DETERMINATION OF WATER SOLUBLE VITAMINS IN CABBAGE SEEDS

https://doi.org/10.5281/zenodo.14571138

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Annotation: *In this article, information about the cabbage (Brassica L.) plant, its chemical composition, medical importance, and the amount of water-soluble vitamins in the cabbage seed were determined by high-performance liquid chromatography, and a word about its physicochemical properties and spectral characteristics. is conducted.*

Key words*: Cabbage (Brassica L.), cruciferous family, seed, sugars, organic acids, vitamins (C, P, V,, V2, PP, K, E), carotene, pantothene, folic acid, fat , enzymes, phytoncides, potassium, calcium, iodine, manganese, iron, infrared spectroscopy, chromatography,*

INTRODUCTION

Today, it is difficult to imagine the table of our people without vegetables and dairy products. For this reason, great attention is being paid to the cultivation of vegetables and fruit products in the republic in the following years. As a result, the population's interest in vegetable crops and their cultivation is increasing. This, in turn, is an important source of filling our markets with a variety of vegetable products, as well as improving the material well-being, lifestyle and healthy diet of families, ensuring that their free time is occupied with useful work. It is known that it depends on the agriculture of each country and the level of food supply. Due to the planned expansion of the area of vegetable crops in our country, more and more vegetable products are grown. Today, at a time when the shortage of food products in the markets of some countries is threatening, our President Sh. The instructions of M. Mirziyoev and the government of the republic on the further development of the industry make the issue of increasing and exporting vegetable-polished products the main task. Decision PQ-3978 of the President of the Republic of Uzbekistan "On additional measures to increase the efficiency of the export of fruit and vegetable products to foreign markets" published on October 17, 2018 and the Cabinet of Ministers of the Republic of Uzbekistan in the republic Decision No. 935 dated November 20, 2018, "On additional measures to increase the volume of fruit and vegetable processing in 2019-2020" is also dedicated to this area. It says, among other things: "On the basis of effective use of household and homestead plots, great attention is being paid

to the issues of increasing the production of fruit, grapes, vegetables, sugar, and leguminous products and increasing the volume of exports. At the same time, the analysis of the commissioning of new capacities for processing (drying) fruit and vegetable products grown in households and plots of land shows the need to further develop activities in this direction and implement new projects in some districts of the republic. is doing.

THEORETICAL PART

Cabbage (Brassica L.) is a group of annual, biennial and perennial plants, vegetable and fodder crop belonging to the Brassicaceae family. Cabbage Eurasia and Shim. There are about 35 species in Africa. Many species originate from the Mediterranean region and China. Broccoli, rapeseed, turnip, sour pizza, mustard also belong to this category. There are many species of one type of polyz K. (V. o1egaseae) that have economic value. Among them, white-headed cabbage, red K., Savoy cabbage, Brussels sprouts, kohlrabi, cauliflower, Beijing cabbage are cultivated in agriculture in almost all countries of the world. The total cultivated area of white-headed cabbage in the world is 2.3 million. ha, yield 209.9 s/ha, gross yield 48.8 mln. t (1999). Cabbage heads are small (0.5-1.5 kg), medium (1.5 - 2.5) and large (more than 2.5 kg), depending on their size and density. The flowers are yellow, large, collected in spikes, the fruit is a pod. The seed is round, dark brown, about 2 mm in diameter. Cabbage is resistant to cold, its seeds begin to germinate at 2-5 °C. Greens can withstand -5°C frost, large plants can withstand short-term frosts -8°C. White-headed Cabbage forms a head at a temperature of 11-18 °C. When T-ra exceeds 25°, the emergence of the head is delayed; it develops quickly in a sunny and bright place.

