



BIOMORPHOLOGICAL FEATURES OF A WILD FOLK MEDICINAL PLANT *ZYGOPHYLLUM FABAGO* L.

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Abstract. Medicinal plants have significantly contributed to the development of human civilization. Many contemporary medications are derived indirectly from plants, while ancient remedies were directly made from them. The protection and prudent use of the planet's biological resources is a global concern involving governments worldwide. Kazakhstan's flora is notable for its rich gene pool and rare collections of beneficial plants, predominantly wild species with medicinal properties. Many of these species hold potential for further research into their molecular composition and biologically active components due to the increasing demand for pharmaceutical products in the global market. Medicinal plants are a crucial source of raw materials for the production of herbal medicines with various pharmacological and therapeutic effects. They act quickly and have no adverse side effects. *Zygophyllum fabago* L. is one such plant species with potential therapeutic and pharmaceutical applications.

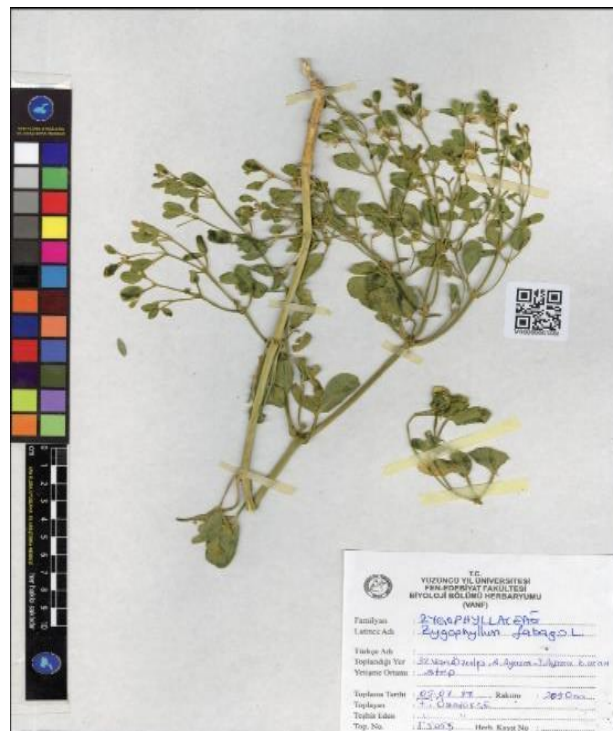
Folk remedies made from wild medicinal plants have been used for thousands of years, even before recorded history was. To treat a variety of ailments and reduce the risk of developing chronic conditions, the majority of people in the world rely mainly on these herbal remedies. Due to their antioxidant properties, medicinal plants are currently the source of most widely used and effective medicines that have their roots in ethnopharmacological applications. Alkaloids, flavonoids, terpenoids, glycosides, tannins, and other various types have been found in many extracts from medicinal plants. Antimicrobial, antiparasitic, antidiabetic, antioxidant, anti-inflammatory, and anticholinesterase properties are only a few of the biological and pharmacological actions that each has the ability to regulate (Ahmed et al., 2020). The number of pharmaceutical species is constantly increasing due to active worldwide research in the field of pharmacological research (Grudzinskaya et al., 2020).

In the context of independent Kazakhstan, where the supply of pharmaceutical production with herbal raw materials is an integral part of the production of medicinal preparations from medicinal plants, an assessment of the biodiversity of the medicinal plant flora and its resource potential is particularly important (Grudzinskaya et al., 2014). The demand for medicinal herbs is growing daily. *Zygophyllum fabago* L., in some sources referred to as Syrian Bean-Caper is one such plant. Scientific research indicates that the plant under study has unique medicinal qualities (Grudzinskaya et al., 2014). The systematic review was conducted by herbarium materials from herbarium fund (AA) of the Institute of Botany and Phytointroduction (Almaty, Kazakhstan), herbarium materials of the Van Yüzüncü Yıl University (Van, Turkey) (<http://vanf.yyu.edu.tr/search>), herbarium materials of the Moscow State University (Moscow, Russia) (<https://plant.depo.msu.ru/open/public>) (Pictures 1–3).

