Scholar's Digest- Journal of Multidisciplinary Studies
Volume 02, Issue 06, June, 2023
ISSN (E): 2949-8856
Scholarsdigest.org

PHARMACOLOGICAL SIGNIFICANCE OF FERULA COMMUNIS L

Sharipova Riboba Gulomalievna
Assistant of the Department of Pharmacology and
Clinical Pharmacology of the Bukhara State Medical Institute

Abstract:
Traditional medical books such as Dioscorides report numerous beneficial uses for this plant. They are both widely used in traditional medicine to treat a wide range of ailments. A large number of chemical compounds have been isolated from this plant, including sesquiterpene coumarins and polysulfides. Fresh plant materials, crude extracts and isolated components of F. persica have demonstrated a wide range of pharmacological properties, including anti-pigment properties of Serratia marcescens., cytotoxic, antibacterial, antifungal, antileishmanial, chemoprophylactic against cancer, elimination of multidrug resistance, anti-inflammatory and inhibitory effects on lipoxygenase.

Keywords: Ferula communis L., biologically active additives, ferutin, sesquiterpene coumarins.

INTRODUCTION

The genus Ferula L. includes perennial flowering plants and is a rich source of biologically active phytochemicals such as sulfur derivatives, coumarins, sesquiterpenes, sesquiterpene lactones, sesquiterpene coumarins, glucuronic acid, galactose, arabinose, rhamnose, and daucan esters. In the last decade, much attention has been paid to the biological activity of these compounds; it is assumed that the most striking biological features of the genus Ferula are their cytotoxic effects. This article discusses the cytotoxic activity of the genus Ferula and their important compounds [7].

The genus Ferula L. belongs to the family dycotiledonus of plants Apiacae, which includes more than 400 genera and about 3700 species. This genus includes about 170 species, which mainly grow in the Mediterranean, North Africa and Central Asia. Three species are described in Italy, i.e. Ferula communis L., Ferula glauca L. and Ferula arrigonii Bocchieri [1].

Ferula communis L. subsp. communis (giant fennel) is a latex-containing perennial plant 1–2.5 m high, fragrant, with dense roots. Its cylindrical leg is green, striated, with mucous exudate. Branches 8-10 cm long alternate (lower) or opposite (upper). The leaves are glabrous, with a large sheath. The lower leaves are 3-4-pinnate, triangular, variable in size, soft, glabrous, green on both sides and usually with a well-marked base. The lamina is finely divided into linear and filiform lobes. The latter do not have a distinct rounded edge and are up to 50 mm long, but not more than 1 mm long. wide.

The upper fertile leaves of the inflorescence are gradually reduced to a noticeable integumentary base. Bracts are absent, and bracts are few or absent. The stem is very strong, wide (3–7 cm in diameter), full, finely striped, can reach 2–3 m in height. The upper fertile

umbrella is large and consists of 20-40 rays. The inflorescence is attached to the terminal part of the peduncle. The flower is bright yellow. The fruit (mericap) is elliptical or oblong-elliptical in shape, strongly compressed from above; length varies from 7 to 15 mm. The plant, despite the name, is not a variety of fennel itself, belonging to another genus Foeniculum. The name of the phenolic compound ferulic acid, which can be isolated from giant dill, comes from the Latin name of the plant [2,3].

They are both widely used in traditional medicine to treat a wide range of ailments. A large number of chemical compounds have been isolated from this plant, including sesquiterpene coumarins and polysulfides. Fresh plant materials, crude extracts and isolated components of F. persica have demonstrated a wide range of pharmacological properties, including anti-pigment properties of Serratia marcescens., cytotoxic, antibacterial, antifungal, antileishmanial, chemoprophylactic against cancer, elimination of multidrug resistance, anti-inflammatory and inhibitory effects on lipoxygenase [8].

Traditional medical books such as Dioscorides report numerous beneficial uses for this plant. For example, the administration of mashed fresh kernels is useful for expelling bloody fluid from the mouth and for treating abdominal pain with diarrhea. Also recommended for the treatment of snake bites. Preparation of crushed plants in the form of a wick for filling a bleeding organ. The introduction of the seeds of the plant relieves spasms, and when the mixture of pureed seeds with oil is rubbed into the skin, it causes sweating [4].

The traditional use of the non-poisonous F. communis as a phytohormone is due to ferutinin, an aromatic ester of daucan alcohol. This plant has been reported to act as a possible source of daucan-type phytoestrogens. In Morocco, F. communis has traditionally been used as a hypoglycemic medicinal plant, but its use has been limited due to its toxicity [5].

