



## **FERULA PLANT: HABITAT, PROPERTIES AND APPLICATION IN UZBEK FOLK MEDICINE**

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### **Annotation**

The article describes the use of ferula in medicine, especially aspects in traditional medicine. And also special attention is paid to biochemical properties, complex substances in the composition of the ferula and the area of its distribution.

**Keywords:** ferula, pharmaceutical industry, medicinal plant, gum tar, oligosaccharides, tangeritin, traditional medicine, curcumol.

### **INTRODUCTION**

As you know, as a result of the rapid development of science in the last century, chemistry developed intensively, through the synthesis of which many new, fast-acting and powerful medicinal substances were obtained. But it turned out that their regular use inevitably adversely affects the human body and leads to a violation of its vital functions [3:5].

Therefore, in the health care system, traditional medicine already plays an important role in a number of countries around the world, especially in Asian countries. As you know, traditional medicine has deep roots, going back to ancient times. To date, traditional medicine has not lost its importance, and in our republic this system is legalized. In particular, the implementation of the decree of the President of the Republic of Uzbekistan dated April 10, 2020 "On measures for the protection, cultivation, processing of wild medicinal plants and rational use of available resources" will allow at the present stage to solve such problems as the cultivation, protection and rational use of medicinal plants, complex processing of medicinal raw materials, based on cost-effective technologies [1]. The Strategy of Actions for the further Development of the Republic of Uzbekistan also defines the tasks" further development of the pharmaceutical industry, providing the population and medical institutions with cheap, high-quality medicines" [2].

Based on these tasks, the cultivation and processing of medicinal plants on the territory of our republic, their widespread use in the pharmaceutical industry is one of the most important areas. There is a need for reforms in the field of protection of medicinal plants, rational use of natural resources, the organization of plantations for the cultivation of medicinal plants and their processing. Therefore, the use of plant products in medical practice is one of the most pressing issues of today.

### **METHODS**

Based on the above, the use of one of the most common medicinal plants of the genus ferula in medicine is of particular importance.



Ferula species are widely distributed in the Caucasus, Central Asia, Eastern Siberia, the Middle East, Iran, Afghanistan, Pakistan, China and India. Ferula grows on sandy deserts, hills, mountain and foothill plains and fertile soils of the Tashkent, Surkhandarya, Kashkadarya, Samarkand, Jizzakh, Navoi, Bukhara regions of Uzbekistan, as well as on the territory of the Republic of Karakalpakstan.

There are more than 160 species of ferula in the world, 104 in the Central Asian republics, and more than 50 in Uzbekistan, which are considered similar in external morphological features. Family ferula-perennial monocarpic and polycarpic plants with thick and tall stems, representatives of the family apiales and umbelliferae. The leaves are long-stemmed, large, divided into several lobes, the shape of the leaves on the stem is well developed. The basal leaves are small, hairy on top, the stem is alternately covered with pressed hairs. The flowers are complex, collected in umbrellas, single or bisexual, light yellow in color. It blooms in March-April, the fruits consist of pistachios and ripen in April-May. Depending on the external climatic conditions, the overgrown part of the plants continues growing for 1.5-2 months [4:226].

In medicine, parts of plants that contain biologically active substances that have a positive effect on the human body are used. As medicines, the roots and rhizomes, leaves, bark, flowers, fruits and other parts of plants are mainly used.

Information about the use of ferula in Mesopotamian medicine found its expression in the Egyptian papyri [8:149]. In Indian folk medicine, ferulic resin was used as an analgesic, antiseptic, and strengthening agent. When wiping a person's skin with its juice in a liquid state, it has the property of tightening the skin. It was also used as an external lubricant for joint pain [6:512]. In Iranian medicine, the ferula of gum tar is used as a sedative, against convulsions, tumors [9:577]. In folk medicine, gum was used for some nervous diseases, as an antiemetic, for wound healing. It has also been used to treat diabetes, otitis media, bronchial asthma, gastritis, and other diseases [5:212].

Ferula species contain root juice that hardens in the air, i.e. gum (9.3-65.1%), resins (12-48%) and essential oils (5.8-20%), which are used to treat various diseases. In ancient times, ferulic acid, asaresen, asimafoetidol, etc. were isolated from ferulic resin. It was also possible to isolate caffeic acid from its composition. Essential oils consist mainly of organic sulfides and have an unpleasant ashy smell. Its fruits contain a large amount of fat and protein. The dark mass released when cut from their roots and leaves is mentioned by the locals under the names kinna, sapagen, asafoetida, galbanum, sumbul, ammonikum and others, which are also mentioned in the works of Ibn Sina and Abu Rayhan Beruni.

## RESULTS AND DISCUSSIONS

The plant species identified in science are ferula foetida, ferula foetidissima, ferula kuhistanica, ferula copetdagensis, ferula cocanica, ferula persica, ferula songarica, ferula tenuisecta, ferula badracema, ferula diversivittata, ferula caspica, ferula caratavicha, ferula carelini, ferula gummosa, ferula nevskii, ferula mushata, ferula renardi, and ferula oopoda.

