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PHYTOCHEMICAL STUDIES OF FERULA FOETIDA PLANT AND ITS MEDICAL SIGNIFICANCE

Resume. *There are many different types of medicinal plants in the world. Since time immemorial, mankind has been creating unique plants with medicinal and healing properties, located in such a diverse geographical area. The ancient Greek physician Hippocrates was the first to write extensively about medicinal plants. He believed that any plant tree is very useful, they can be widely used to treat various chronic diseases, and also described more than one hundred and ninety plants that he used in his time. However, the scientist did not pay attention to the healing properties of the plants he described. [1].*

The pharmaceutical industry of the country originated in the study of plants in the production of ephedrine, salcolin, ephyzimine and other valuable drugs.

Of course, before being introduced into medical practice, each medicinal plant undergoes a thorough examination of modern medicine. In particular, the chemical composition is checked, to what extent the factors affecting the body affect the function of each of the human organs and systems. They determine the harmfulness of certain chemicals obtained in the plant as a whole or in each of its parts, and also carefully check the medicinal properties of the plant. Then, the medicinal properties of the plant and preparations from it are evaluated experimentally in various ways. After that, the medicinal plant is tested in many clinics only under special instructions. The Pharmacological Committee of the Ministry of Health will allow the wide distribution and use of the plant for medicinal purposes, and its preparations will be developed on an industrial scale.

*In this regard, the study of the current chemical composition of the plant *Ferula foetida*, which we took as the object of study, is an important issue in assessing the healing properties of the plant.*

Keywords: *plant resources, distribution, useful plants, rational use, soap root, saponins, foetida, storage, stocks, annual volume of collection, recommendations.*

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FERULA FOETIDA ӨСІМДІГІНІҢ ФИТОХИМИЯЛЫҚ ЗЕРТТЕУЛЕРІ ЖӘНЕ ОНЫҢ МЕДИЦИНАЛЫҚ МАҢЫЗЫ

Түйін. *Әлемнің кез-келген жерлерінде шипалық қасиетке ие көптеген түрлі өсімдіктер кедеседі. Осындай алуан түрлі географиялық аумақта орын тепкен емдік, шипалық қасиеттері бар ерекше өсімдіктерді өте ерте заманнан-ақ адамзат баласы өз қажеттілігіне жаратып келген. Дәрілік өсімдіктер жайында алғаш рет біздің заманымызға дейінгі*



ертедегі грек дәрігері Гиппократ кең ауқымды еңбек жазды. Ол өсімдіктің кез-келген дарақтары өте пайдалы, оларды әр түрлі созылмалы ауруларды емдеу мақсатына кеңінен пайдалануға болады деп есептеген. Сонымен қатар ол өз кезеңінде пайдаланған жүз тоқсаннан астам өсімдікке сипаттама берді. Бірақ ғалым сол өзінің сипаттама берген өсімдіктердің қандай емдік қасиеті бар екендігіне назар аудармады [1].

Еліміздегі фармацевтикалық өнеркәсіп эфедрин, сальсолин, эфизимин және тағыда басқа бағалы препараттарды дайындауда өсімдіктерді зерттеу барысында дүниеге әкелді.

Әлбетте, әрбір дәрілік өсімдіктер емдеу тәжірибесіне енгізілмес бұрын заманауи медицинада тыңғылықты зерттеудің сараптамасынан өтеді. Атап айтқанда химиялық құрамы тексеріледі, ағзаға әсер етуші факторлары адамның әрбір мүшелері мен жүйелерінің қызметіне қаншалықты әсер ететіндігі жеті бақыланады. Өсімдіктердің түгелдей өзіндегі немесе оның әрбір бөлігіндегі алынған кейбір химиялық заттардың қаншалықты зиянды екендігі анықталады, сонымен қатар өсімдіктің емдік қасиеті жан-жақты мұқият тексеріледі. Содан кейін әр түрлі жолмен тәжірибе жасау арқылы өсімдіктің және содан жасалған препараттардың дәрілік қасиеттеріне баға беріледі. Осыдан кейін барып қана арнаулы нұсқау бойынша дәрілік өсімдік көптеген клиникаларда сынақтан өтеді. Сынақтан сәтті өткен өсімдікті Денсаулық сақтау министрлігінің фармакологиялық комитеті халық арасына кеңінен таратуға және емдеу мақсатында қолдануға, ал оның препараттарын өндірістік жолмен жасауға рұқсат беріледі.