Cabbage varieties are divided into early, medium-early, late-early, medium-early and late-early groups. The following varieties of white-headed cabbage are planted in Uzbekistan: Gribovsky 147, it ripens in 60-65 days after transplanting. The head is 0.7-1 kg, round, medium dense, bluish, bursts when ripe. Tashkent 10th grade, after planting, it ripens in 90-110 days. Cabbage 2 - 2.5 kg, round-flat, heat resistant. Uzbekistan 133-mid evening, after transplanting, it is done in 110-120 days. Cabbage 2.5-4.3 kg, round-flat. Also, Apsheron autumn, Saratani, Nowruz, Ashgabat, Parallel Fp Derbent, etc. varieties are also planted. Cabbage seeds and finished fruit products [1-4] (Fig. 1)

Figure 1. Cabbage seeds and finished fruit products

Cabbage contains sugars, organic acids, vitamins (C, P, V,, V2, PP, K, E) and carotene, pantothenic and folic acids, fat, enzymes, phytoncides, potassium, calcium, iodine, manganese, iron, etc. . there are salts of the elements. It is used directly for food, salted and canned. Cabbage is used in folk medicine for various diseases, it accelerates the removal of cholesterol from the body. Cabbage has a lot of fiber.

In scientific medical practice, stomach and intestinal ulcers are treated with cabbage juice. Vitamin U contained in cabbage leaves has been considered as an anti-ulcer factor. This vitamin, methylmethionesulfonium, has a special effect on the mucous membrane of the medulla and has healing properties. For this purpose, it is recommended to drink half a glass of warm cabbage juice 3 times a day for 3-4 weeks. Dried cabbage juice is used in the treatment of atherosclerosis. Tartronic acid contained in cabbage does not allow people to become obese. Therefore, if you want to lose extra weight in the body, definitely eat cabbage. Cabbage is highly valued in folk medicine. Ancient Roman doctors described cabbage as a blessing that strengthens the human body, makes it resistant to various diseases, and relieves headaches. For headaches, drink half a cup of cabbage juice and lie on your back. Fresh cabbage leaves are applied to painful areas. In ancient times, when the temperature of the patient rose, cabbage leaves were placed on the forehead and temples of the head. For the same purpose, a piece of pickled cabbage can be wrapped in a clean gauze. In the prevention of atherosclerosis, whole and salted cabbage is eaten by adding it to salads and juices (one cup 20 minutes before meals 3 times a day). Cabbage leaves are wrapped around swollen areas in gout. This procedure is performed at night for 5-8 days, and warm socks are worn on the feet. In case of spleen disease, the juice of cabbage core is heated to 30-32 degrees and drunk 3-4 times a day 1 hour before meals. Cholecystitis, cholangitis and chronic hepatitis Cholecystitis, cholangitis and chronic hepatitis drink freshly squeezed cabbage juice 3 times a day, 20 minutes before meals, or warm salted cabbage water and drink 1 cup before meals 2 times a day. [5-6]

Vegetables are one of the main types of food due to their deliciousness, nutritional value and medicinal properties. The nutritional value of vegetables is determined by the amount of carbohydrates, proteins, fats and other substances in them. The biochemical composition of vegetables consists mainly of water (60-90%), and dry matter is cucumber, tomato -4-7%, root vegetables - 11-17%, green peas - 24%, garlic -35%. ladi Therefore, the nutritional value of vegetables is not high. One kg of most consumed vegetables has 150-400 kcal or 600-1700 kj. Vegetables as food cannot meet the body's energy needs. But they serve as a source of biologically active substances, vitamins, enzymes, proteins, oils, carbohydrates, mineral salts, etc. necessary for the human body. Vitamins play a big role in people's life activities and healthy eating. [7-8]

Vitamins were first discovered in 1880 by N.I. Lunin. He came to the conclusion that in addition to proteins, carbohydrates, fats and mineral substances that provide normal life, there are also organic substances necessary for life. Vitamins are called substances necessary for life (vita means life, vitamin means life amines). Vitamins are small molecular

organic compounds that are extremely important in the life and activity, growth and reproduction of organisms. [5-6]