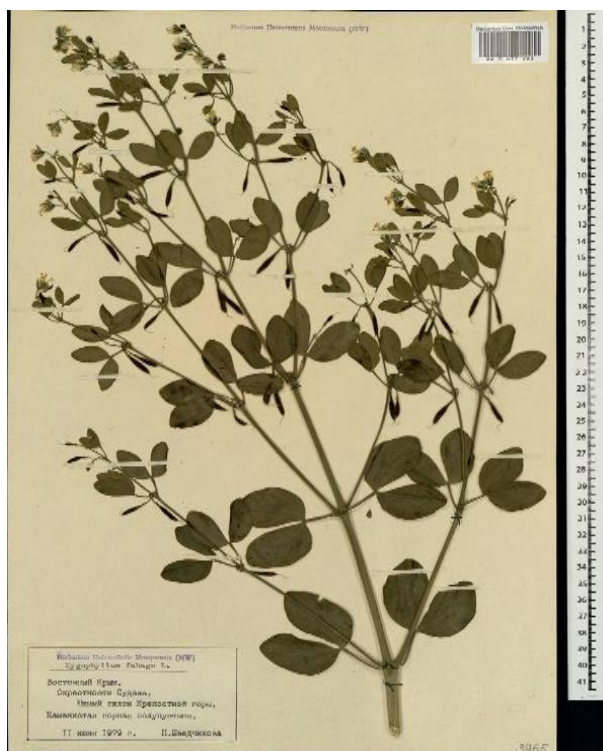
Zygophyllum fabago L. is a perennial herbaceous plant, that grows to a height of 30–75 cm on spreading branches. The capsule is 10 (15–40) mm long, cylindrical, short or long, drooping or deflected downwards. The Stipules are oval, elliptical or lanceolate, 4–10 mm long, fused on the basal stems and separate, and smaller on the apical stems. Two leaflets per leaf; the petiole is shorter than leaflets; the leaves are thick, oblong-obovate with a rounded tip. Axillary flower. Pedicel: 4–10 mm. The sepals are oblong to elliptical, with a blunt apex and a white membranous margin. Petals are as long as the sepals, obovate, and orange-red at the base. Apically, they are white. The stamens are longer than the petals, with elongated appendages half as long as the anthers (Pictures 1–3). Pendulous, elongated to cylindrical, pentagonal capsule flowers from April to June. Grows in desert steppes on salty soils and uneven sands (Medical Plants..., 2022).



Picture 1 – *Zygophyllum fabago* L. plant
(Herbarium materials of the Herbarium fund (AA) of the Institute of Botany and
Phytointroduction. Almaty, Kazakhstan)



Picture 2 – *Zygophyllum fabago* L. plant
(Herbarium materials of the Van Yüzüncü Yıl University
(<http://vanf.yyu.edu.tr/search>))



Picture 3 – *Zygophyllum fabago* L. plant
(Herbarium materials of the Moscow State University
(<https://plant.depo.msu.ru/open/public>))

Plants are a source of bioactive compounds for the production of medicines and are widely used in traditional medicine around the world. This study demonstrates the value of traditional medicine in the management and treatment of diseases. The WHO has confirmed that over 80% of the world's population can get the medical care they need from herbal medicines; this is especially true for the millions of people living in the vast rural areas of developing countries (Hosseinzadeh et al., 2015). Most people use herbal medicines to treat a variety of ailments, including inflammation-related issues such as rheumatism, asthma, eczema, chronic tiredness, and irritable bowel syndrome. *Zygophyllum fabago* L. is a wild growing, promising medicinal plant with bioactive potential, used in traditional medicine for a wide range of indications. Among different species of *Zygophyllum*, *Zygophyllum fabago* L. is used more than other species in folk medicine. *Zygophyllum fabago* L. is native to many countries in Central Asia. *Zygophyllum fabago* L. has shown that the bioactive compounds in plant have attributes such as anti-inflammatory, antioxidant, laxative, anti-asthma, coughing antibacterial and antifungal properties (Isambayev et al., 2000; Feng et al., 2007; 2008; Abdel-Hamid et al., 2013; Khan et al., 2014; Alhaddad et al., 2015; Yaripour et al., 2017). The aim of this review is to consider the current value of medicinal plant *Zygophyllum fabago* L. which is used in traditional medical practices as a bioactive natural plant.

