https://www.sworldjournal.com/index.php/swj/article/view/swj11-02-085
DOI: 10.30888/2663-5712.2022-11-02-085

UDC 635.35:641.1

NUTRITIONAL AND BIOLOGICAL VALUE OF CAULIFLOWER

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Annotation. *The results of the analysis of valuable nutrients of cauliflower are presented. Significant influence of hybrid features on the formation of individual valuable nutrients is revealed. The most valuable hybrids are selected according to the studied indicators.*

Key words: *cauliflower, biochemical composition, hybrid.*

Introduction.

Cauliflower (*Brassica oleracea var. botrytis*) belongs to the family Brassicaceae and it is used in most cuisines of the world. This variety of cabbage is one of the most common vegetable crops in the world, which is grown on an area of over 400 thousand hectares. World production exceeds 25.8 million tons. The main producers of this vegetable are China and India (73%) of world production, and only 0.4-1.3 million tons – the United States, Mexico and European countries. There is a growing demand for fresh and processed products in China, Europe and the United States [1,2,4,5].

Currently, among cabbage vegetables, it ranks second after white cabbage in vegetable growing in Ukraine. Its wide distribution is due to high taste and dietary qualities, variety of assortment by maturity groups, as well as color (from snow white, cream to yellow and even purple). This culture can be effectively grown in all regions of Ukraine [1, 2].

In terms of nutrient content, taste and absorption exceeds all types of cabbage. The edible part is quite low in sugars, but there is easily digestible protein, tender fiber and a number of vitamins. Of the minerals in cauliflower, potassium predominates, in much smaller quantities phosphorus, calcium, sodium, magnesium, as well as iron and sulfur (table). The other part consists of biologically active

substances, in particular vitamins [2, 7].

The content of some biologically active substances in cauliflower

Content of valuable nutrients in 100 g of raw mass	
Vitamins	Minerals
Ascorbic acid – 48.2 mg Thiamine – 0.05 mg Riboflavin – 0.06 mg Niacin – 0.51 mg Choline – 44.3 mg Pantothenic acid – 0.67 mg Pyridoxine – 0.18 mg Folate – 57 mcg Lutein + Zeaxanthin – 1 mcg Alpha-tocopherol – 0.08 mg Phylloquinone – 15.5 mcg	Calcium – 22 mg Iron – 0.42 mg Magnesium – 15 mg Phosphorus – 44 mg Potassium – 299 mg Sodium – 30 mg Zinc – 0.27 mg Copper – 0.039 mg Manganese – 0.155 mg Selenium – 0.6 mcg Fluorine – 1 mcg
Fatty acids	Amino acids
Saturated – 130 mg Capric – 18 mg Pentadecanoic – 2 mg Palmitic – 93 mg Heptadecanoic – 1 mg Stearic – 9 mg Arachinic – 3 mg Behenic – 2 mg Lignoceric – 2 mg Monounsaturated – 34 mg Myristoleic – 2 mg Palmitoleic (omega-7) 3 mg Oleic (omega-9) – 27 mg Nervonic (omega-9) – 2 mg Polyunsaturated – 31 mg Linoleic (omega-6) – 16 mg Alpha-linolenic (omega-3) – 15 mg	Alanine – 116 mg Aspartic acid – 177 mg Arginine – 86 mg Valine – 125 mg Histidine – 56 mg Glycine – 71 mg Glutamic acid – 257 mg Isoleucine – 71 mg Leucine – 106 mg Lysine – 217 mg Methionine – 20 mg Proline – 71 mg Serine – 86 mg Tyrosine – 51 mg Threonine – 76 mg Tryptophan – 20 mg Phenylalanine – 65 mg Cystine – 20 mg

It exceeds all types of cabbage in terms of nutrients, taste and digestibility. The edible part is quite low in sugars, but there is easily digestible protein, tender fiber and a number of vitamins. As for the minerals in cauliflower, potassium predominates here, in much smaller quantities phosphorus, calcium, sodium, magnesium, as well as iron and sulfur (table). The other part consists of biologically active substances, in particular vitamins [2, 7].

