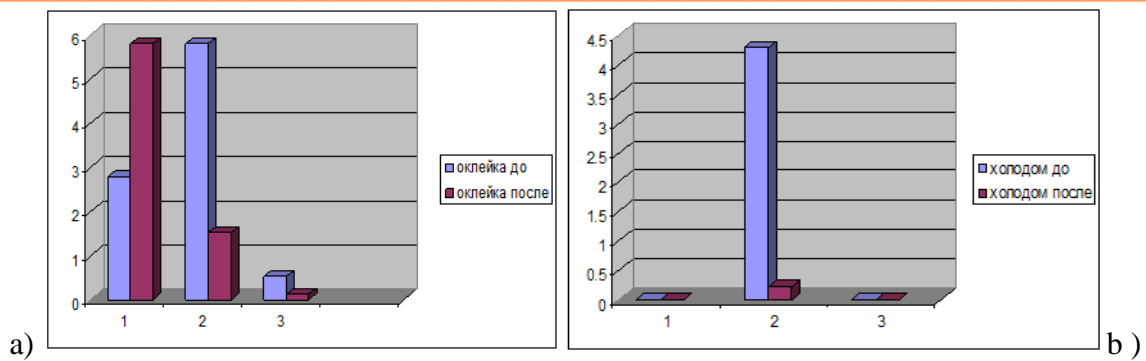
In samples where oxygen saturation is noted, the reaction of the active form of sulfurous acid with oxygen can be represented by reaction 2, where 2 moles of bisulfite react directly with one molecular oxygen, forming two moles of sulfate:



In the future development of the industry, it is planned to increase the production of aged vintage dry and high-quality fortified wines that meet modern requirements [3] [4] environmentally friendly. These circumstances require both improvement of existing technologies and individual stages. If we assume that SOD activity is the first sign of the presence of reactive oxygen species, then technological methods such as pressing and sedimentation should be considered the most dangerous or vulnerable when processing white wines. In general, when processing white grapes, the following technological methods can be sources of “oxygen stress”:

For the study, we chose technological treatments of secondary winemaking (finishing with bentonite, temperature treatment). [5] Samples were sampled before and after treatment for analysis. The concentration of molecular oxygen and enzymes of the antioxidant defense system (AOD) of white and red dry wines were determined and compared. The main representatives of which are the enzymes catalase, superoxide dismutase and peroxidase .

Superoxide dismutase (SOD) activity was determined by a method based on its ability to inhibit the reduction reaction of nitrotetrazolium blue; and the activity of catalase in wines was determined by the reaction with ammonium molybdate and the activity of peroxidase was determined by a method based on the oxidation of pyrogallol in the presence of hydrogen peroxide to purpurogalline . Oxygen concentration was determined using the polarographic method. [6]. Table 1 shows the physicochemical parameters of the wines under study.



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