

**PROSPECTS FOR THE USE OF STINKING FERULA (FERULA ASSA-FOETIDA L.),
GROWING IN THE REPUBLIC OF KARAKALPAKSTAN**

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Annotation: Ferula belongs to the genus of perennial plants of the Apiaceae family. In the East it has long been used as a spice. Several of its species are found in the Republic of Karakalpakstan. Of these, ferula stinking is the most common and has been used in folk medicine for many times as a medicine for many diseases of the internal organs. The high content of valuable biologically active components of ferula represents a prospect for the development of drugs, especially chemopreventive ones. In addition, the bioactive components of Ferula species with antimicrobial and insecticidal effects can be used in the development of green pesticides.

Key words: Stinking ferula, asafoetida, Aral region, traditional medicine, Ferula assa-foetida L., herbal medicine, medicinal plants.

The history of human use of plants to combat various diseases goes back centuries. Peoples from all over the world have widely used medicinal plants at all times. They were especially popular in oriental medicine. One of the valuable and little-studied species is the stinking ferula (*Ferula assa-foetida* L.) belonging to the genus *Ferula*.

Ferula is the third largest genus of the Apiaceae family, numbering 180-185 species, geographically distributed mainly in Central and South-West Asia.[7,11] Found in the Southern Aral Sea region, mainly on the gravelly soils of the Karakalpak part of the Ustyurt plateau, in the vicinity of Nukus and in the northern and southern regions of the Republic of Karakalpakstan. According to S. Erezhepov [3], 6 species of ferula grow in the Aral Sea region: *Ferula assa-foetida*, *F. Lehmanii* Boiss, *F. Dshaudshamyr* Eng.Kor., *F. caspica* MB., *F. schair* Borsz., *F. syreitschikowii* K. Pol. Some of its species have long been used as medicinal plants in many countries. [2] *Ferula* genus metabolites have biological activities including antiviral, anti-inflammatory, antitumor, antiulcer, antidiabetic, antibacterial, cytotoxic, estrogenic, acaricidal, and antiprotozoal. In addition, plants of this genus are known as sources of biologically active compounds, such as sesquiterpene coumarins and sesquiterpenes. [7.11]

Many types of ferula have long been used as plants containing medicinal resins (*asafetida*, *galbon*, *sumbul*, *chyltit*, *quinna*, etc.). Resin from the root of the plant is included in more than a hundred traditional recipes of oriental medicine in Central Asia, Iran, China, and India for the treatment of diseases such as syphilis, tuberculosis, various forms of tumors, convulsions, scabies, diseases of the gastrointestinal tract and respiratory system. In Tibetan medicine, gum resin was successfully used for heart disease. In Chinese medicine it was mainly used as a strengthening and tonic for neurasthenia. In Indian medicine, *asafetida* (*hing*) was used for bronchitis, asthma, dyspepsia, diarrhea, cholera, diabetes, neuroses and rheumatism, also as an expectorant and antiseptic. In Iranian medicine, *ferula* gum-sol was used as an antiepileptic, antispasmodic, antiasthmatic and antitumor agent. [4,6]

Asa foetida is an oil resin whose main source is *Ferulae assa-foetida* L. *Asafoetida* is composed of three main fractions including resin (40-64%), gum (25%) and essential oil (10-17%). [7.11]

Most essential oil components primarily fall into the classes of monoterpene and sesquiterpene compounds. Many of the biological properties of ferula, such as antiviral, anti-inflammatory and antitumor, are attributed to the sesquiterpene coumarins contained in the essential oil. Bronchoprotective properties have been found in the essential oil of ferula gum resin, which is successfully used in the treatment of pneumonia and bronchial asthma. [7]

In this article we are going to review the therapeutic properties of Ferula stinking, growing in the Republic of Karakalpakstan.

The purpose of this work is to show the possibility of using stinking ferula, which has high biological activity for many diseases that are widespread in the Republic of Karakalpakstan.

Phytochemical composition of the essential oil of *Ferulae assa-foetida* L.