By eating this vegetable, we get a great wealth of valuable nutrients that help lower cholesterol in our body and a very useful value – they are strong antioxidants [2,7]. Cauliflower contains sulforaphane, which has a number of healing properties and is a promising chemoprophylactic agent not only against various cancers such as breast, prostate, colon, skin, lungs, stomach and bladder, but also in cardiovascular disease and diabetes [4, 8]. Vegetables are used for soups, salads in fried and stewed form, as well as in canned form [2, 3].

The aim of our research was to conduct a comparative evaluation of different cauliflower hybrids for nutritional and biological value.

Research materials and methods.

The research was conducted at the department of storage, processing and standardization of plant products named after professor B.V. Lesik NULES of Ukraine, the UIPVE, department of vegetable growing UNUH, department of horticulture and viticulture PSU and data from specialized farms of Ukraine. The main most common hybrids of Dutch selection were taken for analysis. The most valuable samples were determined by ranking the studied indicators with the assignment of conditional points. Tests of samples were performed according to generally accepted methods [6, 5, 9].

Results and their discussion.

The content of individual components of the biochemical composition is quite variable in the studied crops. It should be noted that the chemical composition of vegetables depends on soil and climatic conditions, variety, physiological condition, efficiency of post-harvest processing, conditions and duration of storage and transportation. The products were harvested at a technical level of ripeness and met current standards (SSTU 3280-95 Fresh cauliflower. Specifications; UNECE SSTU FFV-11 : 2007 Cauliflower. Guidelines for supply and quality control). The vegetables were fresh, clean, in optimal turgor condition, which provides high marketability and suitability for transportation and temporary storage.

Dry matter (DM) partially affects the mechanical structure, strength and suitability for processing. The formation of this indicator depends on a set of factors. The average value of DM for the studied hybrids is 8.2%, and the maximum deviation of this indicator is 4.2% (Figure). Hybrids Barcelona F_1, Skywalker F_1 and Freedom F_1 (over 9%) had a high ability to form this indicator.

Cauliflower should be classified as low-calorie foods because of the small amount of sugar. The average content of sugars in total according to the studied samples is 2.2%. The lowest sugar content was observed in the hydrides Montano F_1, Syria F_1, Palace F_1 and Fargo F_1 (below 2%). These hybrids should be recommended for dietary nutrition for diabetics.

Dietary fiber is a necessary component of the human diet. According to resistance to bacterial fermentation, they are divided into those that are subject to partial and complete fermentation, and those that are not fermented. The first group includes pectin, gums, mucus, the second – cellulose and hemicellulose, the third – lignin. Vegetables are the main source of the first group of dietary fiber. These compounds normalize the functioning of the intestine, promoting the development of beneficial microflora and slowing down the absorption of fast carbohydrates. These substances are natural fibers which are an excellent substrate for the beneficial microflora that forms the immune status. According to various authors, the deficiency of these compounds in the diet of modern urban youth is over 65-70% [8].

The average fiber content is only 0.9%, and the maximum deviation is 0.4%. Therefore, it can be argued that the features of the hybrid play a significant role in the formation of this indicator. The highest values of fiber were observed in hybrids Barsak F_1, Barcelona F_1, Skywalker F_1 and Freedom F_1 (over 1%).

An indicator that characterizes the biological value is the content of ascorbic acid. The value of this indicator varies greatly. The average content of hybrids is – 64.7 mg / 100 g of raw mass of the edible part. Hybrids of Barsak F_1, Candide Sharm F_1, Lateman F_1, Skywalker F_1, Palace F_1 and Freedom F_1 have a higher average value of this indicator.

