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Quality Assurance And Export Potential Of Uzbek Grapes

Muminov Najmiddin Shamsiddinovich

Doctor Of Technical Sciences, Head Of The Department Of Standardization And Certification Of Agricultural Products, Tashkent State Agrarian University, Tashkent, Uzbekistan

Kendjaev Anvar Akromovich

Master Of The Tashkent State Agrarian University, Tashkent, Uzbekistan

ABSTRACT

The article describes the chemical composition and nutritional value of grapes, assortment and its classification, technology for the production and storage of grapes, tasting assessment and the standard requirement for the quality of table grape varieties. Also, the state of development of the viticulture and winemaking industry of the Republic of Uzbekistan is analyzed, the assortment and classification of products are analyzed. The requirement of the international standard for the quality of table grapes (UNECE FFV-19) is given. As a result of the analysis and research, recommendations were developed to ensure the quality and safety of grapes and wine products and to increase their export potential.

KEYWORDS

Viticulture, grapes, winemaking, variety, yield, nutritional value, chemical composition, storage of grapes, medicinal properties, product quality and safety, export, customs control, phytosanitary norms, the international standard, technical regulations.

INTRODUCTION

The analysis of best practices in the field of production, storage, processing and quality assessment, as well as the sale of safe fruit and vegetable products to the population, is an

urgent task of ensuring food security. To solve the problem of ensuring food security, it is of crucial importance to preserve the quality of food and the biological value of food raw

materials and food products as much as possible with minimal losses. It is necessary to provide for the implementation of their assessment of quality indicators and safety, according to the requirements of international standards, using modern testing methods and means of measuring and testing devices.

The purpose of this scientific article is to characterize the assessment of the quality and export potential of grapes grown in the republic, according to the consumer properties and requirements of existing international standards, and to develop recommendations for all participants in the process, representatives of Dehkan farms, agro-clusters

and representatives of production-related to the cultivation, storage, processing and sale of a valuable product - grapes.

MATERIALS AND METHODS

2.1. Nutritional value of grapes. Each grape variety has its distinctive taste, colour, size, peel thickness, hardness, acidity, the presence of seeds (Fig.1.). Most of the listed characteristics of grapes depending on the climate, the composition of the soil, the temperature regime of the area where the grapes grow.



Figure 1. Grapes.

Grapes are one of the most popular fruits all over the world, a valuable food product that contains: - calorie content-72 (kall); - proteins-0.6 (g); - fats-0.6 (g); - carbohydrates-15.4 (g); - dietary fiber - 1.6 (g); - organic acids-0.8 (g); - water-80.5 (g); - unsaturated fatty acids-0.2 (g); - mono - and disaccharides-15.4 (g); - ash-0.5 (g); - saturated fatty acids - 0.2 (g)

Like most other fruits, grapes are a rich source of natural vitamins. Grapes are a great source of vitamin C-6 mg. In addition, it also has a significant amount of vitamin A - 5 mcg.

Grapes contain many useful minerals. Potassium-225 mg and calcium-30 mg, are the

main minerals and nutrients that makeup grapes. In addition, it contains a small amount of other useful macro and microelements.

Now there are more than 8000 grape varieties in the world. Classification of grapes:

- By purpose;
- According to the terms of maturation;
- By the quality of the crop;
- By the amount of harvest.

The grapes fully ripen when the sugar content ceases to increase, and the acidity decreases for three days. After the berry stops growing, complex chemical changes begin in it. The accumulation of sugars in berries increases

with an intensity of 0.2-1.0 g/100 ml per day, depending on the variety and weather conditions.

Grapes are distinguished between removable (technical) and full (physiological) maturity of the crop. It is believed that the most favourable, harmonious in taste is the ratio of sugars and acids in berries (2.5-3):1. The full or physiological maturity of berries is characterized by the establishment of the stability of the sugar content, as well as the hardening and browning of the seed peel.

Grapes are consumed selectively as they mature. You can extend the period of consumption by timely cleaning and laying for storage. Unlike winter varieties of apples, grapes are poorly stored.