The air-hardened milky juice of ferula roots consists of resin (9.3-65.1%), gum (12-48%) and essential oil (5.8-20%). Ferulic acid, asaresen, farnesiferol, umbelliferone, sesquiterpene asafoetida, sesquiterpene coumarin asimafetidiol, etc. have been isolated from ferula resin.

The resin contains caffeic acid, sesquiterpene coumarin saradaferin, assafoetidiol A and B, sesquiterpene coumarins phanesiferol C, badrakemin acetate, kellerin, samarkandine diastereomer.

The essential oil of the plant consists mainly of organic sulfides and has an unpleasant odor. [4,6,7]

Neuroprotective effect

Ferulic acid, contained in the plant due to its antioxidant properties, has a positive effect on neurodegenerative diseases - Alzheimer's and Parkinson's diseases.[5]

Anti-inflammatory effect

Randomized clinical trial by Asma K et al.[8] showed that the gum resin of the plant was effectively used in the treatment of dysmenorrhea, comparable to the effect of mefenamic acid.

Antitumor effect

A study conducted by a group of scientists led by Xiang Zhang [13] showed a decrease in viability, increased apoptosis and suppression of metastatic potential in the MDA-MB-231 breast cancer cell line when treated with ferulic acid.

Choleretic and cholesterololytic effects

I. Azonov et al. [1] studied the choleretic properties of various doses of ferula stinking essential oil (ferusinol) on healthy and experimental white rats affected by carbon tetrachloride. The results indicated a significant choleretic effect. In addition, it has been shown that ferusinol actively affects the chemical composition of bile, reducing the concentration of cholesterol.

Hepatoprotective effect

A group of scientists led by Bagheri et al. [9] studied the antiurolithiasis and hepatoprotective effects of the essential oil of Ferula stinking gum resin in Wistar rats. Negative control rats were given 1% ethylene glycol in their drinking water for 28 days. At the same time, in the treatment

group, asafoetida was administered at a dose of 25 mg/kg for 28 days. The results showed a significant positive effect on liver function.

Antidiabetic effect

According to scientific research by E. Latifi et al. [10] Ferula stinking oleo-gum-resin ethanolic extract (FAOGRETE) showed hypoglycemic and hypolipidemic effects of the drug, as well as positive effects on liver and kidney function in streptozocin-induced diabetic rats.

Another study was conducted by a group of scientists led by Yarizade A. et al. [12] by determining in vitro the inhibitory activity of Ferula assa-foetida L. seed extract on dipeptidyl peptidase IV and α -glucosidase in diabetes mellitus. According to the study, ferula seed extract is effective against both enzymes and may be a potential source for the discovery of other active components in type 2 diabetes.

Conclusion

Thus, a review of the scientific literature showed a wide range of therapeutic properties of Ferula stinking. The plant is very promising from the point of view of developing new compositions for the treatment of various diseases that are widely found in the Aral Sea region. It should also be noted that due to the high content of biologically active substances, it should be used with caution at high temperatures, high acidity and pregnancy.

References:

