

QIZILPOYCHA (HYPERICUM SCABRUM L.) O'SIMLIGINI YUQORI SAMARALI SUYUQLIK XROMATOGRAFIYASI (HPLC) USULIDA VITAMINLAR TAHLILI

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Annotatsiya. *Mazkur maqolada Qizilpoycha (Hypericum scabrum L.) o'simligining vitamin tarkibi askorbin kislota (C vitamini), filloxinon (K1 vitamini) va retinol (A vitamini) yuqori samarali suyuqlik xromatografiyasi (HPLC) usuli yordamida aniqlandi. Tadqiqot natijalariga ko'ra, o'simlik tarkibida suvda eruvchan va yog'da eruvchan vitaminlar mavjudligi aniqlanib, ularning miqdoriy ko'rsatkichlari baholandi. Olingan natijalar o'simlikning biologik faolligini asoslashda muhim ahamiyatga ega.*

Kalit so'zlar: *Hypericum scabrum, vitaminlar, HPLC, flavonoidlar, biofaol moddalar.*

Abstract. *In this article, the vitamin content of the plant Hypericum scabrum L. (ascorbic acid (vitamin C), phylloquinone (vitamin K1) and retinol (vitamin A) was determined using the high-performance liquid chromatography (HPLC) method. According to the results of the study, the presence of water-soluble and fat-soluble vitamins in the plant was determined, and their quantitative indicators were evaluated. The results obtained are important in substantiating the biological activity of the plant.*

Keywords: *Hypericum scabrum, vitamins, HPLC, flavonoids, bioactive substances.*

Hypericum scabrum L. — Hypericaceae oilasiga mansub dorivor o'simlik bo'lib, xalq tabobatida keng qo'llaniladi. Ushbu o'simlik tarkibida flavonoidlar, fenolik birikmalar, katexinlar va boshqa biofaol moddalar mavjudligi ilmiy jihatdan tasdiqlangan.

So'nggi tadqiqotlar shuni ko'rsatadiki, ushbu o'simlik antioksidant faollikka ega bo'lib, bu uning tarkibidagi biologik faol komponentlar bilan bog'liq. Vitaminlar esa ushbu biofaol kompleksning muhim qismi hisoblanadi.

Vitaminlar miqdorini HPLC usulida aniqlash metodikasi

1. Asbob-uskunalar

Tahlil yuqori samarali suyuqlik xromatografiya tizimida bajarildi (UV-Vis detektor bilan jihozlangan).

Kolonka sifatida **Agilent Poroshell 120 EC-C18** (4.6 × 250 mm, 5.0 μm, ishlatildi).

2. Reagentlar va erituvchilar

- Metanol (HPLC grade)
- Asetonitril (HPLC grade)
- Tetrahidrofuran (THF)
- Muz sirka kislotasi (glacial acetic acid)
- Distillangan yoki deionizatsiyalangan suv

Standart moddalar:

- **Vitamin A**
- **Vitamin D**
- **Vitamin E**
- **Vitamin K**
- **Vitamin C**

3. Mobil fazalarni tayyorlash

Mobil faza A:

- Suv : THF = 95 : 5 (v/v)
- 0.05% (v/v) sirka kislotasi qo'shildi

Mobil faza B:

- Asetonitril : Metanol : THF = 75 : 25 : 5 (v/v/v)
- 0.035% (v/v) sirka kislotasi qo'shildi

Har ikki mobil faza 0.45 μ m membrana filtr orqali filtrlandi va ultratovush vannasida degazatsiya qilindi.

4. Xromatografik sharoitlar

Parametr	Qiymat
Kolonka	Poroshell 120 EC-C18 (2.1 \times 75 mm; 2.7 μ m)
Oqim tezligi	0.9 ml/min
Kolonka harorati	45 $^{\circ}$ C
Namuna termostati	5 $^{\circ}$ C
Deteksiya to'lqin uzunligi	256 nm
Ma'lumot yig'ish tezligi	20 Hz
Inyeksiya hajmi	10–50 μ l

5. Gradient elyutsiya dasturi

Vaqt (min)	Mobil faza B (%)
0	30
3	50
15	75
20	100
25	100
30	30
40	30

Tahlil yakunida kolonkani 10 minut davomida boshlang'ich sharoitda (30% B) re-ekvilibrlash amalga oshirildi.