Vitamins have the following properties: - they are not synthesized in the human body; - does not participate in the formation of structures; - when they are not enough in the body, the metabolism is disturbed and causes specific diseases; - vitamins consumed with food affect biochemical processes in the body as coenzymes. A change in the amount of vitamins in the body leads to the following conditions: 1. Avitaminosis - diseases caused by the lack of some vitamin in the body. 2. Hypovitaminosis - diseases caused by vitamin deficiency. 3. Hypervitaminosis - diseases caused by an excess of vitamins. [5-6]

So far, more than thirty vitamins have been identified, and they are divided into three groups: water-soluble, fat-soluble vitamins, and vitamin-like substances. Water-soluble vitamins include: Vitamin B1, Vitamin B2, Vitamin B6, Vitamin B12, Vitamin PP, Biotin, Vitamin N, Vitamin C, Vitamin P. Fat-soluble vitamins include: vitamin A, vitamin D, vitamin E, vitamin K. Water-soluble vitamins: Vitamin B1 - thiamine, is the first vitamin to be isolated in pure form. Lack of vitamin B1 - avitaminosis occurs in beriberi or polyneuritis. Vitamin B1 causes a violation of carbohydrate metabolism. Vitamin B1 is a coenzyme of pyruvate decarboxylase. This vitamin is found in large quantities in eggs, meat, and peas. The daily requirement of the body is 1-3 mg. Vitamin B2 is called riboflavin and it has a yellow color. Deficiency of this vitamin leads to avitaminosis, colds of the mucous membrane of the oral cavity, impaired vision, and anemia. Riboflavin is a coenzyme of flavin enzymes. A person receives 65-70% of this vitamin through dairy, meat and bread products, 30-35% through vegetables and fruit products. Daily requirement - 2 mg. Vitamin B6 (pyridoxine). A lack of vitamin B6 causes a disturbance in the metabolism of amino acids and leads to a skin disease called dermatitis. It also causes anemia and growth retardation. This vitamin is a coenzyme of enzymes that catalyze the reamination reaction of amino acids. Vitamin compounds: pyridoxine, pyridoxal and pyridoxamine. Vitamin B6 is mainly found in meat, fish, and grain products. Adults need 2 mg of this vitamin. is Vitamin PP (nicotinic acid). Nicotinic acid is important in metabolic processes in living organisms. It is a coenzyme of dehydrogenase enzymes that catalyze oxidation-reduction reactions by becoming part of NAD and NADF. It is a derivative of pyridine: nicotinic acid and nicotinamide. Vitamin PP deficiency causes pellagra disease. The nervous system and digestive system are disturbed. Vitamin PP is found in cereals and vegetables. The daily requirement for an adult is 7 mg. Vitamin C (Ascorbic acid). Humans, monkeys and guinea pigs do not synthesize ascorbic acid, so they consume vitamin C with ready-made food. If there is a lack of products rich in vitamin C in the food, people and some animals develop ringworm. Milks cause bleeding and blood accumulation under the skin. If vitamin C is not taken into the body, it leads to death. Vitamin C increases the body's antioxidant capacity. Ascorbic acid serves as an intermediate that transfers hydrogen in oxidation-reduction reactions in living organisms. Vitamin C is abundant in plums, oranges, lemons, dill and other plants. The daily requirement of an adult is 0.2-1 g. is [9-10]

DISCUSSION OF RESULTS

Water-soluble vitamins in cabbage seeds were determined using the high-performance liquid chromatography (HPLC) method. 5-10 g of cabbage seeds are taken out on an analytical scale and placed in a 300 ml flat flask. 50 ml of 40% ethanol solution is added to it. The mixture was heated under vigorous stirring for 1 h, equipped with a magnetic stirrer, reflux condenser, and then stirred at room temperature for 2 h. The mixture is cooled and filtered. The remainder was re-extracted 2 times with 25 ml of 40 percent ethanol. The filtrates were combined and filled to the mark with 40% ethanol (5-10%) in a 100 ml volumetric flask. The resulting solution is spun in a centrifuge at a speed of 7000 rpm for 10 minutes. The resulting solution was taken from the upper part for analysis. Working solutions of water-soluble vitamins with a concentration of 1 mg/ml were prepared. For this purpose, 50.0 mg of each vitamin standard is taken on an analytical balance and dissolved in 40% ethanol in a 50 ml volumetric flask and filled to the mark.