Ferutinin is a sesquiterpene extracted from roots, leaves and rhizomes. Various mechanisms are known by which several compounds isolated from many Ferula L. species exert their inhibitory activity on cell growth. Among the compounds isolated from many Ferula species, ferutinin obtained from the plants Ferula ovina Boiss., Ferula communis L., Ferula hermonis Boiss. and other Ferula species, is known for various activities that act in a dose-dependent manner both in vitro and in vivo. In particular, ferutinin has shown estrogenic, anti-inflammatory, antiproliferative, cytotoxic, antifungal, and antimicrobial activity; cytotoxic activity is a key role of its action, which should lead to the use of this molecule in antitumor therapy [6].

Ferula assafoetida and others are some of the medicinal plants used for anti-diabetic therapy. The presence of phenolic compounds, flavonoids, terpenoids and coumarins determines the antidiabetic nature of medicinal plants. These components have been shown to lower blood glucose levels. Pycnogenol, acarbose, miglitol, and voglibose are some examples of marketed drugs that are derived from natural sources and are used as anti-diabetic drugs. Plant-derived actives act through a variety of anti-diabetic mechanisms, including inhibition of α-glucosidase, α-amylase and protein tyrosine phosphatase 1B activity. One of the main advantages of herbal preparations is the low level of side effects attributed to these drugs, and this has attracted various researchers to develop new molecules for the treatment of diabetes [9].

The seeds and roots of this plant have long been used in the Middle East as an aphrodisiac and to treat frigidity and impotence in both men and women. The anti-inflammatory properties of the three main esters of daucan, ferutinine (1), teferine (2) and teferidine (3), isolated from the root oil of Ferula hermonis, were evaluated in a carrageenan induced edema model in rats. The anti-inflammatory effect of both 1 and 2 was observed at a dose of 100 mg/kg, while compound 3 did not show anti-inflammatory activity [10].

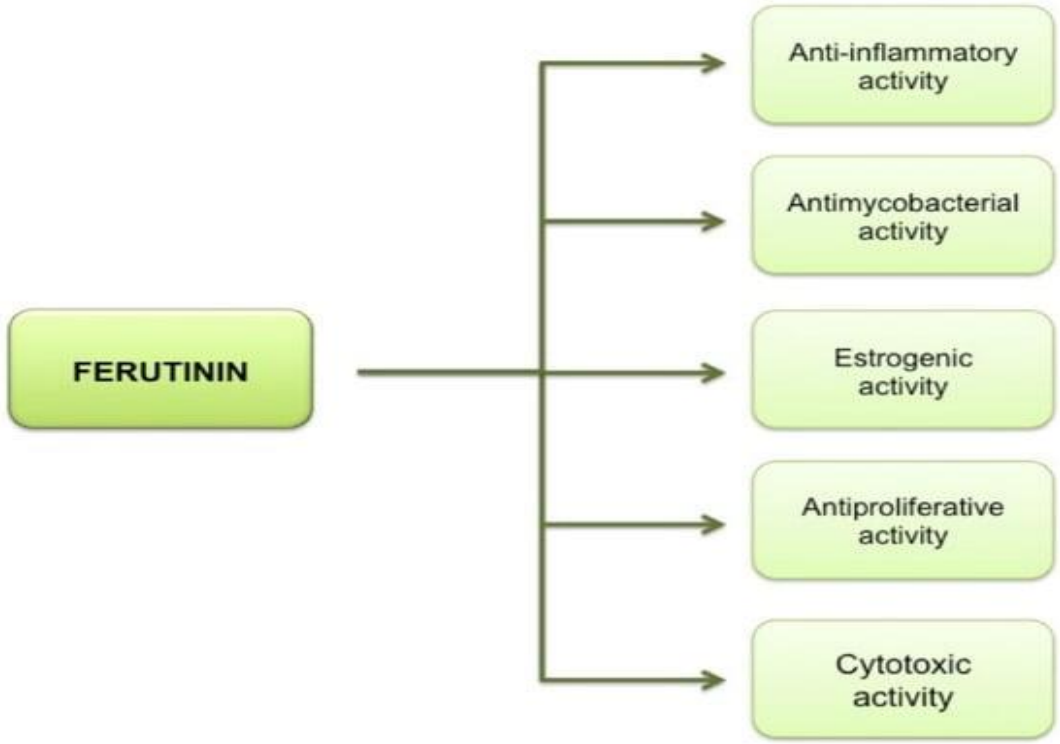

Figure 1. Pleiotropic activity of sesquiterpene ferutinin. Ferutinin exhibits several types of activity in human diseases, having estrogenic, anticancer, anti-inflammatory, and bactericidal properties [6].

The purpose of this mini-review is to highlight traditional and new uses for extracts of this plant and its main sesquiterpene ester, ferutinin. In particular, the phytochemical constituents and pharmacological uses of ferula hermonis crude extract and ferutinin will be discussed.