Early varieties are unsuitable for long-term storage. It is poorly stored in both overripe and unripe grapes that do not ripen in the maturation. Berries with a tan are stored for less than a long time. Not all table grape varieties are well stored, late and mid-late varieties are stored for three or more months.

Grapes are harvested in dry weather: getting raindrops or heavy dew on the berries has a negative effect on the storage of even the hardiest varieties. The removed grapes can not be left open under the scorching sun - this reduces their shelf life.

Uzbekistan is one of the producers of grapes in the world, and in the CIS area, it occupies a good position in terms of the volume of grapes grown. According to the FAO, Uzbekistan ranks 18th in the world in terms of vineyard areas, and in 2017 it ranked 17th in the world in

terms of gross volumes of harvested grapes and 5th in the world in terms of dried grapes.

In 2018, the total area of vineyards amounted to 150.7 thousand hectares, an increase of 17% over 5 years.

The volumes of grapes produced in Uzbekistan make it possible not only to cover the needs of the population but also to carry out export deliveries in significant volumes. The export potential of grapes consists mainly of yield, quality of the grown crop, and the price of grapes in foreign markets. The current situation is characterized by several problems, the solution of which will increase the export potential of viticulture and winemaking.

The main regions of viticulture in Uzbekistan are Samarkand (40.4 thousand hectares), Tashkent (19.2 thousand hectares), Surkhandarya (16.2 thousand hectares), Kashkadarya (15.1 thousand hectares), Namangan and Bukhara (13.9 and 13.3 thousand hectares) regions.

In 2018, 1,564.5 thousand tons of grapes were harvested in Uzbekistan. Of these, 13.2% (206.8 thousand tons) were exported, 9.4% (146.5 thousand tons) were processed by the wine industry, and the remaining volumes were domestic consumption and processing of the food industry. The yield of grapes in 2018 was 10.4 t/ha.

According to the State Statistics Committee of the Republic of Uzbekistan, 45,497 tons of grapes were grown in the republic in January-June 2021.

Grape production increased by 5.1% compared to the same period last year.

High volumes of grape cultivation were recorded in dehqan (personal) subsidiary farms - 24 thousand tons or 52.7% of the total production.

2.2. Regions with the largest share in the total volume of grape cultivation:

Surkhondarya region - 30.1%;

Kashkadaryo region - 13.9 percent;

Namangan region - 11.8 percent;

Bukhara region - 11.4%.

Currently, the export of grapes in the physical volume of exports of fruit and vegetable products of Uzbekistan occupies 16%.

The Strategy of Actions for the development of the Republic of Uzbekistan for the period 2017-2021 is working to expand the area for vineyards, increase yields and reduce resource costs through the introduction of modern agro technologies.

In addition, it is planned to increase the total area of vineyards of wine varieties suitable for industrial processing to 29 thousand hectares by creating new vineyards on an area of 23.4 thousand hectares, the harvest from this area will fully load the current production capacities of the wine industry.

The country has accumulated sufficient experience in the production of high-quality wine products, which has been repeatedly noted at international exhibitions and fairs.

The production capacities of the enterprises in 2017 allowed processing 200 thousand tons of grapes per year and producing 3.7 million dal of

grape wine, 19.9 million dal of alcoholic beverages, 118.5 thousand dal of cognac, 187.5 thousand dal of champagne, 9.3 million dal of food alcohol.

Thus, the processing of grapes in 2017 amounted to only 45% of the production capacity (or 90.4 thousand tons). In 2018, processing increased to 146 thousand tons. At the same time, the capacity for the production of grape wine was used by 66%, alcoholic beverages by 80.7%, food alcohol by 76.7%, champagne wines by 20.4%.

62 enterprises are operating in the system of the wine industry, including 16 enterprises of primary winemaking, 42 for the production of alcoholic beverages, 4 for the production of ethyl alcohol.

These include 17 joint ventures with partners from Russia, the United States, Bulgaria, Israel, Latvia, Germany, the United Kingdom, and Kazakhstan. There are also 82 specialized wholesale bases, which include 507 branded stores.