Соған байланысты біз зерттеу нысаны ретінде алынған *Ferula foetida* өсімдігінің қазіргі кездегі химиялық құрамын зерттей отырып ол өсімдіктің шипалық қасиетін бағалау өзекті мәселе болып табылады.

Түйінді сөздер: өсімдік ресурстары, таралуы, пайдалы өсімдіктер, ұтымды пайдалану, сабын тамыры, сапониндер, сақтау, қорлар, жыл сайынғы жинау көлемі, ұсыныстар.

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ФИТОХИМИЧЕСКИЕ ИССЛЕДОВАНИЯ РАСТЕНИЯ FERULA FOETIDA И ЕГО МЕДИЦИНСКОЕ ЗНАЧЕНИЕ

Резюме. В мире существует множество различных видов лекарственных растений. Человечество с незапамятных времен создавало уникальные растения, обладающие лечебными и целебными свойствами, расположенные в столь разнообразном географическом ареале. Древнегреческий врач Гиппократ был первым, кто много писал о лекарственных растениях. Он считал, что любое дерево растения очень полезно, их можно широко использовать для лечения различных хронических заболеваний, а также описал более ста девяноста растений, которые использовал в свое время. Однако ученый не обратил внимания на целебные свойства описанных им растений. [1].

Фармацевтическая промышленность страны зародилась при изучении растений при получении эфедрина, салколлина, эфизимина и других ценных лекарств.

Безусловно, каждое лекарственное растение перед внедрением в медицинскую практику проходит тщательную экспертизу современной медицины. В частности, проверяется химический состав, в какой степени воздействующие на организм факторы влияют на функцию каждого из органов и систем человека. Определяют вредность тех или иных химических веществ, полученных в растении в целом или в каждой его части, а также тщательно проверяют лечебные свойства растения. Затем оценивают лечебные свойства растения и препаратов из него опытным путем разными способами. После этого лекарственное растение испытывают во многих клиниках только по особым указаниям. Фармакологический комитет Минздрава разрешит широкое распространение и использование растения в лечебных целях, а его препараты будут разрабатываться в промышленных масштабах.

В связи с этим изучение современного химического состава растения *Ferula foetida*, взятого нами в качестве объекта исследования, является важным вопросом в оценке целебных свойств растения.

Ключевые слова: растительные ресурсы, распространение, полезные растения, рациональное использование, мыльный корень, сапонины, хранение, запасы, ежегодный объем сбора, рекомендации.

Introduction. *Ferula L.* is a relative of many promising medicinal plants, which are widely used in practice (fodder, food, essential oils, medicinal, etc.). The plant *Ferula foetida L.* has great prospects in traditional oriental medicine as a medicinal plant and as a new medicinal plant. In Kazakhstan, the locusts are called stink bugs. Although the medicinal plant is widespread in South Kazakhstan (Turkestan region), it has not been fully studied. It is collected without losses only for export to foreign countries (China, India, Pakistan, etc.) [3].

From an experimental point of view, feruls are aromatic, essential oil plants as a food plant that cannot be replaced by other plants, as well as a medicinal plant in traditional oriental medicine, being the primary source of medicines. Some species of ferula have been used in Central Asia in the past centuries as a food plant (*F. karelinii*, *F. sibirica*, *F. dubjanskyi*, *F. schtschurovasiana*), as a kind of spice (mainly garlic and garlic-flavored species). as a material; In recent years, it has been found that their particularly large deciduous species can be used for decorative purposes



(Rakhimov, 2010): (F. Kokanica Regel & Schmalh and others) and others., for decorative purposes: F.dissecta (Ledeb.) F.karatavica Regel & Schmalh, F.kelleri Koso-pol. (Sikura, 1982) species are also important; The people of Central Asia also have a special place in the flora of Kazakhstan, where they made musical instruments from the lessons of the century. On the one hand, the plants of this genus are used for economic purposes and are not absent in the data on their importance [6].