6. Namuna tayyorlash

1. Tekshirilayotgan o'simlik aralashmasi 40–45 °C da doimiy massa holatigacha quritildi va maydalandi.

2. Quritilgan xom ashyodan **1.000 g** aniq tortib olindi.

3. Namuna 300 ml hajmli konussimon kolbaga solindi.

4. 100 ml miqdorda **metanol : suv (50 : 50, v/v)** aralashmasi qo'shildi.

5. Ekstraksiya orbital sheykerda **200 rpm tezlikda 2 soat** davomida olib borildi.

6. So'ng aralashma **30 minut ultratovush vannasida** ishlov berildi.

9. Ekstrakt xona haroratiga sovitildi.

10. Ekstraktdan **1.0 ml** olinib, 100 ml hajmli o'lchov kolbasiga o'tkazildi.

11. Metanol : suv (50 : 50, v/v) aralashmasi bilan belgi chizig'igacha yetkazildi va aralashtirildi.

7. Eritma avval filtr qog'ozi orqali, keyin 0.45 µm membrana filtri orqali filtrlandi.

7. Standart eritmalarni tayyorlash

1. Har bir vitamin standartidan **10.0 mg** aniq tortib olindi.

2. Moddalar 100 ml hajmli o'lchov kolbasiga solindi.

3. Metanol : suv (50 : 50, v/v) aralashmasida eritildi.

4. Eritma hajmi shu erituvchi bilan 100 ml ga yetkazildi.

5. Eritma 0.45 µm membrana filtri orqali filtrlandi.

Natijada har bir modda uchun konsentratsiya:

$$C = 0.1 \text{ mg/ml (100 } \mu\text{g/ml)}$$

Standart eritmalar 2–8 °C da, yorug'likdan himoyalangan holda saqlandi.

8. Tahlil tartibi

1. Tizim boshlang'ich gradient sharoitida kamida 10–15 minut barqarorlashtirildi.

2. Standart eritmalar yuborilib retention time va pik maydonlari qayd etildi.

3. Namuna eritmalari tahlil qilindi.

4. Miqdoriy hisoblash tashqi standart usuli bilan amalga oshirildi.

9. Hisoblash

Vitamin miqdori quyidagi formula yordamida hisoblandi:

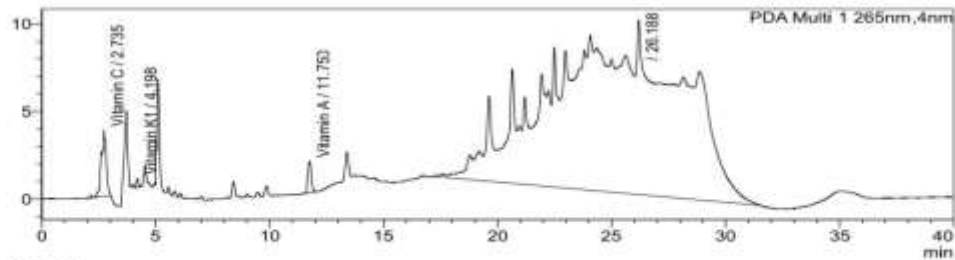
$$X = \frac{S_{namuna}}{S_{standart}} \times C_{standart} \times DF$$

bu yerda:

- S_{namuna} — namuna pik maydoni
- $S_{standart}$ — standart pik maydoni
- $C_{standart}$ — standart eritma konsentratsiyasi
- DF — suyultirish koeffitsienti (100)

Natija mg/g yoki % hisobida ifodalanadi.