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Reference list

Abdel-Hamid, R. A., Abilov Zh. A., Sultanova N. A., Saitjanova Sh. B., and Gemedzhieva N. G. (2013) Preliminary Phytochemical Screening of *Zygophyllum fabago* // *International Journal of Biology and Chemistry*. 6(2):60-64.
<https://ijbch.kaznu.kz/index.php/kaznu/article/view/101>.



Ahmed A, Hameed A, Saeed S. Biochemical profile and bioactive potential of thirteen wild folk medicinal plants from Balochistan, Pakistan. Šiler BT, editor. PLOS ONE. 2020 Aug 18;15(8):e0231612. doi: 10.1371/journal.pone.0231612.

Alhaddad H, Amer Fadhil A, Ismael S H. (2015) Estimation of LD50 and Acute Toxicity of *Zygophyllum fabago* in Mice // Pharmacol Sci. 4:94–97. doi:10.12691/ajps-3-4-2.

Feng Y L, Li H R, Xu L Z, Yang S L. (2007) 27-NorTriterpenoid glycoside from the barks of *Zygophyllum fabago* L. // Asian Nat Prod Res. 9:505–510. doi:10.1080/10286020600782157.

Feng Y L, Wu B, Li H R, Li Y Q, Xu L Z, Yang S L, Kitanaka S. (2008) Triterpenoidal Saponins from the Barks of *Zygophyllum fabago* L. // Chem Pharm Bull. 56:858–860. doi:10.1248/cpb.56.858.

Grudzinskaya L. M., Gemedzhieva N. G., Nelina N. V., and Karzhaubekova Z. Annotated List of Medicinal Plants in Kazakhstan. – Almaty, Kazakhstan, vol. 20, no. 1, 2014. – 200 p.

Grudzinskaya L., Gemejiyeva N., Karzhaubekova Zh. The Kazakhstan medicinal flora survey in a leading families volume // Қарағанды университетінің habarşysy Biologiâ, medicina, geografiâ seriâsy. 2020 Dec 30;100(4):39–51.

Hosseinzadeh S, Jafarikukhdan A, Hosseini A, Armand R. (2015) The Application of Medicinal Plants in Traditional and Modern Medicine: A Review of *Thymus vulgaris* // International Journal of Clinical Medicine [Internet];06(09):635–42. Available from: https://file.scirp.org/pdf/IJCM_2015091513262965.pdf DOI: 10.4236/ijcm.2015.69084.

Isambaev I., Rakhimov K., Egeubaeva R. The application of medicinal plants in folk medicine. – Almaty, 2000. – 117– 118 p.

Khan S S, Khan A, Khan A, Wadood A, Farooq U, Ahmed A, et al. Urease inhibitory activity of ursane type sulfated saponins from the aerial parts of *Zygophyllum fabago* Linn. Phytomedicine. 2014 Feb;21(3):379–82. doi: 10.1016/j.phymed.2013.09.009.

Lomonosov Moscow State University (n.d.). *Zygophyllum fabago*. Retrieved from <https://plant.depo.msu.ru/open/public/search?searchBy=any&queryString=Zygophyllum%20fabago%20>.

Medical Plants of Kazakhstan. Vol.1. – Korea. Gemejiyeva N. G., Sitpayeva G. T., Karzhaubaeva Zh. Zh., Choi S. H., Paik J. H. 2022. – 314–315 p.

Yaripour S, Delnavazi M R, Asgharian P, Valiyari S, Tavakoli S, Nazemiyeh H. A survey on phytochemical composition and biological activity of *Zygophyllum fabago* from Iran // Advanced Pharmaceutical Bulletin. 2017 Apr 13;7(1):109–14. doi: 10.15171/apb.2017.014

Yüzüncü Yıl University (n.d.). Search. Retrieved from <http://vanf.yyu.edu.tr/search>