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**PAULOWNIYA VA ROSMARINUS O'SIMLIK BARGI TARKIBIDAGI FLAVONOIDLAR MIQDORINI ANIQLASH****ОПРЕДЕЛЕНИЕ КОЛИЧЕСТВА ФЛАВОНОИДОВ В ЛИСТЬЯХ РАСТЕНИЙ ПАВЛОВНИИ И РОЗМАРИНУС****DETERMINATION OF THE AMOUNT OF FLAVONOIDS IN PAULOWNIA AND ROSMARINUS PLANT LEAVES****Mamatqulova Surayyoxon Abdusamatovna<sup>1</sup>** <sup>1</sup>Farg'ona davlat universiteti, k.f.b.f.d.(PhD), dotsent**Usmanova Tursunoy Erkinovna<sup>2</sup>** <sup>2</sup>Farg'ona davlat universiteti, o'qituvchi**Asqarov Ibrohimjon Rahmonovich<sup>3</sup>** <sup>3</sup>Andijon davlat universiteti, kimyo fanlari doktori, professor**Annotatsiya**

Mazkur tadqiqot ishida Respublikamizga introduksiya qilingan, Farg'ona viloyati hududida o'suvchi Paulownia va Rosmarinus o'simlik barglari tarkibidagi flavonoidlari YuSSX usulida o'rganildi. O'rganilgan o'simlik namunalari natijasi tahliliga ko'ra ularning tarkibida 6 xildagi flavonoidlar mavjudligi aniqlandi.

**Abstract**

In this study, the flavonoids contained in the leaves of Paulownia and Rosmarinus, which were introduced to our country and grow in the territory of Fergana region, were studied by the HPLC method. According to the analysis of the results of the studied plant samples, it was found that they contain 6 types of flavonoids.

**Аннотация**

В данном исследовании методом ВЭЖХ изучены флавоноиды, содержащиеся в листьях Paulownia и Rosmarinus, завезенных в нашу страну и произрастающих на территории Ферганской области. По анализу результатов изученных образцов растений установлено, что они содержат 6 видов флавоноидов.

**Kalit so'zlari:** Flavonoidlar, digidrokversitin, rutin, salidrozd, senerozid, lyutionin, kversitin.

**Key words:** Flavonoids, dihydroquercetin, rutin, salidroside, seneroside, luteinin, quercetin.

**Ключевые слова:** флавоноиды, дигидрокверцетин, рутин, салидрозид, сенерозид, лютеинин, кверцетин.

**INTRODUCTION**

Flavonoids are a structurally variable group of polyphenolic compounds widely distributed in nature, and more than 8000 flavonoids have been identified so far [1]. The health benefits of flavonoids are mainly related to their antioxidant activity [2]. Flavonoids have a very good protective effect on the human immune system, improve the activity of lymphocytes in the body, and can reduce the deterioration of the immune state caused by radiation damage. At the same time, flavonoids protect DNA and prevent gene mutation[3].

**LITERATURE ANALYSIS AND METHODOLOGY**

*Paulownia* is a tree belonging to the *Paulowniaceae* family[4]. Its homeland is Southeast Asia (especially China), where it has been cultivated for decorative, cultural and medicinal purposes for more than 2000 years [4,5]. It is also known as queen tree, Kiri tree, emperor tree and phoenix tree[6]. Medicinal rosemary (*Rosmarinus officinalis* L.) is also a plant rich in essential oil, it belongs to the family of rosaceae, and it is an evergreen shrub up to 1.5-2 meters tall. The homeland is the countries around the Mediterranean Sea [7]. This plant is used in perfumery and

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food industry. Many conducted scientific experiments show that this plant can be used not only as a medicine, but also as a natural preservative [8]. *Rosmarinus* has shown strong antibacterial and antifungal effects in many studies.

**RESULT AND DISCUSSION.**

To determine the amount of flavonoids in the leaves of *Paulownia* and *Rosmarinus* plants, samples were collected from the leaves of plants growing in Fergana region in June, dried in natural conditions (in a cool place) at 30-40°C and crushed. The flavonoids contained in the prepared sample were determined using the liquid chromatography method. 5-10 g of the sample is taken on an analytical scale and placed in a 300 ml flat flask. 50 ml of 70% ethanol solution was added to it. The mixture was heated at 70-80°C with intensive stirring for 1 hour, equipped with a magnetic stirrer, reflux condenser, and then stirred at room temperature for 2 hours. The mixture was cooled and filtered. 25 ml of 70% ethanol was added to the remaining part and re-extracted 2 times. The filtrates were combined and made up to the mark in a 100 mL volumetric flask with 70% ethanol. The resulting solution was spun in a centrifuge at a speed of 6000-8000 rpm for 20-30 minutes. The resulting solution was taken from the upper part for analysis. First, working standard solutions and then prepared working solutions were introduced into the chromatograph. Qualitative determination of flavonoids was determined by comparing retention time of standard samples - dihydroquercetin, quercetin, rutin, luteolin, seneroside and salidroside. Quantitative analysis was performed by calculating the area of the peaks corresponding to the solutions. Chromatograms are presented in

