Journal of Chemistry of Goods and Traditional Medicine

J Chem Good Trad Med, Volume 3, Issue 4, 2024 Traditional Medicine

CHEMICAL COMPOSITION AND MEDICINAL PROPERTIES OF TUSSILAGO FARFARA (TUSSILAGO FARFARA L) PLANT (SPUTUM EXPECTORANT)

Nurillo K. Tulakov
Andijan State University, Associate Professor of Chemistry, Doctor of Philosophy in Chemistry (PhD)
https://orcid.org/0009-0008-2788-1166

Sabrokhon A. Adkhamova
Andijan State University, Master's student of the Department of Chemistry
https://orcid.org/0009-0004-6674-5459
E-mail: adxamovasabroxon2@gmail.com

DOI: https://doi.org/10.55475/jcgtm/vol3.iss4.2024.352

Keywords:
coltsfoot, extract, vitamin, medicinal substances, HPLC

Abstract
The vitamins contained in the ordinary white pepper plant were determined. A 100g sample was used for the experimental analysis of the plant's chemical composition. The analysis revealed that the plant contains 8 different vitamins. Standard solutions and sample extracts were analyzed using an LC-40 Nexera Lite high-performance liquid chromatograph equipped with an LC-40D pump, a SIL-40 autosampler, an SPD-M40 photodiode array detector (PDA), and LabSolution ver.6.92 software.

How to Cite
Tulakov, N. K., & Adkhamova, S. A. CHEMICAL COMPOSITION AND MEDICINAL PROPERTIES OF TUSSILAGO FARFARA (TUSSILAGO FARFARA L) PLANT (SPUTUM EXPECTORANT). Journal of Chemistry of Goods and Traditional Medicine, 3(4). https://doi.org/10.55475/jcgtm/vol3.iss4.2024.352

INTRODUCTION

Protection of medicinal plants, cultural cultivation, processing and rational use of available resources have become one of the urgent problems of today. We studied the information about one of the medicinal plants. We determined the percentage of vitamins in the plant. It is possible to use the plant of common sedum in folk medicine and in medicine as various ointments and medicines.

METHODOLOGY. Common sedge, Ko`ka-Mat' i macheha-Tussilago farfara L. Belongs to the family of sedges and grows in Uzbekistan. The name of the species is in Latin "tussis" - cough, "agere" - effect. It is given because the plant is a cure for cough, meaning to help. The chemical composition of the plant has been studied, and the flower basket contains faradiol, arnidiol, sigmasterin, taraxandin, sitosterol and additives [1].

The plant is mainly in Tashkent, Fergana, Samarkand and Surkhandarya regions, partly in Jizzakh and Kashkadarya regions, on the slopes of mountains, on the banks of rivers and streams, weeds and shrubs in sparse senescences that often do not have permanent lawns. grows with[2]

In medicine, the leaves are used as an expectorant and softening agent. In the form of tinctures, they are also used in the composition of chest sweating teas for bronchitis, laryngitis, and bronchiectasis. It is also used in lung abscess and gangrene. Externally, it is used as an emollient, disinfectant and anti-inflammatory agent [3].

Determination of the amount of water-soluble vitamins in the extract by the HPLCh method

Experience part. Reagents. Vitamin B12 was obtained from "Rhydburg Pharmaceuticals" (Germany), vitamin C from "Carl Roth GmbH" (Germany), B9 from "DSM Nutritional Products

GmbH" (Germany), vitamins B1, B2, B3, B6, PP from "BLDPharm" (China). . HPLC grade water, acetonitrile, chemically pure grade acetic acid and sodium hydroxide reagents were used.

The amount of water-soluble vitamins in the plant was determined using a LC-40 Nexera Lite high-performance liquid chromatograph manufactured by Shimadzu, Japan.

