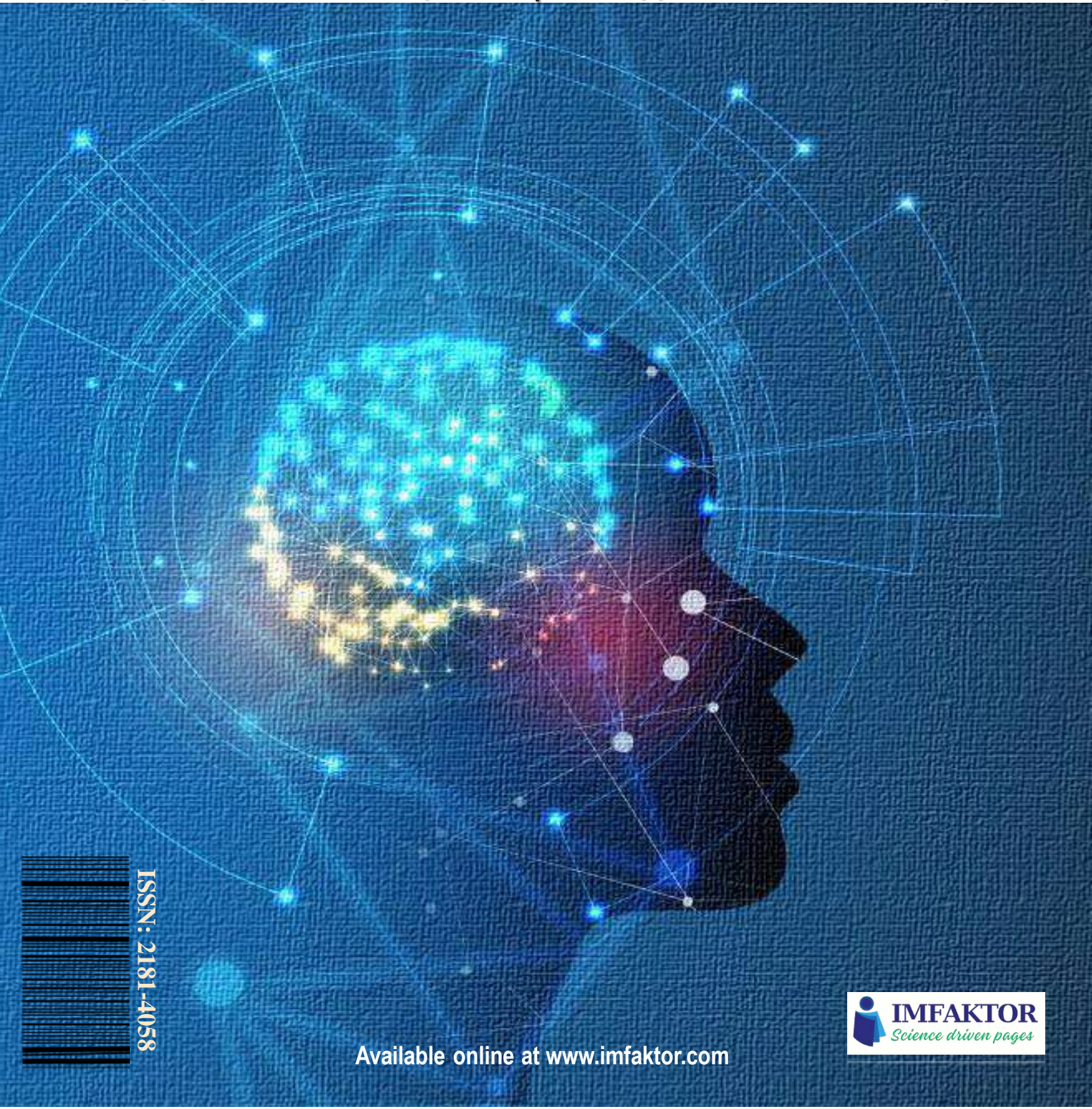


Volume II | Issue 3 | March-April | 2024

Journal of
RESEARCH
and **INNOVATIONS**

ТАДҚИҚОТ ВА ИННОВАЦИЯЛАР | ИССЛЕДОВАНИЯ И ИННОВАЦИИ



ISSN: 2181-4058

Available online at www.imfaktor.com

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Science driven pages

ISSN: 2181-4058
DOI Journal 10.56017/2181-4058

ТАДҚИҚОТ ВА ИННОВАЦИЯЛАР ЖУРНАЛИ

II-ЖИЛД, 3-4 СОН

ЖУРНАЛ ИССЛЕДОВАНИЯ И ИННОВАЦИИ
ТОМ-II, НОМЕР-3-4

JOURNAL OF RESEARCH AND INNOVATIONS
VOLUME-II, ISSUE-3-4

ТОШКЕНТ - 2024

ТАДҚИҚОТ ВА ИННОВАЦИЯЛАР ЖУРНАЛИ

ЖУРНАЛ ИССЛЕДОВАНИЯ И ИННОВАЦИИ | JOURNAL OF RESEARCH AND INNOVATIONS

№ 3-4 (2024) DOI <http://dx.doi.org/10.56017/2181-4058-2024-3-4>

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ТАДҚИҚОТ ВА ИННОВАЦИЯЛАР ЖУРНАЛИ

ЖУРНАЛ ИССЛЕДОВАНИЯ И ИННОВАЦИИ | JOURNAL OF RESEARCH AND INNOVATIONS

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<https://doi.org/10.5281/zenodo.10935424>

STUDYING THE QUANTITY OF VITAMINS CONTAINED IN TUBERS AND ROOT CROPS

ANNOTATION

Vitamins are organic compounds necessary for the functioning and normal metabolism of a living organism. They have different chemical structures, and information that people get sick due to a lack of certain substances in nutrients is recorded in ancient Chinese books, and later in the works of Hippocrates. Vitamins are not synthesized in the body; a person receives the necessary vitamins from various nutrients. Hypovitaminosis occurs when there is a lack of vitamins in food, vitamin deficiency occurs when they are completely absent. The main source of vitamins is plants. The biological significance of the vitamin lies in its corrective effect on metabolism. Vitamins enhance the chemical reactions occurring in the body, affect the body's absorption of nutrients, help normal cell growth and development of the entire body, are part of the body's enzymes and ensure their normal function and activity.

Key words: vitamin, tubers, root vegetables, water-soluble vitamins, fat-soluble vitamins.

TUGUNAK VA ILDIZMEVALAR TARKIBIDAGI VITAMINLAR MIQDORINI O'RGANISH

ANNOTATSIYA