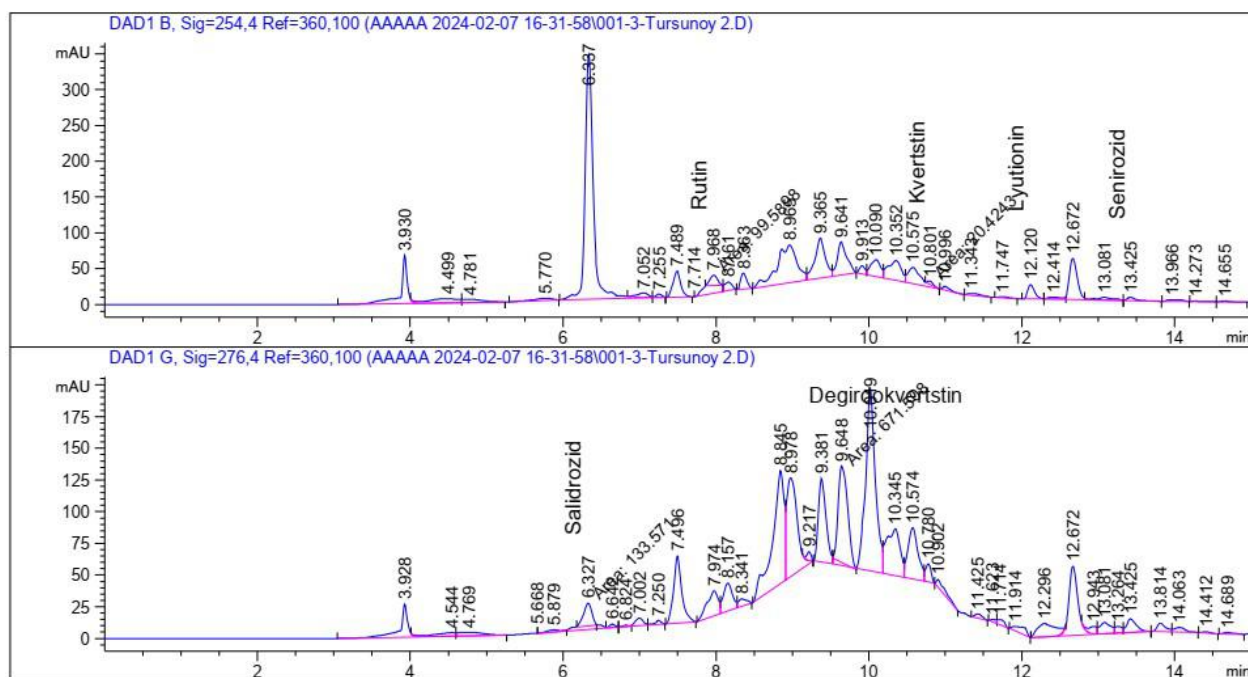


Figure 1. HPLC chromatogram of flavonoids.

According to the chromatograms, the retention time of 7.968 minutes belongs to rutin. The next retention time at 10.575 min is indicative of peaks belonging to quercetin and the retention time at 12.120 min is luteolin. At 13.425 minutes of capture, senerosis was detected. Dihydroquercetin, which had the highest amount, had a retention time of 10.019 minutes. Salidroside had a retention time of 6.327 minutes. According to the results, the amount of flavonoids determined increases in the following order: quercetin < luteinin < seneroside < salidroside < rutin < dihydroquercetin. The analysis of the sample extract revealed the presence of six phenolic compounds-flavonoids (Table 1).

**Table 1**

**The amount of flavonoids in the sample obtained as a result of the analysis.**

No	Amount of flavonoids found in plant leaves.	A mixture of <i>Paulownia</i> and
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		<i>Rosmarinus</i> leaves in a 1:1 ratio.
Concentration mg/g		
2.	Dihydroquercetin	18.71
2.	Routine	5.52
3.	Salidroside	5.28
4.	Seneroside	5.13
5.	Luthionine	3.45
6.	Quercetin	1.21

According to the results of analysis of *Paulownia* and *Rosmarinus* plant leaves by liquid chromatography, dihydroquercetin, rutin, salidroside, seneroside, luteinin and quercetin substances belonging to the class of flavonoids were detected. These flavonoids are natural antioxidants, and their beneficial properties in medicinal plants have been studied in the literature review.

### CONCLUSION

In conclusion, taking into account that the flavonoids contained in the leaves of *Paulownia* and *Rosmarinus* plants have excellent biological activity, they can be a valuable resource for the development of new drugs and food additives based on these plant compounds in medicine. showed that it is possible.

### LITERATURE

1. Pietta, P.G. Flavonoids as antioxidants. *J. Nat. Prod.* 2000, 63, 1035-1042.
2. Havsteen, B.H. The biochemistry and medical significance of the flavonoids. *Pharmacol. Ther.* 2002, 96, 67–202.
3. <https://srcyrl.xjcistanche.com/news/basic-knowledge-of-flavonoids-and-the-effects-59143022.html>.
4. Jakubowski, M.; Tomczas, A.; Jelonek, T.; Grzywiński, W. Wykorzystanie Drewna i Możliwości Uprawy Drzew z Rodzaju Paulownia. *Acta Sci. Pol.* 2018, 17, 291–297.
5. Xu, E.; Fan, G.; Niu, S.; Zhao, Z.; Deng, M.; Dong, Y. Transcriptome Wide Profiling and Expression Analysis of Diploid and Autotetraploid *Paulownia tomentosa* × *Paulownia fortunei* under Drought Stress. *PLoS ONE* 2014, 9, e113313.
6. Icka, P.; Damo, R.; Icka, E. *Paulownia tomentosa*, a Fast Growing Timber. *Ann. Valahia Univ. Targoviste Agric.* 2016, 10, 14–19.
7. Islomov B.S., M.A.Hasanov. O'simliklar introduksiyasi. Samarqand 2022.161 b.
8. Jordán M.J., Lax V., Rota M.C., Lorán S., Sotomayor J.A. (2013) Effect of bioclimatic area on the essential oil composition and antibacterial activity of *Rosmarinus officinalis* L. *Food Control.* 30: 463-468.