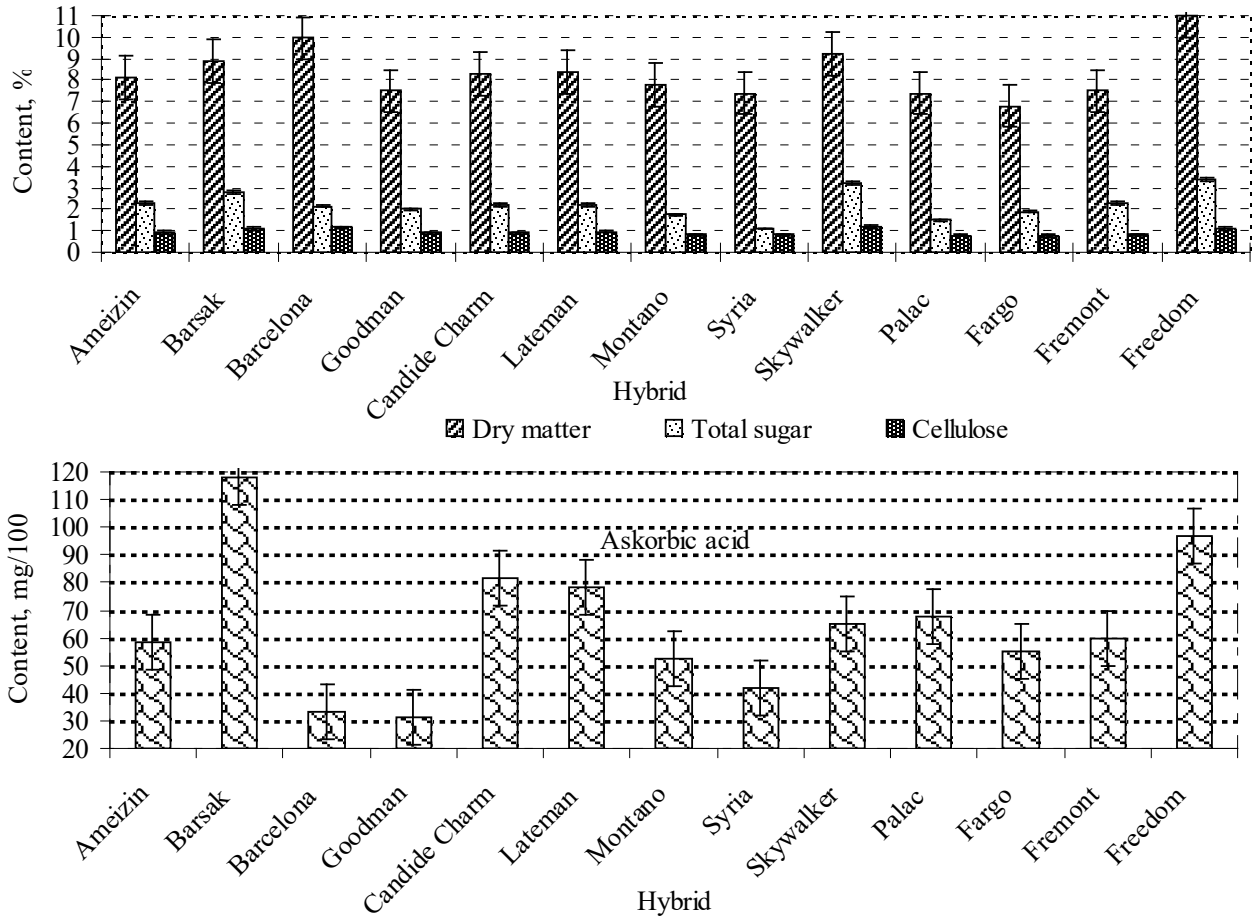

Figure. The content of essential nutrients in cauliflower

Applying the rating, we found the most valuable samples of the studied indicators (in descending order): Freedom F_1, Skywalker F_1, Barsak F_1, Candide Sharm F_1, Lateman F_1, Ameizin F_1, Fremont F_1, Palace F_1, Montano F_1, Goodman F_1, Syria F_1, Fargo F_1.

Conclusions.

Cauliflower is a valuable dietary raw material. Due to the complex of valuable nutrients and low calories, it is recommended to use in order to maintain high resistance of the body to harmful factors. Comprehensive evaluation of the studied hybrids allowed to identify the most valuable specimens, such as Freedom F_1, Skywalker F_1, Barsak F_1, Candide Sharm F_1 and Lateman F_1. It is expedient to use the received data at planning of cultivation of competitive production. In further research, it is advisable to expand the list of varieties and the list of studied indicators and certainly take into account the stability of the studied indicators from a number of facts.

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