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Changes in the chemical composition of apple fruit depending on the cultivation in the regions

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ABSTRACT

The fruits and species of apples are common on all continents of the world, as well as in the hemispheres in the north and south. Apple fruit takes the 4th place in the world among fruit crops. The world produces 61 million tons of apples per year. (FAO, 2019). It is known that the fetus contains various nutrients, sugars, proteins, ascorbic acid and minerals.

Key words: Varieties of apples, the biochemical composition of apples, Vitamin C, Minerals contain substances.

Introduction

In Uzbekistan, the volume of processed products of the agricultural sector does not even reach 10 percent. Although in developed countries this figure exceeds 50%.

Of course, we cannot but worry about the fact that in recent years more and more imported fruit products have been growing on the markets of our country.

In the near future, we need to create in each district specialized complexes for fattening livestock, high-tech factories and greenhouses, as well as orchard crops like apples.

At present, different varieties of apples are grown in the Fergana Valley: Golden Delicious, Renet Simerenko, Jonatan, Starkrimson.

We are currently exporting fruit crops worth $ 1.5-2 billion.

In this context, I would like to note: we have every opportunity to export these products for 10-15 billion dollars a year.

In Uzbekistan, the quality standard GOST 16270-70 is used (this is for fast-speldite varieties of apples), and also according to guests GOST 21122-75 (late) Apples are part of the entire nutritional diet and are well known for their various therapeutic properties (detection of digestive secretion, elimination of toxins, diuretic act). The high content of various carbohydrates in the sugar of the apple fruit increases the nutritional value of the product. According to the FAO, 61 million tons of apples are grown worldwide.

Research method

Attention should be paid to the establishment of strict control over the prevention of the cultivation of genetically modified food products.

Therefore, it is necessary to develop a comprehensive program for further reforming agriculture, giving special emphasis to ensuring food security.

Studies have been carried out on some species of apple trees grown in the valley. Experimental options are shown in the table. Apple varieties Golden Delishes, Renet Simerenko, Jonatan Starkrimson have been widely grown in the valley since 2001.

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Determination of soluble dry matter using a refractometer. The more chemicals are dissolved in water, the more light is broken. The sugar content of apple fruits is determined by the following sugar content.

The process of conducting an experiment. The lower part of the prism is securely fixed, the upper part can be opened and closed on an air hinge, in space the apple fruit samples are dried within 5-8 minutes. Liquid is poured into this space to detect dry matter. During the first minutes of drying, the top plate should be slightly lifted so that the bags do not burst due to the high temperature and humidity of the preparation.

In apples, this process takes 6 minutes at 135 ° C. The drying liquid, designed for 5 g of the sample, is cooled in a desiccator for 2-3 minutes and quickly weighed to 0.01 g of accuracy. When light passes through the window along the prism, it breaks in the direction of the amount of dry matter in the liquid and enters the eyepiece. When working with a refractometer, at the beginning, 2 drops of distilled water at 20 ° C are poured into the eyepiece and if the instrument pointer shows zero, it is ready for use. The prisms are carefully wiped with gauze. Then, two drops of the determined juice are poured between the glasses with a special glass rod. If the juice is thick, it is squeezed with two drops of gauze from the cooled product and poured into a refractometer. The prisms are attached and look through the eyepiece. The eyepiece rotates around the axis, and when lowered from top to bottom, a rectangle is drawn on the white and black borders.

Table 1.

Chemical analysis of samples of different varieties of apples

№	Varieties	Dry matter amount	Soluble dry matter composition	Sugar	Water composition	Total acidity	The amount of vitamin C, Mg / 100 g	Ash substances
1	Golden Delishes	13.89	15.00	12.03	86.11	0.244	7.51	2.77
2	Renet Simerenko	15.59	11.75	10.0	81.82	0.199	7.79	1.81
3	Jonatan	19.61	15.50	12.34	80.39	0.173	7.66	1.38
4	Starkrimson	18.18	11.00	9.84	80.39	0.345	7.79	1.96

Renet-simerenko variants in hybrids - a hybrid from unirradiated Prima seeds and A-1/3 variant - is a hybrid obtained as a result of flowering of Simarenko varieties with Prima varieties.

