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THE QUALITY OF APPLES AND WINE MATERIALS DEPENDS ON THE TECHNOLOGY OF CULTIVATION

ЯКІСТЬ ЯБЛУК І ВИНОМАТЕРІАЛІВ ЗАЛЕЖНО ВІД ТЕХНОЛОГІЇ ВИРОЩУВАННЯ

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The results of researches of influence of technology of cultivation of perspective grades on quality of fruits are resulted. The influence of wine yeast on the quality of natural varietal apple wine materials is revealed. The highest quality fruits and the most effective species of yeast have been selected.

Keywords: *cultivation technology, variety, wine material, yeast, quality.*

Introduction.

The assortment of orchards is updated with domestic and introduced varieties. Idared, Gala, Golden Delicious, Ligol, Florina, Fuji and other varieties and clones occupy a prominent place in the European market. It is important to explore the economic and biological characteristics of apple varieties of world selection in order to identify suitable for the production of quality and biologically valuable fresh, processed and especially organic products in Ukraine [4, 7, 9]

Improving the efficiency of production of environmentally friendly and organic products is now becoming especially important. The Law of Ukraine "On Production

and Circulation of Organic Agricultural Products and Raw Materials" defines the production of organic products as production activities of individuals or legal entities (including cultivation and processing), in the process of which the use of chemical fertilizers, pesticides, GMOs, preservatives is excluded etc., and at all stages of the product life cycle [1, 2, 3, 5].

In Ukraine, the development of organic agriculture as a separate industry began in the 1990s. Today, according to FiBL, Ukraine is one of the twenty major world leaders in the organic movement, such as the United States, Britain, Germany, France, Sweden, Switzerland and the Netherlands. The area of agricultural land certified according to organic standards in Ukraine has increased 1.5-2 times over the last 5 years and amounts to almost 0.5 million hectares. Ukraine ranks first in the Eastern European region in terms of certified area of organic agricultural land. Consumption of such products in Ukraine has increased more than 55 times over the past 10 years. The domestic market reached sales of $ 25 million and the foreign market - 204 million [7-12].

In many countries of the world (England, France, Spain, Germany, the USA, Australia, etc.) cider - a natural low-alcohol hygienic drink - has been traditionally produced from apples for a long time. Its world production is over 90 million dal per year. Domestic fruit and berry winemaking, in contrast to the experience of leading countries, is currently focused on the production of low-quality commercial wines. Table wines and ciders, which in Ukraine produce only 3-5% of the volume of fruit and berry wines, but are currently gaining popularity [8-12].

The aim of our research was to compare the quality of fresh fruits and cider obtained by industrial and organic technology.

Research materials and methods.

The experiments were holded at the Professor B.V. Lesik Department of Storage, Processing and Standardization of Plant Products of NULES of Ukraine and at the Institute of Horticulture NAAS of Ukraine. Wine materials were prepared according to the generally accepted technology with the addition of nitrogen nutrition and pure yeast cultures in an amount of 3-5% and fermented (at a temperature of 12-15 °C) by different species. After fermentation and the remaining sugar up to 0.2-0.6%, the containers were filled, tightly closed and stored at a temperature of 5-10 °C. Wine materials were prepared from apples growed for industrial and organic technologies. Before tasting, the wine materials were saturated and closed in bottles, kept and evaluated for quality. Raw materials for the experiments were selected during the period of removable ripeness and have 2nd commercial varieties. The chemical composition and quality of wine materials were determined according to generally accepted methods in winemaking. Toxicological analysis (the content of residual amounts of pesticides, heavy metals was not performed [6].

Research results and their interpretation.

Research results and their interpretation. One of the important indicators of apple fruit is tasting evaluation. We made an appropriate assessment on the basis of such features as appearance, color, taste, consistency and gave an overall assessment on a nine-point scale (table 1).