1. Azonov Isfandiyor Jakhonovich, Kholzoda Abdukhakim Kuvvat, Azonov Jakhon Azonovich, Musozoda Safol, Ganiev Khurshed Alimovich CHOLEGOUS AND CHOLESTEROLLYTIC PROPERTIES OF FERULA STINKING ESSENTIAL OIL IN NORMAL AND IN SUBACUTE TOXIC LIVER DAMAGE CC14 // Colloquium -journal. 2020. No. 26 (78). URL: <https://cyberleninka.ru/article/n/zhelchgonnye-i-holesteroliticheskie-svoystva-efirnogo-masla-feruly-vonyuchey-v-norme-i-pri-podostroy-toksicheskoy-porazhenii> (access date: 12/06/2022).
2. Davletmuratova B.T., On the issue of studying the bioecological characteristics of stinking ferula (Ferula assa-foetida) in the conditions of the southern Aral Sea region, UNIVERSUM: CHEMISTRY AND BIOLOGY, No. 10 (88), 2021
3. Erezhepov S.E. Flora of Karakalpakstan, its economic characteristics, use and protection. - Tashkent: Fan, 1978. - 300.
4. Zubaidova T.M., Dzhamshevdov J.N., M.Khodzhimatov, Nazarov M.N., Isupov S.D., Zagrebely I.A., Samandarov N.Yu., Sukhrovov P.Sh., Application of ferula stinking in ancient traditional and folk medicine, BULLETIN OF THE TAJIK NATIONAL UNIVERSITY. SERIES OF NATURAL SCIENCES, No. 1-2(106), 2013, 204-213 pp.
5. Karomatov Inomzhon Dzhuraevich, Zhalilov Nabizhon Abdievich Parkinson's disease - prospects for prevention and treatment with herbal preparations // Biology and integrative medicine. 2018. No. 11. URL: <https://cyberleninka.ru/article/n/bolezni-parkinsona-perspektivy-profilaktiki-i-lecheniya-fito-preparatami> (access date: 12/06/2022).
6. Saidova Nodira Ganievna, Kodirova Gulbahor Khalimovna, Karomatov Inomzhon Dzhuraevich Medicinal plant ferula stinking // Biology and integrative medicine. 2017. No. 9. URL: <https://cyberleninka.ru/article/n/lechebnoe-rastenie-ferula-vonyuchaya> (access date: 12/06/2022).

7. ABDOLHAMID BAMONIRI , ASMA MAZOOCHI, DETERMINATION OF BIOACTIVE AND FRAGRANT MOLECULES FROM LEAVES AND FRUITS OF *Ferula assa-foetida* L. GROWING IN CENTRAL IRAN BY NANO SCALE INJECTION, Digest Journal of Nanomaterials and Biostructures Vol. 4, No.2, June 2009, p. 323 – 328
8. Asma K, Arshiya Sultana, Khaleequr Rahman, A single-blind randomized comparative study of *Asafoetida* vs Mefenamic acid in dysmenorrhea, associated symptoms and health-related quality of life, Journal of Herbal Medicine, Volume 9, 2017, Pages 21-31 , ISSN 2210-8033, <https://doi.org/10.1016/j.hermed.2017.06.003>.
9. Bagheri SM, Yadegari M, Behpur M, Javidmehr D. Antilithiatic and hepatoprotective effects of *Ferula assa-foetida* oleo-gum-resin on ethylene glycol-induced lithiasis in rats. Urol Sci [serial online] 2018 [cited 2022 Dec 6];29:180-5. Available from: <https://www.e-urol-sci.com/text.asp?2018/29/4/180/233799>
10. Ebrahim Latifi, Ahmad Ali Mohammadpour, Behrooz Fathi H, Hosein Nourani, Antidiabetic and antihyperlipidemic effects of ethanolic *Ferula assa-foetida* oleo-gum-resin extract in streptozotocin-induced diabetic wistar rats, Biomedicine & Pharmacotherapy, Volume 110, 2019, Pages 197-202, ISSN 0753-3322, <https://doi.org/10.1016/j.biopha.2018.10.152>.
11. Maryam Salehi, Mohammad Reza Naghavi, Moslem Bahmankar, A review of *Ferula* species: Biochemical characteristics, pharmaceutical and industrial applications, and suggestions for biotechnologists, Industrial Crops and Products, Volume 139, 2019, 111511, ISSN 0926-6690, <https://doi.org/10.1016/j.indcrop.2019.111511>.
12. Yarizade A., Kumleh H.H., Niazi A., IN VITRO ANTIDIABETIC EFFECTS OF FERULA ASSA-FOETIDA EXTRACTS THROUGH DIPEPTIDYL PEPTIDASE IV AND α -GLUCOSIDASE INHIBITORY ACTIVITY, Asian journal of pharmaceutical and clinical research, Vol. 10, Issue 5, 2017, pp. 357-360.
13. Zhang X, Lin D, Jiang R, Li H, Wan J, Li H. Ferulic acid exerts antitumor activity and inhibits metastasis in breast cancer cells by regulating epithelial to mesenchymal transition. Oncol Rep. 2016 Jul;36(1):271-8. doi: 10.3892/or.2016.4804. Epub 2016 May 12. PMID: 27177074.