Vitaminlar, tirik organizmning hayot faoliyati va normal moddalar almashinuvi uchun zarur bo'lgan organik birikmalar hisoblanadi. Ular turli xil kimyoviy tuzilishga ega bo'lib, oziq moddalar tarkibida qandaydir moddalar yetishmasligi natijasida odamlar kasal bo'lishi to'g'risidagi ma'lumotlar qadimiy Xitoy kitoblarida, keyinchalik Gippokrat asarlarida qayd etilgan. Vitaminlar organizmda sintez qilinmaydi, kishi o'zi uchun zarur vitaminlarni turli ovqat moddalari bilan oladi. Ovqatda vitaminlar yetishmaganda gipovitaminoz, mutlaqo bo'lmaganda avitaminoz paydo bo'ladi. Vitaminning asosiy manbai o'simliklardir. Vitaminning biologik ahamiyati moddalar almashinuviga rostlovchi ta'sir etishdan iborat. Organizmda vitaminlar sodir bo'ladigan kimyoviy reaksiyalarni kuchaytiradi, organizmning oziq moddalarni o'zlashtirishiga ta'sir ko'rsatadi, hujayralarning normal o'sishiga va butun organizmning rivojlanishiga yordam beradi, organizmda fermentlar tarkibiga kirib, ularning normal funksiyasi va faolligini ta'minlaydi.

Kalit so'zlar: vitamin, tugunaklar, ildiz mevalar, suvda eruvchi vitaminlar, yog'da eruvchi vitaminlar.

ИЗУЧЕНИЕ КОЛИЧЕСТВА ВИТАМИНОВ, СОДЕРЖАЩИХСЯ В КОРНЯХ И КОРНЕВЫХ ПЛОДАХ

АННОТАЦИЯ

Витамины—это органические соединения, необходимые для жизнедеятельности и нормального обмена веществ живого организма. Они имеют разную химическую структуру, а сведения о том, что люди заболевают из-за недостатка тех или иных веществ в составе питательных веществ, зафиксированы в древних китайских книгах, а позже и в трудах Гиппократов. Витамины не синтезируются в организме, необходимые витамины человек получает с различными пищевыми веществами. Гиповитаминоз возникает при недостатке витаминов в пище, авитаминоз—при их полном отсутствии. Основным источником витаминов—растения. Биологическое значение витамина заключается в корректирующем воздействии на обмен веществ. Витамины усиливают химические реакции, происходящие в организме, влияют на усвоение организмом питательных веществ, помогают нормальному росту клеток и развитию всего организма, входят в состав ферментов организма и обеспечивают их нормальную функцию и активность.

