CHANGES IN THE CHEMICAL COMPOSITION OF APPLE FRUIT DEPENDING ON THE CULTIVATION IN THE REGIONS

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Annotation. 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 acids and minerals.

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

Apples are part of the entire nutritious diet and are well known for their various therapeutic properties (detection of digestive secretions, elimination of toxins, diuretic action). The high content of various carbohydrates in the sugar of apple fruits increases the nutritional value of the product.

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

Determination of soluble solids using a refractometer. The more chemicals 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, apple fruit samples are dried for 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 raised 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, calculated on 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 a window along a prism, it is refracted 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 are poured into the eyepiece at 20 ° C and if the instrument pointer shows zero, it is ready for use. Prisms are carefully rubbed with gauze. Then, with a special glass rod, two drops of the juice to be determined are poured between the glasses . If the juice is thick, it is squeezed with two drops of gauze

from the chilled product and poured into the refractometer. The prisms are attached and viewed 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 border.

Table 1

Chemical analysis of samples of different varieties of apples

No.	Varieties	Amount of dry matter	Soluble dry matter composition	sugar	Water composition	General acidity	of vitamin C mg/100 g	Ash substances
1	Golden Delicious	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	Jonathan	19.61	15.50	12.34	80.39	0.173	7.66	1.38
4	starcrimson	18.18	11.00	9.84	80.39	0.345	7.79	1.96

Simerenko variants in hybrids - a hybrid from non-irradiated Prima seeds and the H -1/3 variant - is a hybrid obtained from the flowering of Simarenko varieties by Prima varieties.

In studies of the qualities of an apple, toxic compounds and biochemical and mineral elements are studied. Standard methods of analysis were used for biochemical properties. According to the Kzheldahl method, mineral elements and common forms were obtained as a result of decomposition, drying and wet mineralization of apples. Methods for determining 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 by spectrophotometric method. Soluble forms of apple nitrate were determined by the colorimetric method.

The results on the biochemical composition of apples (table 2) show a high level of sugar ranging from 9.53 to 12.34%. High sugar levels were recorded in Simarenko and Conatan varieties , with the highest H 1/1 variant being 13.89%. The amount of sugar in apples varies according to weather conditions, cultural conditions, cultivation technology, and the condition and type of fruit in the natural environment, as far as possible.

It was found that the recorded values of total acidity in the range from 0.244 to 0.345% are less than 0.41% within the maximum allowable limits. Acid purity determines good quality for human consumption.

Vitamin C (content / mg / 100 g) is between 7.51 and 7.79 mg / 100 g of natural fruits. The highest values were obtained for varieties " Renet Simerenko "," Starkrimson " and " Jonatan ".

Table 2

The mineral elements, ash elements, N , P , K , respectively, differ among apple varieties in the valley regions.

Varieties and variants	Total Nitrogen %	Nutrients %	P_2O_5 – – %	K_2O %	CaO %	FeO %
Golden Delicious	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
Jonathan	0.39	12.21	7.9	48.1	3.8	2.726
starcrimson	0.35	12.97	8.1	50.9	4.9	2.112
H-1/1	0.37	14.37	7.1	51.1	4.6	2.755
H-1/2	0.36	14.84	9.2	50.84	4.44	2.786
H-1/3	0.31	15.02	9.7	49.78	4.58	2.304

The normal nitrogen content should be in the range of 0.354 to 0.37%. Nitrogen is the element that determines the accumulation of sugar and high yields. After analysis, the total amount of malic nitrogen varies from 0.366 to 0.337%. This composition is influenced by the correct fertilization of 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 a crop 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 PPBL-2 electrons from the ASPK-type and the BSB-2 lightweight electrode in the main cathode was determined with a KSP-4 self -registration potentiometer. The biomaterials selected for the experiment are first mineralized. To do this, they are burned and heated at 350 - 400 ^{0}C 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. In this case, organic matter, consisting of oxygen, hydrogen, carbon, sulfur and phosphorus, evaporates.

Minerals contain substances containing metals and their salts. As with other metals in the mineral, the extract is obtained by adding organic solvents to the mineral to detect zinc. An atomic absorption device is used to identify the macro and micro elements in the extract. This device allows you to automatically determine the amount of 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 levels of potassium between 48.1-51.6% K_2O . A low content of this element may indicate some problems with the quality of apples over time. Calcium and iron are key elements in plant development, but when new, this affects macronutrients. They concentrate at values between 4.6 and 0.5.1% CaO and between 1.996 and 2.752% FeO .

To find the effect of a proper fertilization system, it is necessary to correctly calculate the compound 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 nitrate 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 diseases.

Analysis of data on apples Zn , Pb and Cd shows that low values of these elements do not adversely affect the quality of apple fruits.

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