Preparation of standard solutions. C (CAS 50-81-7), B1 (CAS 59-43-8), B6 (CAS 58-56-0), B3 (CAS 59-67-6), B12 (CAS 68–19–9) and Solutions of PP (CAS 98-92-0) vitamins (100 mg/l) are prepared by dissolving 5 mg of each vitamin in 50 ml of 0.1 N HCl solution. Standard solutions of vitamins B2 (CAS 83-88-5) and B9 (CAS 59-30-3) were prepared by dissolving 5 mg of these vitamins in 50 ml of 0.025% sodium hydroxide solution. Then, 200 µl of the initial B1, B6, B3, B12, PP vitamins were mixed and a solution with a concentration of each vitamin of 14,286 mg/l was prepared. In this way, standard solutions of 7.143, 3.571, 1.786 mg/l were prepared. Standard solutions of vitamin C with concentrations of 286, 143, 71.5, 57.2 mg/l were also prepared. Pure water for a concentration of 0 mg/l was used to make a calibration graph.

Preparation of sample extract. For the extraction of water-soluble vitamins, 1 g of the tested sample was measured, placed in a 50 ml conical flask, and 25 ml of 0.1 N HCl solution was added. The mixture was extracted in an ultrasonic bath of GT SONIC-D3 (China) at a temperature of 60 oC for 20 minutes. Then the mixture was cooled, filtered and made up to 25 ml with water in a volumetric flask. 1.5 ml of the extract was filtered through a 0.22 µm syringe filter and placed in a vial and used for analysis.

Chromatographic conditions.

Identification of vitamins. Standard solutions and sample extracts LC-40 Nexera Lite high performance liquid chromatograph consisting of LC-40D pump, SIL-40 autosampler, SPD-M40 photo-diode array detector (PDA) and LabSolutions ver. 6.92 software was analyzed. Shim pack GIST C18 (150 × 4.6 mm; 5 µm, Shimadzu, Japan) reverse-phase column and a gradient mobile phase consisting of acetonitrile (A) and a 0.25% solution of acetic acid in water (B) (Table 1) was used. The injection volume was set at 10 µL, the flow rate at 0.6 mL/min, and the column thermostat temperature at 40 °C. Analytical signal (peak area) of each vitamin was recorded at three wavelengths 265, 291, 550 nm (Figures 1-3). A 15-minute gradient was used to determine vitamin C (Table 2) and the analytical signal was measured at a wavelength of 265 nm.

Table 1. Mobile phase gradient program in the determination of vitamins.

Time, minutes	Acetonitrile (A), %	0.5% acetic acid (B), %
0	0	100
3	0	100
14	20	80
17	50	50
18	0	100
25	Finish	

Table 2. A mobile phase gradient program for the determination of vitamin C.

Time, minute	Acetonitrile (A), %	0,5 % acetic acid (B), %
0	0	100
2	0	100
6	50	50
6,01	0	100
15	Finish	