In research on the qualities of an apple, toxic compounds and biochemical and mineral elements are studied. Standard analytical methods have been used for biochemical properties. According to the Kzheldahl method, mineral elements and common forms were obtained as a

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result of decomposition, drying and wet mineralization of apples. Methods for determination of mineral elements: volumetric method for nitrogen, colorimetric method for phosphorus and flammable photometric method for calcium and potassium. Micronutrients: Cu and Zn and heavy metals: Pb, Cd were determined spectrophotometrically. Soluble forms of apple nitrate were determined by the colorimetric method.

The results for the biochemical composition of apples (table 2) show high sugar levels ranging from 9.53 to 12.34%. High sugar levels were recorded in Simarenko and Konatan varieties, with the highest A 1/1 variant being 13.89%. The amount of sugar in apples varies depending on weather conditions, cultural conditions, growing technology, and the condition and type of fruit in their natural environment, as much as possible.

The reported total acidity values ranging from 0.244 to 0.345% were found to be less than 0.41% within the maximum allowable range. Acidic purity determines good quality for human consumption.

Vitamin C (content / mg / 100 g) ranges from 7.51 to 7.79 mg / 100 g of natural fruits. The highest values were obtained for the varieties "Renet simerenko", "Starkrimson" and "Jonatan".

Table 2.

Mineral elements, ash elements, N, P, K, respectively, differ in apple varieties in valley regions.

Varieties and variants	Total nitrogen %	Nutrients %	P_2O_5 %	K_2O %	CaO %	FeO %
Golden Delishes	0.33	14.08	10.4	51.6	5.1	2.56
Renet Simerenko	0.34	13.14	9.6	50.1	4.8	1.996
Jonatan	0.39	12.21	7.9	48.1	3.8	2.726
Starkrimson	0.35	12.97	8.1	50.9	4.9	2.112
A-1/1	0.37	14.37	7.1	51.1	4.6	2.755
A-1/2	0.36	14.84	9.2	50.84	4.44	2.786
A-1/3	0.31	15.02	9.7	49.78	4.58	2.304

Normal nitrogen content should be between 0.354 and 0.37%. Nitrogen is the element that determines the accumulation of sugar and high yields. After analysis, the total amount of apple nitrogen varies from 0.366 to 0.337%. This composition is influenced by the correct fertilization of the apple trees, which determines the concentration of elements within normal limits, as well as the good quality of fruit consumption and the ability to maintain the harvest due to the high nitrogen content, this leads to an increase in apple spots.

We used atomic absorption (Saturn spectrophotometer) and spectral lamps to identify micro and macro elements. The absorption of electrons by the PPBL-2 from the ASPK-type and the lightweight BSB-2 electrode in the main cathode was determined with a KSP-4 self-recording potentiometer. Biomaterials selected for the experiment are first mineralized. To do this, they are burned and heated at 350 - 4000C in nitric acid in a muffle furnace.

For better mineralization, it is periodically added to hydrogen peroxide. Biomaterials are completely burned and transported to form a colorless mineral. When this organic matter, consisting of oxygen, hydrogen, carbon, sulfur and phosphorus, evaporates.

Minerals contain substances containing metals and their salts. As with other metals in a mineral, an extract is obtained by adding organic solvents to the mineral to detect zinc. An atomic absorption device is used to identify macro- and microelements in an extract. This device makes it possible to automatically determine the amount of the extract by spraying it onto the combustion chamber, since each element has its own specific spectrum. Phosphorus stores 8.1 to 10.4% P_2O_5, a normal ingredient that determines the balance of nutrients, especially nitrogen. The balance between nitrogen and phosphorus determines the sugar content and the quality of the fruit. The potassium content of apples should be about 0.70% of the K_2O value.

Analysis of common forms shows low potassium levels between 48.1-51.6% K_2O. A low content of this element may indicate some quality problems with apples over time. Calcium and iron are key elements in plant development, but in the new state, they affect macronutrients. They are concentrated at values between 4.6 and 0.5.1% CaO and between 1.996 and 2.752% FeO. To find the effect of the correct fertilization system, it is necessary to correctly calculate the constituent nitrate ions, which determine the limitation and exclude the use. Apples and other fruits are known to have a negative effect of high nitrate content on various foods. It is well known that high levels of nitrates in children can lead to various diseases, since the assimilation of nitrates and the conversion of hemoglobin to methemoglobin can occur at different stages. These processes can be a clear sign of oxidative disease.

Analysis of the data for apples Zn, Pb and Cd shows that low values of these elements do not have a negative impact on the quality of apple fruits.

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