The fruits of apples grown by organic technology in appearance varieties

received a fairly high score from 7,2 to 7,5 points. The highest score on this basis was given to Ligol and Golden Resistant 7,5 points and the lowest to Florina and control grade Idared, 7,1 and 7,2 points, respectively. Ligol fruits had the best taste characteristics when grown using two technologies. On the basis of color in our experiments, the varieties were rated at 7,1-7,9 and 6,9-8,0 points, respectively, technology.

The fruits of the studied varieties differed in taste. The fruits of Ligol and Golden Resistant varieties received the highest organoleptic score – 7,5 points according to organic technology, and only Ligol according to industrial technology. The lowest taste rating was given to the control variety Idared for both cultivation technologies. The taste is dominated by sharp acidity, which disappears after storage.

1. Tasting evaluation of fruits of apple varieties of winter maturity in the conditions of SL "Fruit and vegetable garden", 2021

Varieties	Tasting evaluation of fruits, score				
	appearance	colour	taste	consistence	overall assessment
Organic technology					
Idared (control)	7,0	7,4	7,0	7,4	7,2
Florina	7,0	7,1	7,3	7,0	7,1
Golden Resistant	7,3	7,9	7,4	7,4	7,5
Ligol	7,5	7,5	7,5	7,5	7,5
Industrial technology					
Idared (control)	7,8	7,8	6,6	7,8	7,5
Florina	7,1	8,0	7,1	7,0	7,3
Golden Resistant	7,8	6,9	7,5	7,4	7,4
Ligol	8,0	7,7	7,8	8,0	7,9

The consistency of the varieties receive 7,0-7,5 and 7,0-8,0 points according to the technology. This is the best indicator of small fruits of Idared, Ligol and Golden Resistant varieties. Thus, the overall tasting score of apple fruit was in the range of 7,1-7,9 points. Fruits of Ligol and Golden Resistant varieties have slightly better indicators.

According to the industrial technology of cultivation in appearance, the fruits of apples of our varieties have a fairly high score of 7,2-7,9 points. The highest score on this basis was obtained by Ligol fruits 7,9 points and the lowest Florina 7,3 points. On the basis of color in our experiments, the varieties received a score of 6.9-8.0 points. The highest rates were in the fruits of varieties Florina, Idared and Ligol.

Apple varieties also differed in taste. The highest score on this basis was given to the varieties Golden Resistant, Ligol 7,5-7,8 points. The lowest taste rating was given to the control variety Idared 6.6 points due to unbalanced taste. The consistency of the varieties received 7,0-8,0 points and the highest score was in Ligol and control varieties Idared. Thus, the overall tasting evaluation of apple fruits was in the range of 7,3-7,9 points. The highest score was given to the variety Ligol. Analysis of

variance of the influence of varietal characteristics of apple fruits and applied cultivation technologies on the organoleptic characteristics of the fruits of the studied varieties did not reveal a significant impact of technologies on the organoleptic characteristics.

2. Tasting evaluation of apple varietal wine materials fermented by yeast colonies

Varieties	Species of yeast									Average by varieties
	Wild forms	Cydrova 101	Yabluchna 7	Vyshneva 6	Vyshneva 18	Smorodynova 22	Malynova 28	Mix №1	Mix №2	
Organic technology										
Idared	7,12	7,83	7,87	7,65	7,51	7,45	7,44	7,51	7,52	7,54
Golden Resistant	7,15	7,85	7,75	7,69	7,58	7,49	7,49	7,57	7,57	7,57
Ligol	6,72	7,71	7,81	7,73	7,55	7,42	7,40	7,55	7,47	7,48
Florina	6,80	7,69	7,82	7,53	7,42	7,25	7,34	7,61	7,42	7,43
Industrial technology										
Idared	7,15	7,75	7,79	7,72	7,66	7,59	7,61	7,71	7,62	7,62
Golden Resistant	7,10	7,88	7,71	7,81	7,66	7,71	7,69	7,73	7,67	7,66
Ligol	6,79	7,73	7,79	7,79	7,69	7,82	7,77	7,68	7,69	7,64
Florina	6,88	7,67	7,77	7,66	7,76	7,78	7,69	7,75	7,68	7,63

Currently, there are no recommendations for the use of pure yeast cultures for fermentation of wort of regionalized and promising apple varieties in the Northern Forest-Steppe, which is one of the reasons for obtaining low quality wine materials. Data on the dependence of the quality of apple table wine on the variety of apples are given in table. 1. The average value of the tasting evaluation of wine materials obtained from fruits by organic technology is 7,51 points, and industrial – 7,64 points.