Acetate buffer system and acetonitrile were used as an eluent for the determination of water-soluble vitamins contained in cabbage seeds by HPLC Chromatographic conditions:-Chromatograph Agilent-1200 (equipped with an autodoser);-Column Exlipse XDB C 18 (obraschenno-faznyy), 5 µm, 4.6 x150mm; -Diode matrix detector (DAD), 250 nm identified; -Flow rate 1ml/min; - Eluent acetate buffer: acetonitrile: 0-5 min 96:4, 6-8 min 90:10, 9-15 min 80:20, 15-17 min 96:4, thermostat temperature 25 ^{0}C, -5 µl injected amount. First, a working standard solution was prepared in the chromatograph, then a solution made from cabbage seeds was introduced, and the amount of vitamins was determined by comparison. (Figure 2)

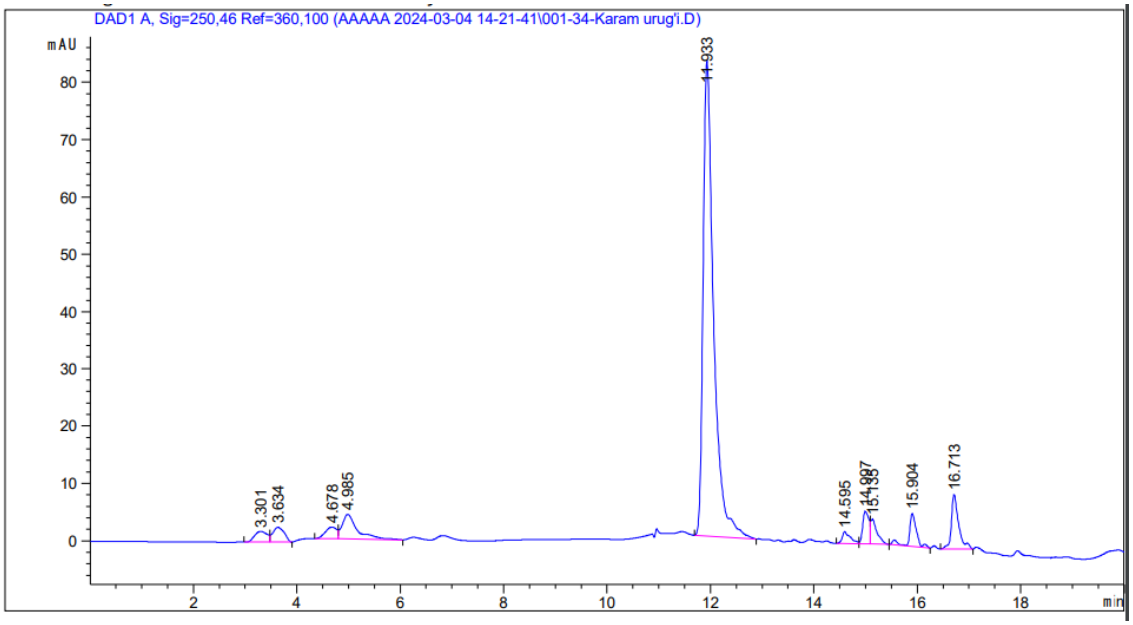

Figure 2. Chromatography of a solution prepared from cabbage seeds to determine the amount of vitamins in cabbage seeds

Chromatographies show that B2=4.433226 mg., B6= 17.14286 mg., (PP) B3=1.75783 mg. in cabbage seeds. Vitamin C was found to be in the amount of 1.946792 mg.

CONCLUSION:

When the content of water-soluble vitamins in cabbage seeds was studied using the high-performance liquid chromatography (HPLC) method, in cabbage seeds B2=4.433226mg., B6= 17.14286mg., (PP) B3=1 ,75783 mg. Vitamin C was found to be in the amount of 1.946792 mg.

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