The current use of sage as a medicinal plant in the future proves that it contains high concentrations of biologically active substances in its roots and seeds. Roots and seeds of safflower are a real source of raw materials, as well as the purposeful use of seeds in terms of preservation of natural shoots proves the high germination of seeds. [5].

Ferula foetida is a monocarpic, propagated only by seeds, flowering seeds only once in 5 years. Therefore, it is important to study and protect the medicinal plant that stinks, to prevent its extinction. Research area: Tole bi district of South Kazakhstan region. South Kazakhstan region as an administrative – territorial unit is mainly geographically a rising undulating plain with an altitude of 190 to 450 m above sea level, with islands of small mountain formations (height from 500 to 875-1000 m). Therefore, the South Kazakhstan region is a very complex formation with alternating areas of flat, foothill and mountainous terrain. [8].

South Kazakhstan region belongs to Zone III (semi-desert landscape zone of the temperate zone). In this region, it occupies the territory of the physical and geographical country of Central Asia-the Tien Shan physical and geographical region, where there are two provinces. One of these provinces includes the south-western Tien Shan physical and geographical province and the territory of the South Kazakhstan region [10]. The southwestern Tien Shan physical and geographical province is part of the desert zone of vegetation in the Southern subzone. Ephemeral-sagebrush deserts are characterized by the predominance of ephemerooids and ephemerooids in the vegetation cover, various types of sagebrush, as well as shrubs.

Methods. F.foetida (Bung.) Regel. - Fragrant - broad-leaved, found in Almaty, Kyzylorda, South Kazakhstan, present-day Turkestan region and Zhambyl region. For medicinal purposes, dried milky juice (gum) is used in the

Results and discussion

Results of chromatographic analysis of Ferula foetida root extract

№	Retention time min	Chemical name	Probability of identification, %	Percentage of content, %
1	9,39	2-Cyclopenten-1-one, 2-hydroxy	76	0,41
2	9,67	Methyl sec-butyl disulphide	86	1,14
3	11,86	Ethyl n-butyl disulphide	80	0,21
4	12,79	2,4,6-Octatriene, 2,6-dimethyl-	82	0,34
5	12,96	2-Hydroxy-gamma-butyrolactone	74	0,67
6	13,19	Thiophene, tetrahydro-2-methyl-	65	0,68
7	14,72	1,2-Dithiolane	62	11,03
8	15,58	Disulfide, bis(1-methylpropyl)	96	8,42
9	16,62	Tioxolone	62	0,48
10	17,12	1,4-Dithiane-2,5-dione, 3,6-dimethyl-	64	1,93

air coming out of the roots and flowering parts. The juice is known in pharmacological practice as "Gummi Assafoetida". Condensed milk juice consists of resin (9-65%), comedy (12-48%) and ephemeral oil (5-20%). From resin are obtained lactic acid, resin (asarezen), resitanol (asarezitanol) and resinol (asarezinol) and their esters with tartaric acid.

The phytochemical composition of plants belonging to the genus Ferula.L in the Turkestan region has not been scientifically determined. Therefore, the study of the accumulation of biologically active compounds and other additives in the roots of Ferula foetida, a relative of Ferula.L, has aroused interest. To date, vascular extracts have been prepared and their composition (Table 3) has been studied to determine the amount of biologically active compounds and other additives that are useful for accurate knowledge of their medicinal properties.

Analysis of the plant Ferula foetida by phytochemistry.

Method of analysis: gas chromatography with mass spectrometric detection

Conditions of analysis: sample volume 1.0 µl, sample introduction temperature 260 ° s.

