

# DETERMINATION OF FLAVONOIDS IN SHEPHERD'S PURSE PLANT EXTRACT BY SPECTROPHOTOMETRY METHOD

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## Abstract

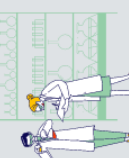
Shepherd's purse (*Inonotus obliquus*), popularly known as chaga, is a medicinal plant that grows on the bark of a birch tree. It is widespread in Eastern Europe, Russia, Korea, China and North America. Chaga, which has been used in traditional medicine since ancient times, is known for its rich composition and health benefits. The Shepherd's purse plant protects the cells of the body from free radicals. Polysaccharides contained in the plant stimulate the body's natural defense system. Some studies have shown that it has anti-tumor and anti-tumor effects. Helps reduce rheumatism, arthritis and other inflammatory diseases.

**Keywords:** Shepherd's purse', plant, extract, flavonoid, medicinal, fungus.

## Introduction

Shepherd's purse is hard, black and uneven, like burnt coal. It can grow mainly on birch trees, as well as on other trees (beech, poplar, maple). But the healing properties are high only when it grows on birch. Shepherd's purse shows its healing properties through its rich chemical composition.

Enter. By the 21st century, along with the use of artificially prepared drugs in the treatment of almost all diseases, the demand for medicinal plants is also increasing [1]. In the territory of Uzbekistan, many plants are distinguished by their healing properties. Today, 750 species of more than 4,300 plants belonging to the local flora are considered medicinal, 112 of which are registered for use in scientific medicine, of which 70 species are actively used in the pharmaceutical industry. In 2019, 48 million dollars worth of processed medicinal plant products were exported. Throughout human history, natural medicines prepared from natural plants have been used as a cure for many diseases [2]. Medicinal plants are plants used in the treatment of humans and animals, in the prevention of diseases, as well as in the food, perfumery and cosmetic industries. It has been determined that there are 10-12 thousand types of medicinal plants on earth. Chemical, pharmacological and functional properties of more than 1000 plant species have been studied. Currently, about 40-47% of the drugs used in medicine are obtained from plant raw materials. Plants are living natural chemical laboratories with a complex structure and the ability to create complex organic substances or compounds from simple inorganic substances. For medicinal purposes, dried herbs, buds, roots, rhizomes, buds, bulbs, barks, leaves, flowers, buds, fruits (seeds), seeds, juice, pulp, essential oil, etc. are used [3]. Shepherd's purse is a plant used by local people in ancient times, and now it is used as food and natural medicine. As a result of the studies, information on the use of medicinal plants in food products was collected on the basis of surveys conducted among residents of the city



of Bukhara and the villages of the region, housewives and the elderly. It should be noted that, based on the requirements of the modern era, the study of the nutritional and medicinal aspects of medicinal plants growing in natural conditions, scientific and practical importance determines the possibilities of their use in folk medicine [4]. Currently, the reserves of medicinal plants growing in natural conditions are decreasing due to human influence. In order to compensate for this and meet the needs of our people, it would be appropriate to increase medicinal plants and plant them on irrigated lands, taking into account the soil and climate conditions of Uzbekistan.

In order to supply the pharmaceutical industry with medicinal plant raw materials in the future, it will be appropriate to establish and increase the number of farms producing medicinal plants and specialized farms [5]. One hundred and seventeen species of 73 genera belonging to 20 families were used by residents of Kitab district of Kashkadarya region to treat various diseases. The results of this study showed that the local people's lack of knowledge about certain diseases led to the non-recognition of ethnobotanical analysis of plants. The main reason for this is the difficulty of recognizing such diseases in rural areas and the lack of ethnobotanical knowledge. It is worth mentioning that traditional treatment methods using medicinal plants have been preserved in remote villages of Kitab District [6].

In Russian traditional medicine, an extract from the mushroom *Inonotus obliquus* (Fr.) Pilat is used as an antitumor and diuretic. *Inonotus obliquus* has been reported to have anti-inflammatory, immuno-modulatory and hepatoprotective therapeutic effects. This study was designed to investigate the chemical composition and biological properties of aqueous and ethanolic extracts of *Inonotus obliquus* from Finland, Russia and Thailand. Their antioxidant, antimicrobial and antitumor properties, as well as cytotoxicity of various tumor cells, have been tested [7]. The polyphenols in Jagjag plant extract are free radical scavengers, and polysaccharides and several LT compounds partially contribute to the scavenging of DPPH and hydroxyl radicals, respectively. NMR-based metabolomic analysis is a useful method to correlate <sup>1</sup>H-NMR spectra of Chaga extracts with their antioxidant activity, which allows prediction of free radical scavenging potentials by <sup>1</sup>H-NMR spectroscopy [8].

**Methods.** The spectrophotometry method is widely used to study the optical properties of flavonoids and to determine their concentration. Shepherd's purse plant extract was subjected to conventional chemical investigation for identified organic acids and phenolic compounds. Spectrophotometric determination of flavonoids in Shepherd's purse plant extract not only provides high-precision results in the laboratory, but also creates the necessary basis for the use of these compounds for pharmaceutical purposes. This method helps to quickly and effectively determine the amount of flavonoids.

**Results.** Spectrophotometric determination of flavonoids in Shepherd's purse plant extract (or Chaga mushroom) is important for pharmacological research because flavonoids directly affect the antioxidant and therapeutic properties of the extract. Below are the main steps of this analysis method and scientific analysis approaches.