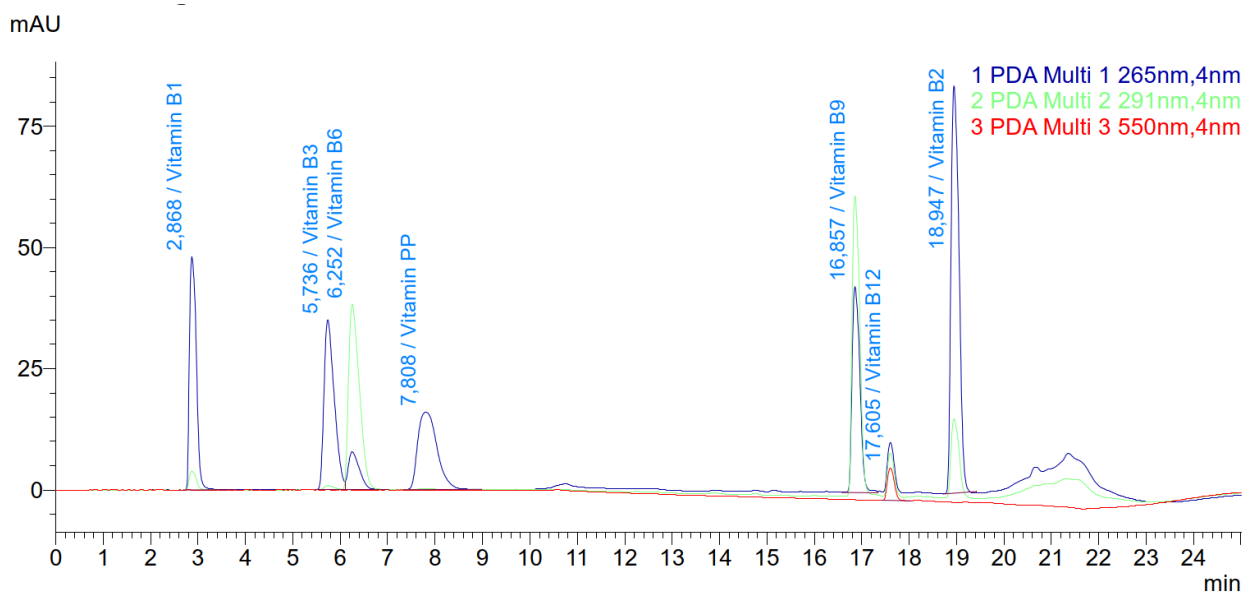


Figure 1. Chromatogram of standard solution of vitamins.

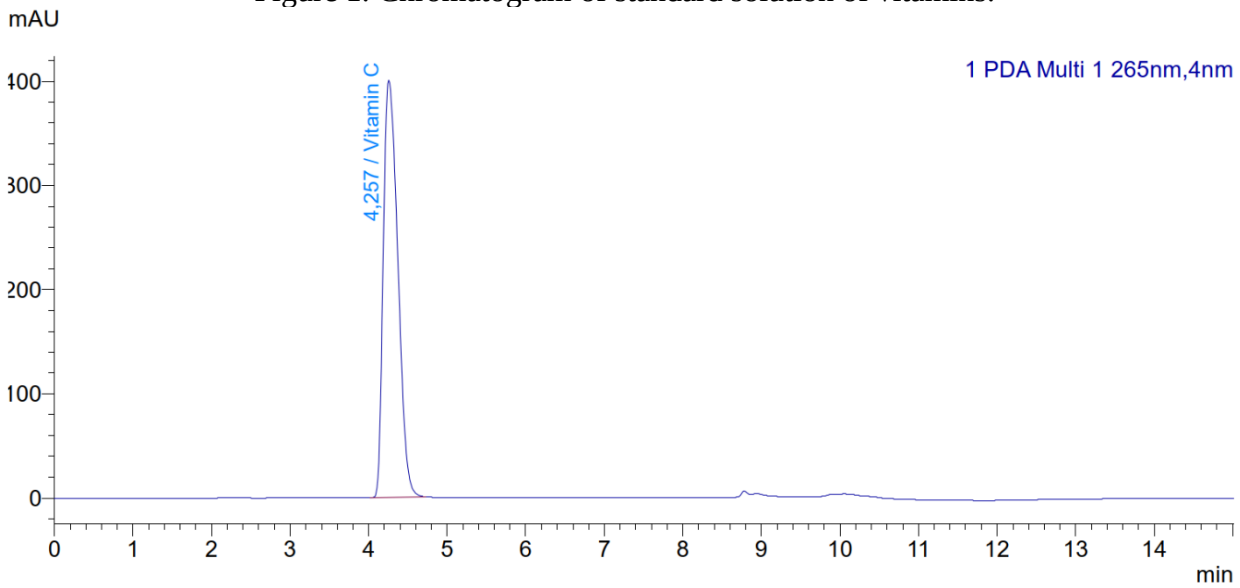


Figure 2. Chromatogram of Vitamin C standard solution.

The results obtained.

Determination of vitamins in sample extract. A chromatogram of the sample extract (Figures 3, 4) was obtained, and based on the results, the amount of vitamins in 100 g of fruit was calculated using the following formula and presented in Table 3.

$$X = \frac{C_{vit} \cdot V_{extract}}{m_{sample}} \cdot 100\ g$$

Here, X is the amount of vitamins in 100 grams of fruit, mg;
Cvit - the concentration of the vitamin in the extract determined by the **HPLCh** method, mg/l;
Vextract – volume of sample extract, l;
Msample - sample mass taken for extract preparation.