The enterprises of the wine industry produce more than 160 types of grape wines, 781 types of vodkas and alcoholic beverages, 25 types of brandy and 13 types of sparkling and carbonated wines.

The analysis of the wine industry indicates the presence of the following problems of an organizational and industrial nature.

Due to the unsatisfactory supply of raw materials, production capacities are currently loaded at a relatively low level. Because of this, the production of wine in comparison with

alcoholic beverages has decreased by 2.5-3 times.

In this regard, the current workload of existing production facilities does not allow us to meet domestic demand and increase the supply of products for export;

Over the past two decades, only 25% of enterprises that harvest wine materials have been modernized, and the rest use morally and physically outdated equipment. To bring domestic winemaking to a qualitatively new level, it is not enough to increase the area for technical grape varieties and the volume of wine production. Winemaking is an industry where the quality of products for the consumer is of paramount importance. In this connection, it is necessary to ensure effective control over the quality of products.

Along with the above, it is also advisable to implement the following measures for the accelerated development of winemaking in Uzbekistan.

In the leading wine-producing countries, there are legally approved systems of classification and labelling of wines. Their essence is reduced in general to the classification of the quality of wine products, where the main indicators are a certain territory of growing grapes from which the wine is made, with its own unique natural and climatic features, the grape variety, the cultivation technology.

Therefore, to start the production of original, elite and branded Uzbek wines to identify high-quality varieties, to determine the specialization of the regions for the production of types of wines. (It is known that in the Bukhara region they produce high-quality

dessert wines, in Tashkent and Samarkand – dry and strong, etc.).

One of the conditions for the development of winemaking is the access of winegrowers and winemakers to the necessary production equipment.

The analysis of the current situation in the viticulture and winemaking of Uzbekistan in comparison with the leading countries-producers of grapes and grape products shows that Uzbekistan uses the export potential of the industry at an insufficiently high level.

The export potential of table grapes in Uzbekistan is objectively constrained by domestic demand, a limited number of large grape producers, as well as insufficient infrastructure and logistics.

To simultaneously meet domestic demand and increase export volumes, it is necessary to increase the acreage for vineyards, increase yields and qualitatively intensify the cultivation of grapes.

The main foreign markets for Uzbek grapes and their processed products are the countries near abroad. This fact makes it possible for importing countries to insist on their terms and prices.

The main reasons for the current situation are:

- High requirements for the quality of agricultural products in foreign markets;
- Tariff and non-tariff barriers applied in importing countries;
- High level of competition in foreign markets;
- High transport costs.

Grapes are taken in batches. Any quantity of grapes of the same ampelographic and commercial variety is considered a batch. To check the quality of grapes, the correctness of packaging and labelling for compliance with the requirements of the current standard, a sample is selected from different places of the batch.

The quality of grapes in damaged or wet boxes is checked separately and the results are distributed only to grapes in these boxes. The appearance, smell and taste, the presence of diseased and damaged berries determine the organoleptic.

The content of bunches with deviations in quality from the requirements of the standard and crumbled, cracked, rotted and crushed berries is calculated as a percentage, relative to the mass of grapes selected from the batch to check the quality of grapes.

To determine the mass concentration of sugars from the boxes of grapes selected in the sample according to GOCT 25896-83 after its analysis. Methods for determining the mass concentration of sugars in grapes - according to GOCT 27198-87.

The residual amounts of pesticides in grapes are determined by methods approved by the Ministry of Health of the Republic.

RESULTS AND DISCUSSION

3.1. Grape quality standards. When checking the quality of grapes, first of all, the conformity of the labelling and the actual content of the ampelographic variety in the packaging unit are checked.

Good quality: The bunches are whole, characteristic of this variety, the berries are fresh, mature, whole, well-formed and developed, well attached to the stalk, elastic, clean, healthy, without excessive moisture, without foreign smell and taste, not damaged by agricultural pests, the ridges are green. It is forbidden to take: non-whole bunches-having from five to fifteen compactly arranged berries; crumbled bunches (less than five berries); crushed, rotted, withered berries. **Unacceptable defects:** rotten, mouldy, frostbitten, fermented berries, with chemical residues, unbroken crumbled bunches, berries with mechanical damage.