Chaga plant extract (70%) reflects the amount of flavonoids and other bioactive compounds (mg/100 ml). Below is an analysis of the role of each component in the table and its importance:

Table 1

Analysis of flavonoids contained in Shepherd's purse extract

No. Name Amount of flavonoids

mg/100 ml

Robinine Rutin Hypolaetin Isorhamnetin Gallic Acid Hyperazide Quercetin

1 Extract 70 % 45.24 30.98 8.91 15.03 52.52 1.25 22.12

Robinin (45.24 mg/100 ml): One of the components with the highest amount of flavonoids in the extract. Robinine has antioxidant properties and is beneficial in anti-inflammatory and cardiovascular support. Rutin (30.98 mg/100 ml): This flavonoid is known for its ability to strengthen capillary blood vessels. Its amount is significantly higher, increasing the therapeutic efficiency of the extract. Hypolaetin (8.91 mg/100 ml): Although the amount in the extract is relatively low, it is distinguished by its antioxidant and anti-inflammatory properties. Izoramnetin (15.03 mg/100 ml): Izoramnetin is known for its anti-aging and anti-cancer properties. Its average amount increases the pharmacological value of the extract. Gallic acid (52.52 mg/100 ml): The component with the highest concentration. Known for its powerful antioxidant properties, it has anti-cancer and anti-inflammatory effects. Hyperazide (1.25 mg/100 ml): Although the amount is very low, it plays an additional role in antioxidant and anti-inflammatory effects. Quercetin (22.12 mg/100 ml): A flavonoid with anti-inflammatory and immune support properties. It plays an important role in the overall therapeutic properties of the extract.

Gallic acid is the main bioactive component of the extract and has an important place among flavonoids in its antioxidant effect. Robinin and rutin constitute a high proportion of flavonoids in the extract, providing therapeutic and preventive properties. Izoramnetin and quercetin components give the extract additional anti-inflammatory and immunomodulatory properties. The composition of these flavonoids and compounds indicates the anti-inflammatory, antioxidant and anti-tumor potential of chaga extract.

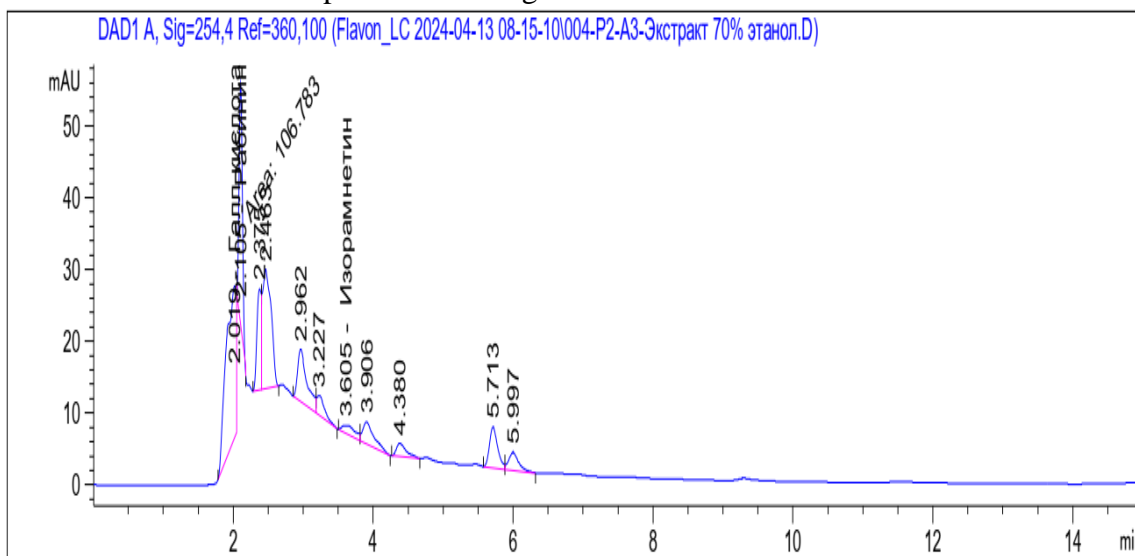


Figure 1. Flavonoids in Shepherd's purse plant extract

The analysis graph shows two main flavonoid components, which are: 3.605 min: The first flavonoid compound. 4.546 min: Second flavonoid compound.

The peak areas of each compound indicate their amounts. The UV detector recorded the absorbance of flavonoids at 254 nm and 269 nm wavelengths. This confirms the presence of flavonoid compounds in the extract.

A 70% ethanol solution is optimal for extracting flavonoids. It extracts most of the flavonoids while preserving their natural properties. Time (in minutes) is marked on the graph, showing the time of release of flavonoid components in the chromatogram. Each peak represents a flavonoid compound at its time. Signal intensity is measured in mAU (milliampere unit). It is related to the concentration of flavonoid and the intensity of light reaching the detector.

The first line is a flavonoid compound, and its peak area corresponds to the concentration of this compound. The second line indicates another flavonoid component. The wavelength of the HPLC signal was measured at 254 nm and 269 nm, which represent UV detector spectra typical for flavonoids.

The total area percentage of each line indicates the percentage of flavonoid components in the total composition. Calculated to identify these.

The concentration of each flavonoid compound is expressed using the "Area" indicator. Signal intensities measured at different wavelengths confirm the presence and quality of flavonoids in the analyzed extract.

### Summary

**Anti-Inflammatory Therapy of Jackfruit Extract:** The extract can be used for medical purposes, such as in the management of arthritis or chronic inflammatory diseases. **Antioxidant supplements:** Used to support cardiovascular health or also in anti-aging preparations. In the cosmetics industry, natural melanin and flavonoids are used to support skin health. Shepherd's purse plant extract contains flavonoids and other bioactive substances, which increases its therapeutic and functional potential. Data obtained from HPLC analysis are used to determine the qualitative and quantitative content of flavonoids.

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