Conclusion. Thus, based on the data obtained, the bioactive compound ferutinin can be considered as an effective therapeutic agent as an adjuvant or replacement for existing antitumor therapies. More research is needed to evaluate its effects on other cell types and other molecular pathways involved, to compare its activity with that of chemotherapy drugs, to assess the varying degrees of toxicity that a side effect has on healthy cells.

Therefore, the use of these bioactive components with antimicrobial and insecticidal action can not only provide a new strategy for the development of drugs and green pesticides, but also protect endangered plant resources.

References:

Чжоу Ю., Синь Ф., Чжан Г., Цюй Х., Ян Д. и Хань Х. (2017). Последние достижения в области биоактивных компонентов ферулы. Исследование разработки лекарств, 78 (7), 321-331.

2. Ираншахи М., Амин Г.Р., Джалализаде Х., Шафии А. Новое производное гермакрана из Ferula persica Willd. вар латисекта Чемберлен. Фарм Биол. 2003 г.; 41 :431–433. [Академия Google]

3. Диоскорид. ДЕ МАТЕРИА МЕДИКА. Южная Африка: AIBIDIS PRESS; 2000. с. 468. [Google Scholar] [список ссылок]

4. Акабери, М.; Ираншахи, М.; Ираншахи, М. Обзор традиционного использования, фитохимии, фармакологии и токсикологии гигантского укропа (Ferula communis L. subsp. communis). Иран Дж. Базис Мед. науч. 2015 , 18 , 1050–1062. [Академия Google]

5. Бноухам М., Мехфи Х., Легссер А., Зийят А. Лекарственные растения, используемые при лечении диабета в Марокко. Int J Диабет Метабол. 2002 г.; 10 :33–50. [Академия Google] [Список ссылок]

6. Macrì R, Musolino V, Gliozzi M, Carresi C, Maiuolo J, Nucera S, Scicchitano M, Bosco F, Scarano F, Ruga S, Zito MC, Guarnieri L, Bombardelli E, Mollace V. Ferula L. Plant Extracts and Dose-Dependent Activity of Natural Sesquiterpene Ferutinin: From Antioxidant Potential to Cytotoxic Effects. Molecules. 2020 Dec 7;25(23):5768. doi: 10.3390/molecules25235768. PMID: 33297504; PMCID: PMC7731292.

7. Iranshahi M, Rezaee R, Najaf Najafi M, Haghbin A, Kasaian J. Cytotoxic activity of the genus Ferula (Apiaceae) and its bioactive constituents. Avicenna J Phytomed. 2018 Jul-Aug;8(4):296-312. PMID: 30377589; PMCID: PMC6204145.

8. Sattar Z, Iranshahi M. Phytochemistry and pharmacology of Ferula persica Boiss.: A review. Iran J Basic Med Sci. 2017 Jan;20(1):1-8. doi: 10.22038/ijbms.2017.8085. PMID: 28133517; PMCID: PMC5243968.

9. Kumar S, Mittal A, Babu D, Mittal A. Herbal Medicines for Diabetes Management and its Secondary Complications. Curr Diabetes Rev. 2021;17(4):437-456. doi: 10.2174/1573399816666201103143225. PMID: 33143632.

10. Geroushi A, Auzi AA, Elhwuegi AS, Elzawam F, Elsherif A, Nahar L, Sarker SD. Antiinflammatory sesquiterpenes from the root oil of Ferula hermonis. Phytother Res. 2011 May;25(5):774-7. doi: 10.1002/ptr.3324. Epub 2010 Oct 29. PMID: 21520471.

11. Зарипова Д. и Шарипова Р. (2020). Сравнительная оценка применения алеандроновой кислоты у женщин в климактерическом периоде, осложненном остеопорозом. Европейский журнал биомедицинских и фармацевтических наук , 7 , 142-146.

12. Zaripova, D. Y., & Sharipova, R. G. (2020). Effeciency of hormone replacement therapy in prevention menopausal therapy. Academicia an international multidisciplinary research journal, 10(8), 422.

13. Кароматов Иномжон Джураевич, Шарипова Рибоба Гуломалиевна ВЬЮНОК ПОЛЕВОЙ КАК ЛЕЧЕБНОЕ СРЕДСТВО // Биология и интегративная медицина. 2021. №3 (50). URL: https://cyberleninka.ru/article/n/vyunok-polevoy-kak-lechebnoe-sredstvo (дата обращения: 15.06.2023).