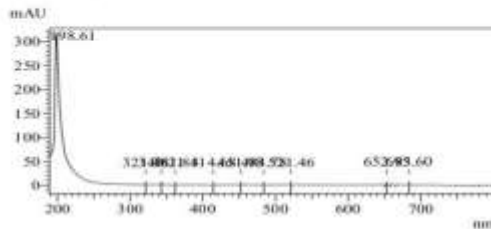
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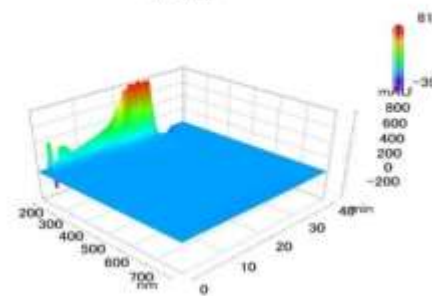
<Peak Table>

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	2.735	56815	3776	0.000	mg/L		Vitamin C
2	4.198	3270	508	0.000	mg/L		Vitamin K1
3	11.750	19085	1795	0.000	mg/L		Vitamin A
4	26.188	3746319	10002	0.000			
Total		3825489	16081				

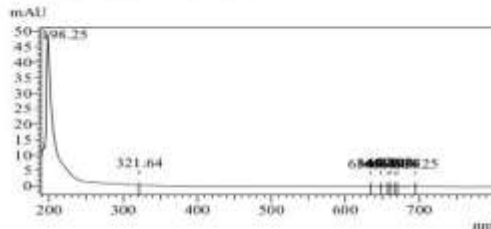
ID# : 1
Retention Time : 2.735 min
Compound Name : Vitamin C
Spectrum Operation : None



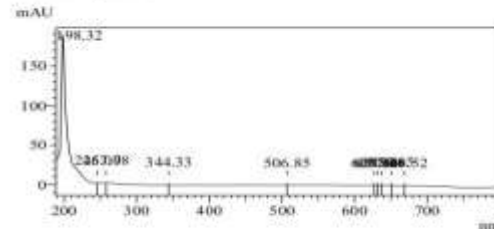
3D Graph



ID# : 2
Retention Time : 4.198 min
Compound Name : Vitamin K1
Spectrum Operation : None



ID# : 3
Retention Time : 11.750 min
Compound Name : Vitamin A
Spectrum Operation : None



Qizilpoycha o'simligi tarkibidagi vitaminlarning foiz miqdori

Vitamin C								
X1 =	$\frac{56815}{19652551}$	$\frac{25}{100}$	$\frac{100}{1000}$	$\frac{1000}{1}$	$\frac{99}{100}$	$\frac{1}{1}$	$\frac{1}{1}$	= 0,07
Vitamin K1								
X2 =	$\frac{3270}{6465060}$	$\frac{50}{100}$	$\frac{100}{1000}$	$\frac{1000}{1}$	$\frac{99}{100}$	$\frac{1}{1}$	$\frac{1}{1}$	= 0,03
Vitamin A								
X4 =	$\frac{19085}{2398042}$	$\frac{15}{100}$	$\frac{100}{1000}$	$\frac{1000}{1}$	$\frac{99}{100}$	$\frac{1}{1}$	$\frac{1}{1}$	= 0,12

Xulosa. Hypericum scabrum L. o'simligida: C, K1 va A vitaminlari aniqlandi. O'simlik farmatsevtik qo'llanilish uchun istiqbolli xom ashyo ekanligi tasdiqlandi.

Foydalanilgan adabiyotlar.

1. Pharmacognosy Reviews – Hypericum turlari kimyoviy tarkibi
2. Journal of Chromatography A – HPLC usullari

3. AOAC Official Methods – Vitaminlar tahlili
4. European Pharmacopoeia – Dorivor o‘simliklar standartlari
5. Natural Product Research – Hypericum scabrum fitokimyosi
6. WHO Guidelines on Good Agricultural and Collection Practices
7. Uzbek farmakognoziya manbalari