Ключевые слова: витамин, клубни, корнеплодов, водорастворимые витамины, жирорастворимые витамины.

In 1880, the Russian scientist N.N. Lunin experimentally proved the necessity of a food component, which was still unknown at that time, for the normal functioning of the body. It got its name vitamin (vita is the Latin word meaning life) at the suggestion of the Polish biochemist K. Funk. Now there are more than thirty compounds related to vitamins. There are vitamins and vitamin-like compounds, and it has not always been proven that vitamin-like compounds cannot be completely replaced. They include bioflavonoids (vitamin P), pangamic acid (vitamin B₁₅), paraaminobenzoic acid (vitamin B₁₀), orotic acid (vitamin B₁₃), choline (vitamin B₄), inositol (vitamin B₈), methylmethionine sulfonyl chloride (vitamin B₁₂), lipoic acid, carnitine. Some products contain provitamins, that is, compounds that turn into vitamins in the body [1].

Vitamins are irreplaceable factors of nutrition and must be taken into the body regularly in certain amounts with food. All vitamins are conditionally divided into water-soluble and fat-soluble vitamins based on the quantitative characteristics of their metabolism in the body [2].

Vitamins have the following properties:

- they occupy a certain place in the main exchange processes;
- is not produced in the human body in the required amount and should be taken with food;
- includes micronutrients, that is, their daily need is expressed in microquantities (milligrams or micrograms);
- cases of hypovitaminosis (vitamin deficiency) when taken with food have clinical and (or) laboratory symptoms [3].

Vitamins are mainly found in large quantities in fruits and vegetables. In particular, we are talking about the number of vitamins contained in tubers and roots [4].

It is not for nothing that older representatives of our people, who have seen a lot, describe potatoes as "second bread". The reason is that potatoes, which are in high demand both in everyday life and in the economy, are one of the most consumed products after bread for family needs. Compared to other root vegetables, carrots are the most popular vegetable in our country. Therefore, we studied the amount of vitamins in tubers and tubers and obtained the theoretical data presented in Table 1 below [5].

Table 1

Tubers and tubers contain the following vitamins

№	Name and designation of vitamins	VQuantity content in potatoes	Quantity content in Red carrot	Quantity content in yellow carrots
1.	Vitamin A (retinol)	-	835 mkg	2 mg
2.	Vitamin B ₁ (thiamine)	0,033-0,12 mg	0,025-0,083 mg	0,05 mg
3.	Vitamin B ₂ (riboflavin)	0,023-0,122 mg	0,031-0,068 mg	0,07 mg
4.	Vitamin B ₅ (pantothenic acid)	0,30-0,38 mg	0,27 mg	0,3 mg
5.	Vitamin B ₆ (pyridoxine)	0,14-0,30 mg	0,098-0,146 mg	0,1 mg
6.	Vitamin B ₉ (folic acid)	19-57 mkg	19-47 mkg	9 mkg
7.	Vitamin C (ascorbic acid)	20,0-26,4 mg	3,5-5,9 mg	5 mg
8.	Vitamin E (alpha tocopherol)	0,050-0,190 mg	0,320-0,950 mg	0,4 mg
9.	Beta tocopherol	-	0,01 mg	
10.	Vitamin B ₃ (PP, nicotinic acid)	1,16-2,36 mg	0,560-1,46 mg	1,1 mg
11.	Vitamin K	16 mkg	10,0-20,2 mkg	
12.	Vitamin B ₇ (Biotin)	0,1 mkg	2,9-4,1 mkg	0,6 mg
13.	Beta-carotene	4-20 mkg	5650-16300 mkg	12 mg
14.	Alpha carotene	-	3477 mkg	
15.	Lutein + zeaxanthin	-	256 mkg	-
16.	Lycopene	-	1 mkg	
17.	Vitamin B ₄ (choline)	11 mg	8,8 mg	8,8 mg
18.	Methylmethionine sulfonium (vitamin U)	0,17 mg	0,12 mg	-

The amount of water-soluble vitamins was studied by the method of high-performance liquid chromatography.

Water-soluble vitamins in the sample were determined using a high-performance liquid chromatography method. 5-10 g is taken from the drawer on an analytical balance 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. 25 ml of 40 percent ethanol was added to the remaining part and re-extracted 2 times.

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 [6].

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.

Phosphorous, acetate buffer systems and acetonitrile were used as eluents in the literature for the determination of water-soluble vitamins by YUSSX. We used an acetate buffer system and acetonitrile.