For the production of resin, 10 types of ferula are mainly used. Olive oil ointment with ferula resin relieves puffiness under the eyes. When rubbing a mixture of ferulic resin with hyacinth root oil, pain



in the bones disappears, when taken orally, it warms the stomach and opens the appetite. Its mixture with honey treats the initial stage of cataracts when rubbed. It is also recommended to drink dissolved in water for angina, cough, and inflammation of the tongue. Its use improves urination, normalizes diarrhea.

The separation of gum resin begins in early spring and continues until autumn, so the collection of gum resin is divided into spring and summer periods. The spring period is the preparatory period, during which the accumulation sites and stocks of ferula, gum resin from individual parts of plants are determined.

Before collecting gum resin, the roots and leaves of each plant are cleaned and prepared. To do this, each individual digs a root 5-10 cm deep and 20-25 cm wide, and the tops of the roots are opened and cleaned. After opening the top of the ferula root in 5-6 days, the cutting process begins, after which you can get the highest quality resin.

Here we get acquainted with the chemical composition of mixtures extracted from vegetable raw materials.

The ferule also contains glycan 3-galactose, which is an oligosaccharide of milk. It is known that milk oligosaccharides are complex glycans that differ from each other in composition [10]. These oligosaccharides consist mainly of lactose and are modified by the addition of the sugars glucose (Glc), galactose (Gal), fucose (Fuc), N-acetylglucosamine (GlcNAc), N-acetylgalactosamine (GalNAc), and N-acetylneuraminic acid (Neu5Ac). Human and cow's milk contain only a small amount of beta-glycan oligosaccharide (GOS) residues. GOS is known to counteract the disorder of the small intestine by exhibiting prebiotic activity [11], which has a positive effect on the large intestine [10]. At the same time, it is able to modulate the immune system. It also inhibits the adhesion of pathogenic microorganisms to the surface of the gastrointestinal epithelium. These oligosaccharides are structurally similar to epithelial glycan receptors and prevent intestinal infections due to their "molecular deception" function by blocking glycan receptors. There is evidence that the anti-adhesive or anti-infective effect of GOS inhibits the accumulation of enterohepatic *Salmonella enterica* or *Chronobacter sakazaki* [12] in Caco-2 cells and HT29 cells. Some studies have reported an improvement in the absorption of calcium ions due to the fermentation of GOS in the intestine.

Industrial production of GOS began in the mid-1980s. Due to its biological activity, GOS is mainly used as a functional ingredient in beverages, baby milk, or baby food.

Picrotoxin, also known as cocculin, is a poisonous crystalline mixture of the plant. It is established that the specific bitter taste of the plant is caused by this substance. The name "Picrotoxin" is a combination of the Greek words *picros* (bitter) and *toxicon* (poison). For many years, this substance has been used as an antidote to central nervous system intoxication by depressants, especially to prevent barbiturate poisoning [13]. Picrotoxin mainly activates the central nervous and respiratory systems. Despite the fact that picrotoxin is toxic to mammals in very high doses, it is sometimes used as a means to enhance the physiological processes in horses.

Another substance released from the composition of the ferule is curcumol. It is known that curcumol is a zarchava oil enriched with curcuminoids. Curcuminoids have a wide range of biologically active



substances, thanks to which the compound exhibits antioxidant, antibacterial, antiviral, antifungal, anti-inflammatory and even anti-cancer properties.

## CONCLUSION

The substance Tangeritin, also extracted from vegetable raw materials, is known as O-polymethoxylated flavone, which we found in the peel of tangerines, oranges and other similar citrus fruits. The literature describes how tangeritin acts as a mechanism for strengthening the cell wall and protecting plants from pathogens. It is also used as a marker compound to detect contamination of citrus juices. At the same time, there is evidence that the substance tangeritin reduces the level of cholesterol in the body and has a protective effect against Parkinson's disease [14]. However, there is evidence that tangeritin has great potential as an anti-cancer agent. In vitro studies, tangerine induces apoptosis in leukemic cells and is relatively undisturbed in normal cells [15]. In experiments with two human breast cancer cell lines and colon cancer lines, tangerite blocked the development of the cell cycle in the G1 phase of growth of all three cell lines, without causing apoptosis in the tumor cell lines. Once tangerite is removed from the tumor cells, it normalizes the development of the cell cycle.

Thus, due to the fact that biologically active substances isolated from the composition of the ferule exhibit antioxidant, antibacterial, antiviral, fungal, inflammatory and even anti-cancer properties, the purpose of our study was to determine the physiologically and biologically active substances contained in it by physico-chemical methods. The study of the use of the Ferula plant in medicine, the collection of samples on the growth period and vegetative organs of the plant growing in different regions, the scientific justification of the composition of this medicinal plant is one of the urgent tasks of science.

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