Separation was performed at a constant velocity of 1 ml / min of carrier gas (helium) through a chromatographic capillary tube with a length of 30 m, an inner diameter of 0.25 mm and a film (transparent shell) thickness of 0.25 µm.

Chromatography temperature is planned from 40 ° C (holding 10 min), heating rate from 5 ° C / min to 270 ° C (holding 10 min).

Detection is performed in SCAN m / z mode 34-750. Agilent MSD ChemStation software (version 1701ea) was used to control the gas chromatography system, record and process the results and data obtained.

Data processing, time storage, determination of peak areas, as well as processing of spectral information obtained with the help of mass spectrometric detector.

Wiley 7th edition and NIST'02 libraries were used to open the obtained mass spectra (the total number of spectra in the libraries is more than 550 thousand).

Sample preparation: 10 g of plant roots were obtained by ultrasonic bath with 96% ethanol for 30 minutes.

Grinded plant roots, ethyl alcohol as an extractant and repercolation method were used to obtain a liquid extract.



11	19,14	3-Thiatricyclo [3.1.1.0(2,4)] heptane 3-oxide	60	1,05
12	20,85	Caryophyllene	92	1,77
13	21,75	Thiophene, 2-ethyltetrahydro-	60	3,30
14	22,20	Trisulfide, bis(1,1-dimethylethyl)	64	1,89
15	24,06	Thiocyanic acid, ethyl ester	68	2,55
16	24,33	6-(Methylthio) hexa-1,5-dien-3-ol	61	1,66
17	24,84	Thiophene, 2-butyltetrahydro-	60	0,74
18	27,77	Thiocyanic acid, ethyl ester	71	56,68
19	30,24	Acetic acid, 3-hydroxy-2,2-dimethoxy-propyl ester	64	0,49
20	31,07	Oxalic acid, 2-phenylethyl tetradecyl ester	60	2,98
21	31,38	Butanoic acid, 3-methyl-, 2-phenylethyl ester	60	0,88
22	32,37	Malonic acid, 3-methylbutyl pentadecyl ester	61	0,70