Chromatographic conditions:

- Chromatograph Agilent-1200 (equipped with an autodoser)
- Column Exlipse XDB C 18 (obrashenno-phazny), 5 mkm, 4.6 x250mm
- Diode array detector (DAD), 250 nm identified.
- Flow rate 0.8 ml/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°C, -5 µl input amount (vkol)

First, working standard solutions and then prepared working solutions were introduced into the chromatograph.

The following diagram 1 shows the vitamins contained in red carrots grown in Koson district, Kashkadarya region, Republic of Uzbekistan, and the amount of vitamins contained in red carrots is shown in table 2.

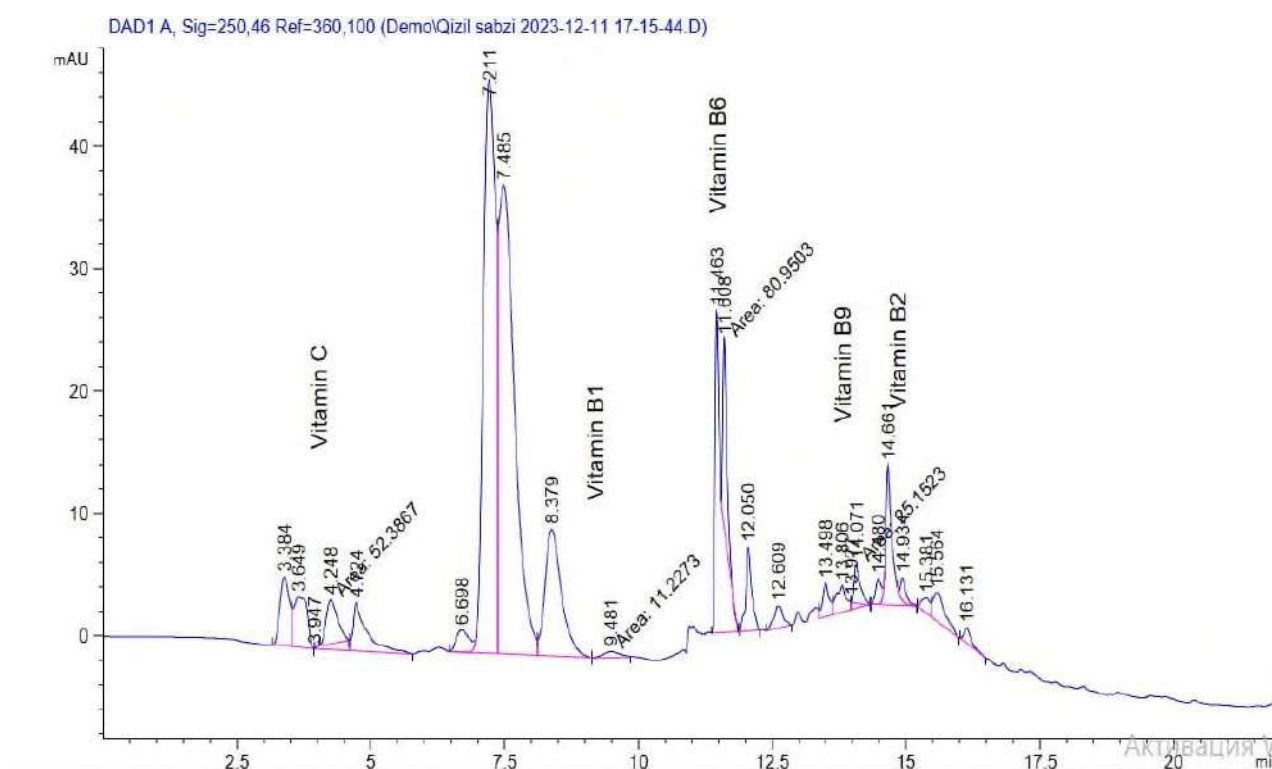


Diagram 1. Vitamins in red carrots

Table 2

The number of vitamins in red carrots

№	Product	Vitamins					
		B ₁	B ₂	B ₆	B ₉	PP	C
		Concentration mkg/g					
1	Red carrots	7,8	35,6	49,8	14,4	8,3	17,1

In conclusion, we can say that fruits and vegetables should have a special place in the diet. Because of the low molecular weight of all vitamins, their role in the human body is involved in the organization of all basic processes. Although vitamins are needed in small amounts by the human body, they play an important role in metabolism. Therefore, vitamins are the most important substances in the course of chemical reactions in the body.

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ISSN: 2181-4058
DOI Journal 10.56017/2181-4058

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Муассис: «IMFAKTOR Pages» масъулияти чекланган жамияти.

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