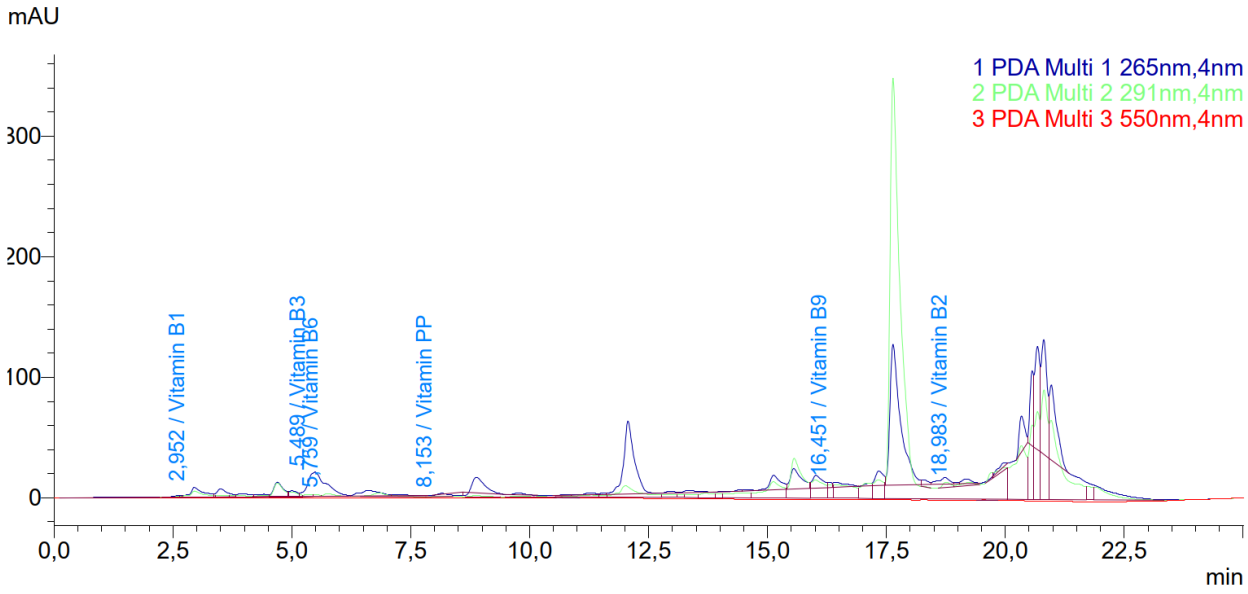


Figure 3. Chromatogram for determination of vitamins in sample extract.