Serious defects: Dried, withered combs, brushes of overripe berries, with signs of a burn from sulfur dioxide, bare bunches-are not allowed.

Minor defects: Minor differences in the colour of the berries, slight deviations in shape are allowed.

During the tasting assessment, a comparative qualitative assessment of bunches and berries is carried out without devices or reagents by testing and evaluating exclusively with external senses (vision, smell, taste), i.e. by an organoleptic method, usually on a 10-point scale.

- I. Appearance (beauty) of bunches and berries
- II. Taste and aroma of berries
- III. Properties of the skin and the consistency of the pulp

The tasting is the first test of new grape varieties. Its importance is especially great for

grape varieties used for the production of juices and wine.

3.2. The requirement of the quality standard for table grapes (UNECE FFV-19).

3.2.1. Product definition. The provisions of this standard apply to table grapes of varieties (cultivated varieties) obtained from *Vitis vinifera* L., delivered to consumers in fresh form and not intended for industrial processing.

3.2.2. Provisions concerning quality. This standard defines the requirements concerning the quality of table grapes at the stage of their export control after preparation and packaging.

a) Minimum requirements: Bunches and berries of grapes of all varieties, taking into account the special provisions provided for each variety and the permitted tolerances, must be:

- Benign; the product is subject to rotting or spoilage, which makes it unfit for use, is not allowed
- Clean and practically free of any visible foreign substances
- Practically free of insect pests
- Practically without damage caused by insect pests
- With normal surface humidity
- Without any foreign smell and/or taste.

In addition, the berries should be:

- Undamaged
- Well-formed
- Normally developed.

Pigmentation caused by sun exposure is not a defect. The bunches should be carefully collected. The bunches should be sufficiently developed and have a mature appearance. The degree of maturity and condition of table grapes should be such that it can:

- To withstand transportation, loading and unloading, and
- To be delivered to the destination in a satisfactory condition.

b) Maturity: The juice of grapes should have a refractometric index of at least:

- 12° on the Brix scale for Alphonse Lavallee, Cardinal and Victoria varieties,
- 13° on the Brix scale for other varieties with seeds,
- 14° on the Brix scale for all seedless varieties.

In addition, all varieties must have a satisfactory level of sugar-acid ratio.

c) Classification: Table grapes are divided into three varieties, defined below:

- I) Top grade: Table grapes of this class must be of the highest quality and have the shape, degree of development and colour characteristic of the variety to which it belongs, taking into account the characteristics of the area in which it is grown, and not have defects. The berries should be firm, well-grown, evenly spaced on the stem and almost completely covered with a coating.
- II) Class I: Table grapes of this class must be of good quality and have the shape, degree of development and colour characteristic of the variety to which it belongs, taking into account the

characteristics of the area in which it is grown.

The berries should be firm, well-grown and, if possible, covered with a coating (pruin) on most of their surface. However, they may be less evenly spaced on the ridge than the berries of the highest grade.

However, the following minor defects are allowed, provided that this does not affect the overall appearance, quality, safety and presentation of the product in the package:

- Minor shape defects
- Minor colour defects
- Very minor sunburn, affecting only the skin.

III) Second grade: This grade includes table grapes, which cannot be classified as higher grades, but meets the minimum requirements listed above.

Bunches of grapes may have minor defects in shape, development and colour, provided that this does not affect the main characteristics and properties characteristic of the variety to which they belong, taking into account the characteristics of the area in which they are grown.

The berries should be sufficiently hard and sufficiently grown, their surface should be covered with a coating if possible. They may be less evenly spaced on the stem than the berries of the first grade.

The following defects are allowed, provided that the grapes retain their main characteristics in terms of quality, safety and presentation:

- Shape Defects
- Colour Defects
- Minor Sunburn, Affecting Only The Skin
- Slight Bruising
- Minor Skin Defects.

A. Quality tolerances

I) Top grade: It is allowed to have 5% (by weight) of bunches that do not meet the requirements of this class, but meet the requirements of the first class or, in exceptional cases, meet the tolerances established for this class.

