

CHEMICAL COMPOSITION OF LATE APPLES OF COMMON VARIETIES**Voitsekhivskiy V.¹, Litovchenko O.², Malenko R.², Minenko T.¹**¹*National university of life and environmental sciences of Ukraine,*²*Institute of Horticulture NAAS of Ukraine*

Apple is the most important fruit culture in the modern gardening of Ukraine, its share among other fruit crops in area, is more than 44 %. It should be noted that in the last 20 years the area of plantations has decreased by almost 3.5 times, but productivity has increased. This culture is in demand in the population due to its taste, food, diet, therapeutic, culinary qualities and moderate price. Apple fruits are excellent raw materials for the processing industry, thanks to high manufacturability. Ukraine ranks 13th in the production of apples and has a strong potential for production. The annual consumption of fruit over the past 20 years has increased by 60%, but it is 58% of the annual norm [2].

Nutrition is the most important physiological need of a person. It is necessary for the construction and constant renewal of cells and tissues. In order to maintain health and performance, a person must constantly consume various foods. Fruits belong to this group and are the most important source of vitamins and amino acids, macro- and trace elements, carbohydrates, natural dietary fiber, polyphenols, volatiles, etc. The American Diabetes Association (ADA) has carried apples to the 8 most useful fruits. A small apple weighing 150-200 g has a fairly low calorie content, contains only 77 kcal and 21 g of carbohydrates (average carbohydrates 150-200 g/day), glycemic index (30-45) and is therefore a recommended product for people who control carbohydrate consumption [1, 5, 6].

In addition, carotenoids and anthocyanins accumulate in the fruits of colored varieties - plants that show high antioxidant, anticancerogen, cardioprotective, angioprotective, radioprotective, and immunomodulatory properties in the human body. The fruits also contain other valuable nutrients: C, E, K, B₁, B₂, B₃, B₆, PP, Biotin [3].

Dietary fiber is a necessary component of a person's diet. By resistance to bacterial fermentation, they are divided into those that are subject to complete, partial fermentation and not fermented at all. The first group includes pectin, gum, mucus, the second - cellulose and hemicellulose, to the third - lignin. Fruits are the main source of the first group of dietary fiber. These compounds normalize the functioning of the intestine, contributing to the development of beneficial microflora and slowing down the absorption of rapid carbohydrates. According to various authors, the shortage of these compounds in the diet of modern youth is 65-70 % [6].

Fresh apples and processing products are an important component of preventive and diet for various diseases, including hypertension, diabetes, gastritis, digestive disorders, etc. [5, 6].

The purpose of the work was to evaluate the quality, biochemical composition and dietary value of apple fruits, represented in the trading networks of the city of Kyiv.

Research methods. The research was conducted in the NULES of Ukraine at the Department of Technology of Storage, Processing and Standardization of Plant Products. B.V. Lesika and the Institute of Horticulture of NAAS of Ukraine. The fruits for the test were selected in the retailers of Auchan, Silpo, Fora and ATB. The products were evaluated according to DSTU 8133: 2015. The definition of the studied indicators was made according to conventional methods [2, 3].

Research results. The biochemical composition of apple fruits of different varieties of domestic origin, available in supermarkets in the autumn (October-November) is analyzed. The content of soluble substances (CPRs) and sugars fluctuated slightly by the studied varieties, on average - 12.8 and 11.0%, respectively. The content of the titrated acids can be divided into 2 groups: low acid - Golden Delises, Johnagold and Champion (0.4%), the rest with high acidity. The fruits of the apple trees of the studied varieties were low in ascorbic acid (AK) on average - 4.8 mg/100 g of raw product. The highest rates were the fruits of the champion (9.8 mg/100 g).

Pectic substances in the human body exhibit detosyating and probiotic properties. Their average content is 1.0 %, at the same time the highest content was distinguished by the variety of Renet Simirenko. No less valuable nutrients of apple fruits are phenolic compounds. In humans and animals, aromatic rings are not synthesized, but come with plant foods and are included in many vital phenolic compounds - adrenaline, thyroxine, serotonin, etc. Regular flow of plant phenols into the human body helps to strengthen the walls of capillaries, normalize blood pressure, increase immunity. In the varieties under study, the total content of phenolic compounds is an average of 175.4 mg/100 g. Fruits of varieties of Jonathan and Johnagold were distinguished by the highest concentration of phenolic compounds - 222.4 and 205.2 mg/100 g, respectively. The nitrate content in the fruits of all varieties did not exceed the values of the MPC (60 mg/kg), so apple fruits are safe for consumption. The organoleptic evaluation of the selected samples has found that the varieties of the need Delises, Johnagold and the champion have a more balanced taste (students' preferences). The rest of the samples were marked with sour-sweet taste. Using the method of ranking biochemical and consumer indicators in size and weight, the most points were scored by champion and Johnagold.

Conclusions. The comprehensive assessment of the assortment of popular apple varieties has found that the most promising content of valuable nutrients are champion and Johnagold varieties. The apple trees contain an average of up to 10% of easily digestible sugars, 0.6% organic acids, 4.8 mg/100g of ascorbic acid, 175.4 mg/100 g - phenolic compounds and 1.0% - pectic substances and have high taste properties. The results obtained should be taken into account when drafting full diet in the autumn.

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Національний університет біоресурсів і природокористування України
 Національна академія аграрних наук України
 Інститут сільського господарства Полісся НААН України
 Інститут продовольчих ресурсів НААН України
 Інститут садівництва НААН України
 Актюбінський регіональний державний університет ім. К.Жубанова
 RAGT Semences
 Lulea University of Technology
 Університет прикладних наук Вайєнштефан-Тріздорф
 International Academy of Applied Sciences in Lomza

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*присвяченої 110-річчю від дня народження видатного вченого,
 основоположника кафедри технології зберігання, переробки та
 стандартизації продукції рослинництва,
 завідувача кафедри з 1968 по 1987 рр.,
 доктора сільськогосподарських наук, професора
ЛЕСИКА БОРИСА ВАСИЛЬОВИЧА
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Національний університет біоресурсів і природокористування України
(НУБіП України)

вул. Героїв оборони, 15, м. Київ

03041, Україна

<https://nubip.edu.ua>

Агробіологічний факультет: <https://nubip.edu.ua/structure/abf>

Кафедра технології зберігання, переробки та стандартизації продукції
рослинництва ім. проф. Б.В. Лесика:

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