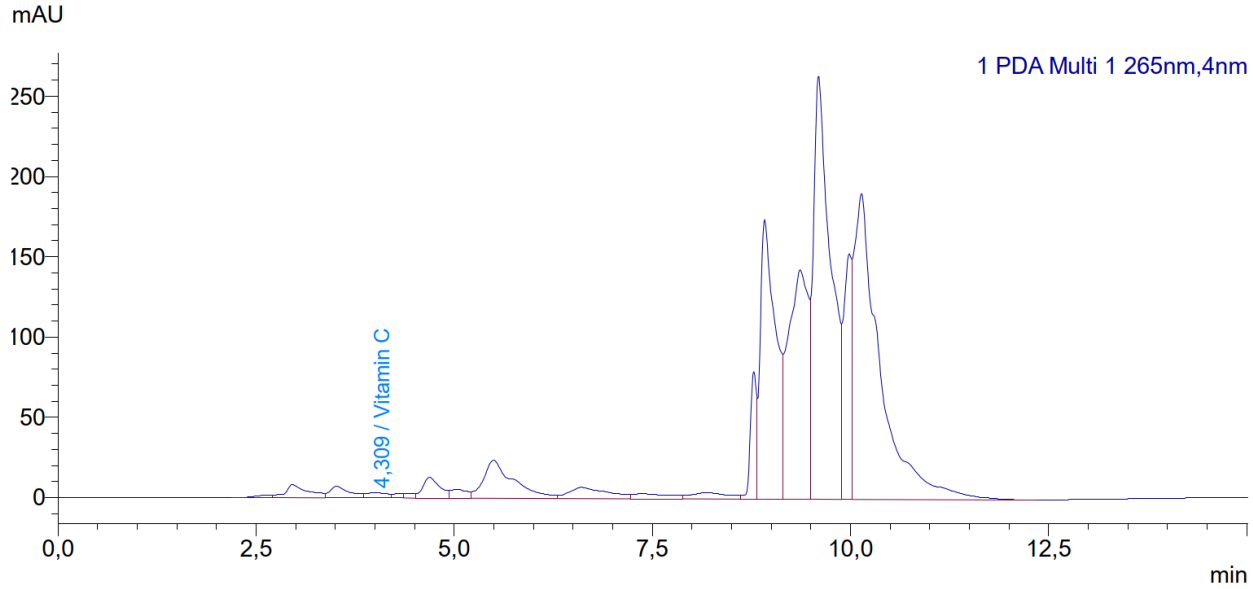


Figure 4. Chromatogram for determining the amount of vitamin C in the sample extract.

Table 3. Amount and retention times of vitamins in the extract.

Vitamin	Holding time, sec	Consentratsion, mg/l	Amount per 100g sample, mg
Vitamin B_1	2,952	4,469	11,173
Vitamin B_3	5,489	14,431	36,078
Vitamin PP	8,153	0	0,000
Vitamin B_9	16,451	2,242	5,605

Vitamin B_2	18,983	0,403	1,008
Vitamin B_6	5,759	0,864	2,160
Vitamin B_{12}	Not founded	0	0,000
Vitamin C	4,309	0,882	2,205

CONCLUSION. The experimental analysis of the chemical composition of the plant (Table 3) showed that among the 8 vitamins analyzed in the extracts of 100 grams of the sample, the peak of Vitamin B3 was clearly manifested. We can see that there is no peak of Vitamin PP and Vitamin B12. We have received information that vitamins are organic compounds necessary for the life activity and normal metabolism of a living organism.

References

1. O’zbekiston Reespubliksi Prezidentining 10.04.2020 yildagi PQ-4770-son “ Yovvoyi holda o’suvchi dorivor o’simliklarni muhofaza qilish, madaniy holda yetishtirish, qayta ishlash va mavjud resurslardan oqilona foydalanish choratadbirlari” to’g’risidagi qarori "Экономика и социум" №6(97)-1 2022 www.iupr.ru 242
2. Belolipov I.B., To’xtaev B. Yo., Qarshiboev H.Q. “O’simliklar introduksiyasi” fanidan ilmiy- tadqiqot ishlarini o’tkazishga oid metodik ko’rsatmalar.(to’ldirilgan 2 nashr).- Guliston,2015.- 32b.
3. To’xtaev B. Yo., Maxkamov T.X., To’laganov A., Mamatkarimov A.I., Mahmudov A.B., Allayorov M.O’. “Dorivor va ozuqabop o’simliklarni plantatsiyalarini tashkil etish va xom-ashyosini tayyorlash bo’yicha metodik qo’llanma”, Toshkent- 2015.
4. Toyjonov K., Nigmatullaev B.A., Sagdullaev Sh.Sh. “O’zbekiston dorivor o’simliklari lotincha nomlanishining etimologik lug’ati”. Toshkent- 2016.
5. Haydarov Q.H., Hojimatov Q.H. O'zbekiston o'simliklari. Toshkent,. "O'qituvchi", 1992 y. - 241.
6. Karimov V., SHomahmudov A. Xalq tabobati va zamonaviy ilmiy tibda qo'llaniladigan shifobaxsh o'simliklar. Toshkent, “Ibn Sino” NMB, 1993 y. - 320 b.
7. Xolmatov H.X., Habibov Z. H., Farmakognoziya [Darslik], T., 1967;
8. Nabiyev M, Shifobaxsh giyoxlar, T., 1980;
9. Hojimatov Q., Olloyorov M. O'zbekistonning shifobaxsh usimliklari va ularni muhofaza qilish, T., 1988.
10. Abdullaev, S. S., Mamatkulova, S. A., Askarov, I. R., & Abdirazakov, A. (2023). THE DETERMINATION OF WATER-SOLUBLE VITAMINS IN THE UNABI EXTRACT BY HPLC METHOD. Journal of Chemistry of Goods and Traditional Medicine, 2(2), 84–101. https://doi.org/10.55475/jcgtm/vol2.iss2.2023.175