II) Class I: 10% (by weight) of bunches are allowed that do not meet the requirements of this class, but meet the requirements of Class II or, in exceptional cases, meet the tolerances established for this class.

III) Class II: 10% (by weight) of bunches that do not meet either the requirements of this class or the minimum requirements are allowed, while the presence of products damaged by rotting or having any other defects that make it unfit for consumption is not allowed.

B. Size tolerances:

I) Top grade and first grade

It is allowed to have 10% (by weight) of bunches that do not correspond to the sizes established for this variety but correspond to the sizes of the subsequent variety.

II) Second class

It is allowed to have 10% (by weight) of bunches that do not correspond to the sizes established

for this variety, but whose weight is not less than 75 grams.

III) For all varieties: in each package that is directly sold to consumers and whose net weight does not exceed 1 kg, one bunch weighing less than 75 g is allowed for weight equalization, provided that this bunch meets all other requirements for the corresponding variety.

C. Provisions concerning the presentation of products

1) **Uniformity:** The contents of each package must be uniform; each package must contain only bunches of grapes of the same origin, variety, quality and degree of maturity.

Clusters of the highest grade should be, if possible, the same size and colour.

The requirement that the bunches are of the same variety and origin does not apply to grapes in small packages with a net weight of not more than one kilogram,

The presence of clusters of different colours in each package for decorative purposes is allowed for the variety of Chasselas (Shasla).

The visible part of the product in the package must correspond to the contents of the entire package.

1) **Packaging:** Table grapes should be packed in such a way that the product is properly preserved.

Bunches of grapes of the highest grade should be laid in one layer.

The materials used inside the package must be new, clean and of such quality that they do not cause external or internal damage to the product. The use of materials, in particular paper or labels with trade specifications, is allowed, provided that non-toxic ink or glue is used to apply the text or paste the labels.

Labels that are separately pasted on products should be such that if they are removed, there are no visible traces of glue or damage on the skin.

The packages should not contain any foreign substances, although it is allowed to leave a part of the vine in the form of a special design on the branch of the bunch, but not more than 5 cm long.

IV) Provisions concerning marking: On each package, the data grouped on one side and visible from the outside should be applied in a clear and indelible font.

2) Origin of the product:

- The country of origin or, where appropriate, the countries of origin and, not necessarily, the area of production or the national, regional or local name.

The fruit must be packed according to all relevant rules, the manufacturer's marking must be present on the package, the packaging must protect the berry from environmental influences.

2) Marking of grapes

Each package with a berry must have a marking that helps to identify the cargo, information about the sender, recipient.

The labelling of grapes takes place in accordance with the requirements of TR CU 022/2011 Technical Regulations of the Customs Union "Food products in terms of their labelling".

CONCLUSIONS

The content of more than 150 components in grapes determines its taste and aroma, respectively, the quality of grapes and their nutritional value depends on the behaviour of these components. The storage process is characterized by the indicator "stability" of products, depending on the variety of culture, its resistance to diseases and physiological disorders, mechanical damage and environmental stress factors. Agro technical factors also have a significant impact on the safety of grapes. When tasting an assessment on a 10-point scale, the appearance of the bunch and berries, the taste and aroma of berries are determined. Properties of the skin and the consistency of the pulp.

Compliance with the mandatory requirements of the standards is the basis for ensuring the quality and safety of grapes, one of the valuable agricultural raw materials for industrial processing, as well as a useful and medicinal product for human consumption.

The analysis of the study shows that at the same time, certain problems hinder the more effective development of the industry, the lack of development of the raw material base of wine products, primarily the different grades

and small scale production of technical grape varieties.

The problem of non-compliance with harvesting and delivery technologies is also relevant, which leads to a significant decrease in the quality of the wine.

The lack of a specialized chemical protection service for vineyards contributes to the spread of diseases and pests. A more correct professional selection of grape varieties can contribute to solving the existing problems in the industry, which will create the best prerequisites for obtaining high-quality wine products. In this regard, it is necessary to use foreign experience more widely. It also seems appropriate to develop organic, environmentally sensitive and sustainable vineyards in the hot, arid climatic conditions of the republic.

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