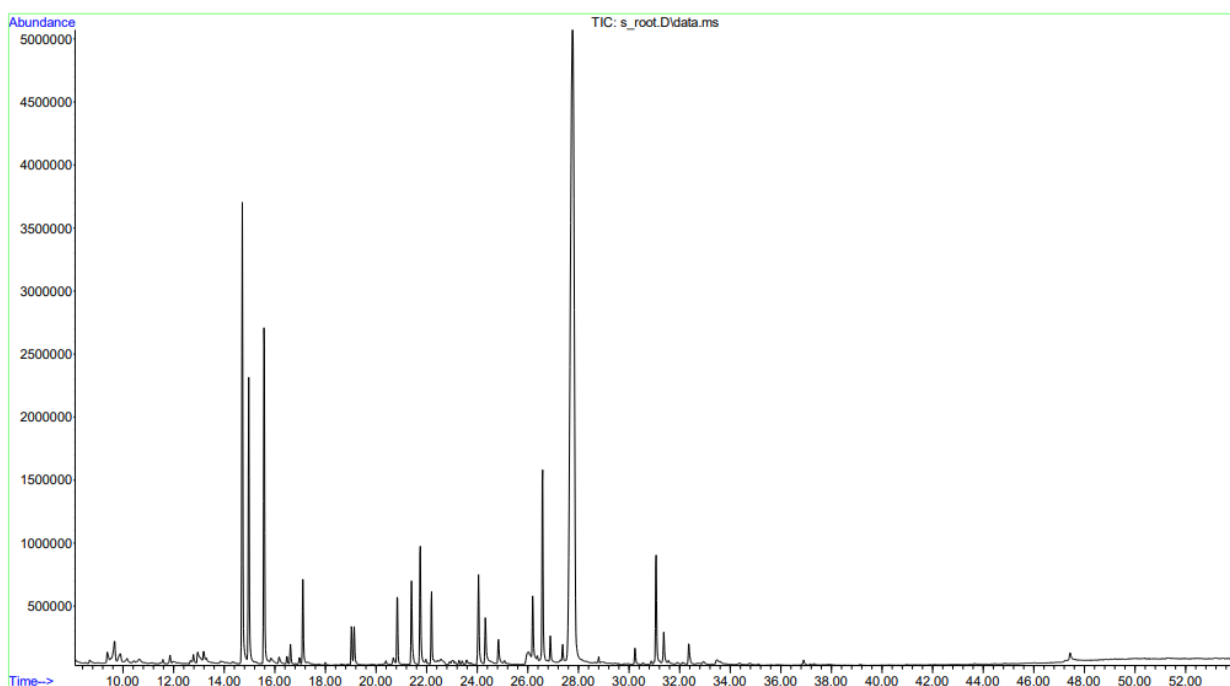


Figure- Extract chromatogram

Phytochemical analysis revealed 22 elements in the root extract of *Ferula foetida*.

People use substances with a pungent odor, similar to rubber, when using drugs.

These include: 2-Cyclopenten-1-one, 2-hydroxy-0.41%, methyl sec-butyl disulphide (methyl ester) -1.14%, Ethyl n-butyl disulphide-0.21% and 2,4,6 -Octatriene, 2,6-dimethyl-0.34%, Thiophene, tetrahydro-2-methyl-0.68%.

Chemical properties:

2-Cyclopenten is an organic compound with a molecular formula (C₅H₈). It is a colorless liquid that tastes like gasoline. The structure is not smooth, but flexible. Cyclopenten is produced in large quantities at industrial sites. It is used as a monomer to synthesize plastics in addition to other chemical syntheses.

Ethyl methyl disulfide has a pungent, white truffle-like aroma. It is found in cabbage, kohlrabi, cheese, beef, pork and coffee.

Thiophene is an important heterocyclic compound that is widely used as a building material in many agrochemicals and pharmaceutical products. The benzene ring of the biologically active compound can often be replaced with thiophene without losing its activity.

At room temperature, thiophene is a colorless liquid with a moderate odor, reminiscent of benzene, 2-Hydroxy-gamma-butyrolactone-0.67% is gamma hydroxybutyric acid, in short. GHB, as well as 4-hydroxybutanoic acid is an organic compound, a natural hydroxyl acid that plays an important role in the human central nervous system, and these compounds are found in wine, citrus fruits, etc. there is. Gamma hydroxybutyric acid is used in anesthesia, but is banned in many countries.



1,2-Dithiolane-11.03%. In medicine, it is found in drugs for the treatment of atherosclerosis, liver disease and diabetes and polyneuritis.

Caryophyllene 1.77%. Caryophyllene is found in some essential oils.

It is often used to create perfume compositions, to obtain fragrances for soaps and cosmetics, and to synthesize certain fragrances.

Trisulfide, bis (1.1-dimethylethyl) - 1.89%. In medicine, in particular, as a substance with anti-inflammatory and anti-arthritis activity.

Oxalic acid 2.98% and Malonic acid 0.70%. It is used in the production of oxalic acid, which is a valuable product in the food and chemical industries. It is also used in medicine as an antimicrobial.

Conclusion. It is the richest in coumarin compounds, which have a wide range of biological activity in plants belonging to the genus *Rose*. Many coumarins, even in relatively small amounts, are lethal to horses, cattle, and sheep, and are used as pharmacological agents for humans. In pharmacology, coumarins are used to treat leukoderma (furocoumarins - peuedanin, prangenin) and other cancers. (Nikonov, 1964; Georgievsky, Komisarenko, 1990). Coumarins - treat skin burns (photophyodermatitis). This property is based on the ability of coumarins to make the skin sensitive to light. Coumarins such as pastinacin, bergapten, improporenin, isopimpinellin, xanthoxol, angiesin have antispasmodic activity.

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