14. Sharipova, R. G. "COMBINED TREATMENT OF ANEMIA OF PREGNANT WOMEN: IRON-CONTAINING DRUG" FEROFORT" AND MULBERRY TINCTURE." EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE 2.7 (2022): 71-76.
15. Шарипова, Р. Г. (2022). Эффективность Комбинации Препарата «Ферофорт» И Настойки Тутовника При Лечении Анемии Беременных. Miasto Przyszłości, 25, 292-296.
16. Sh. Meliboeva, M. Boltayev, F. Jalilov THE EFFECT OF BROCCOLI SPROUTS ON DIABETES MELLITUS AND THE GASTROINTESTINAL TRACT // SAI. 2022. №D5. URL: https://cyberleninka.ru/article/n/the-effect-of-broccoli-sprouts-on-diabetes-mellitus-and-the-gastrointestinal-tract (дата обращения: 09.09.2022).
17. Болтаев, М. М., Мелибоева, Ш. Ш. к., Джалилов, Ф. С., Юлдашева, Д. Х., Джалилова, Ф. С., & Самадов, Б. Ш. (2022). ПРИМЕНЕНИЕ БРОККОЛИ И ПРОРОСТКОВ БРОККОЛИ В ПРОФИЛАКТИКЕ И ЛЕЧЕНИИ РАЗЛИЧНЫХ ЗАБОЛЕВАНИЙ. Журнал химии товаров и народной медицины, 1(4), 242–254. https://doi.org/10.55475/jcgtm/vol1.iss4.2022.93
18. Мелибоева, С. (2022). ПЕРВЫЕ ЛЕЧЕБНО-БОТАНИЧЕСКИЙ САД НА ТЕРРИТОРИИ СОВРЕМЕННОГО УЗБЕКИСТАНА. Наука и инновации , 1 (Д4), 101-105.
19.Meliboeva, S., Boltayev, M., & Jalilov, F. (2022). The effect of broccoli sprouts on diabetes mellitus and the gastrointestinal tract. Science and innovation, 1(D5), 81-87.
20. Болтаев, М. М., Шарипова, Э. М., & Мелибоева, Ш. Ш. (2022). ПЕРВЫЕ ЛЕЧЕБНО-БОТАНИЧЕСКИЕ САДЫ НА ТЕРРИТОРИИ СОВРЕМЕННОГО УЗБЕКИСТАНА. IJTIMOIY FANLARDA INNOVASIYA ONLAYN ILMIY JURNALI, 96-100.
21.Джалилов, Ф. С., Болтаев, М. М., & кизи Мелибоева, Ш. Ш. (2022). BROCCOLINING SHIFOBAXSH XUSUSIYATLARI. Журнал химии товаров и народной медицины, 1(3), 194-205.
22.Sh, M. S. (2022). Comparative analysis of common fennel regenerants according to the main morpho-biological features based on I. European Journal of Life Security and Stability (2660-9630), 15, 299-303.
23.Мелибоева, Ш. Ш. К., Мусаева, Д. М., Шарипова, Э. М., & Болтаев, М. М. (2020). Ботаническая характеристика лекарственного растения «broccoli», фармакологические свойства и химический состав лекарственного растительного сырья «brassica oleracea». Вестник науки и образования, (24-1 (102)), 98-102.
24.Meliboyeva, S. S. Q., Boltayev, M. M., Sharipova, E. M., & Sharipova, R. G. (2021). Comparative efficiency of the preparation" Nodinorm" in complex treatment of fibrocystic mastopathy. ACADEMICIA: An International Multidisciplinary Research Journal, 11(10), 1591-1596.
25. Mavlonovich, B. M. (2022). ANTI-CANCER PROPERTIES OF CRUCIFEROUS VEGETABLES. Asian journal of pharmaceutical and biological research, 11(2).
26.Mavlonovich, B. M. (2022). Pharmacological Properties of Stinky Ferula Gum and its Anti-Inflammatory Effects. American Journal of Social and Humanitarian Research, 3(2), 372-376.
27.Mavlonovich, B. M. (2022). ANTI-CANCER PROPERTIES OF CROSSBOW VEGETABLES. Asian Journal of Pharmaceutical and Biological Research, 11.

28.Boltaev, M. M., Sh, M. S., & Jalilov, F. S. (2023). PREPARATION AND DRYING OF BROCCOLI HERBS (BRASSICA OLERACEA L.). Електронне видання мережне Редакційна колегія: проф. Котвіцька АА, проф. Владимирова ІМ, проф. Георгіянц ВА, проф. Перехода ЛО, проф. Журавель ІО, проф. Колісник СВ, доц. Криськів ОС, проф. Власов СВ, ас. Смєлова НМ, ас. Григорів ГВ, 19.

29.Sh, Meliboeva Sh, M. M. Boltaev, and F. S. Jalilov. "CONTENT ANALYSIS OF ANTI-CANCER DRUGS FOR 2022." Електронне видання мережне Редакційна колегія: проф. Котвіцька АА, проф. Владимирова ІМ, проф. Георгіянц ВА, проф. Перехода ЛО, проф. Журавель ІО, проф. Колісник СВ, доц. Криськів ОС, проф. Власов СВ, ас. Смєлова НМ, ас. Григорів ГВ (2023)