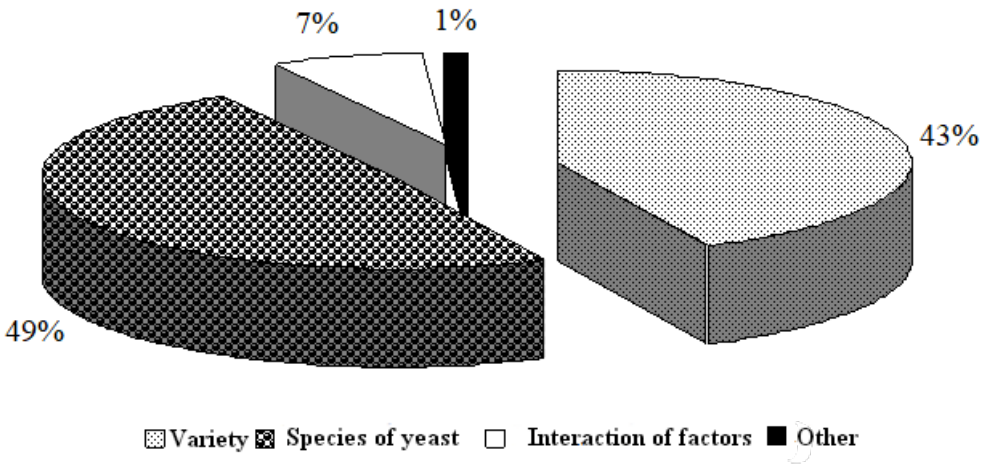

Figure. Influence of yeast variety and race on the formation of organoleptic characteristics of wine materials

Analyzing the data in the table, we can say that higher organoleptic characteristics were characterized by wine materials from the varieties Golden Resistant and Idared (more than 7,5 points). Analyzing the data on the species of yeast slightly better results showed races Yabluchna 7 and Sidrova 101. All wines fermented by pure races were of good quality on average. Wines made from natural microflora were rated much lower due to less harmonious aroma and taste.

Analysis of variance of the influence of varietal characteristics of apple fruits and used pure cultures of wine yeast on organoleptic characteristics of apple varietal table wine materials showed that the race of applied yeast and varietal characteristics have an almost equal effect (figure).

Conclusion and suggestions.

When studying the consumer characteristics of the studied apple varieties in the Kyiv region, it was found that the best organoleptic indicators of apple fruits grown by organic technology are Ligol and Golden Resistant, and industrial - Idared and Ligol. No significant effect on organoleptic parameters depending on the cultivation technology has been established. Studies on the suitability of apple wine production have shown that all varieties are suitable for the production of quality wine materials. Higher quality wine materials were obtained by fermentation of the species of yeast Yabluchna 7 and Sydrova 101. Analysis of variance found that the formation of quality is slightly more influenced by the species of yeast. In further research, we will focus on identifying the impact of various technological factors on the formation of aromatic components of wine materials, biological value and product safety.

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Анотація. *Наведено результати досліджень впливу технології вирощування перспективних сортів на якість плодів. Виявлено вплив винних дріжджів на якість натуральних сортових виноматеріалів. Виділено найбільш якісні плоди і виноматеріали з досліджуваних сортів і рас дріжджів.*

Ключові слова: *технологія вирощування, сорт, виноматеріал, дріжджі, якість.*