

# Medicinal Plants of Karakalpakstan

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**Abstract:** The flora of Uzbekistan consists about 4 500 species of vascular plants due to its biogeographically features, which make a center of medicinal plant diversity (sharply continental climate, availability deserts and high mountains, abundance of endemic flora). The medicinal flora of Karakalpakstan represented by 444 species from 240 genera, which belong to 63 families. The analysis of the received results in this article are given.

**Keywords:** Karakalpakstan, medicinal plants, taxonomy, ethnobotany

## 1. Introduction

The Republic of Karakalpakstan is the largest region of Republic of Uzbekistan, which is situated in the Northern part of Uzbekistan and occupied by about 37% or 167.1 thousand km<sup>2</sup> of the Uzbekistan's area. In this region the amount of population is approximately 1800000 people. By natural complex Karakalpakstan is divided into 4 regions: Plateau Ustyrt of Karakalpakstan, Kizilkum part of Karakalpakstan, Quyi Amudariya and newly appeared Aralqum (Fig.1), [1], [2]. According to literature, in Karakalpakstan grow around 1100 species of vascular plants [2], about 343 species of them are supposed to be medicinal [3], [4], but the total list of medicinal plants still are absent now. The purpose of the present work was establishing the list of medicinal plants, which are widely used in official and folk medicine of Karakalpakstan and make comprehensive analysis of them in various aspects.

## 2. Study Area and Data Analysis

Research work was started in 2009 and continued in the beginning of 2017. During this time we have organized several expeditions in different parts of Karakalpakstan, as the result, there were collected more than 800 sheets of herbarium samples, met numerous number of traditional practitioners, which are called in Karakalpak languages tawup. During interview with traditional practitioners, we obtained new data for 24 species of plants. All collected materials were carried out by analysis in different aspects.

## 3. Results and Discussion

After statistical analysis of obtained data we can surely confirm that medicinal flora of Karakalpakstan is represented by 444 species from 240 genera, which belong to 63 families. Taxonomical analysis has shown that most plants belong to Gymnosperm – 98.4%, from them Dicotyledonous 85.8% (Table 1).

The leading 10 families of Karakalpakstan consist of 59.2 % from all flora of this region. Results of this analysis are given in Table 2.

The largest number of medicinal species – 108, belonging to 15 genera that constitute 24.24% of the total quantity of medicinal flora of Karakalpakstan (Table 3).

According to obtained data, we can make conclusion that this situation expresses flora character not only for Uzbekistan, but for Central Asia as whole.

Ethnobotanical research has spread to almost all big towns of Karakalpakstan, such as Nukus, Kungrad, Takhtakupir, Khujaili and Muinaq. During this research we have visited markets (bazaar), met traditional practitioner (tawup) and they shared their unique knowledge about using medicinal plants to cure patients. As result of this investigation, we establish that tawup's used only 50 species of medicinal plants, which belong to 45 genera and 30 families. This entire popular medicinal are used in Karakalpakstan for treatment of various diseases, as it is shown in Table 4.

The table shows that the application method of folk medicine is extract, decoction and powder, having bathing and fresh form. Water extract and decoction are generally preferred. Both of them are made just before use. For some plants like Adiraspan (*Peganum harmala* L.) the aerial part is burned and the smoke is inhaled for treatment and prophylactics of infectious diseases, such as influenza. Species growing in this territory are provided here: *Glycyrrhiza glabra* L., *Spaerophysa salsula* (Pall.) DC, *Anabasis aphylla* L., *Peganum harmala* L., *Salsola richteri* (Moq.) Kar. ex Litv., *Ferula foetida* L., *Artemisia annua* L., *Artemisia leucoides* Schrenk., *Artemisia santolina* Schrenk., *Capparis herbacea* Willd., *Alhagi pseudalhagi* (Bieb.) Fisch., *Datura stramonium* L., *Hyoscyamus niger* L., *Cichorium intybus* L. have great interest from pharmaceutical industry of Uzbekistan.

According to the last edition of Red data book of Uzbekistan (2009) [5], there are 4 species of medicinal plants, such as *Colchicum kesselringii* Regel, *Malacocarpus crithmifolius* (Retz.) C.A. Mey., *Zizyphus jujuba* Mill. and *Vitis vinifera* L..

**Table 1:** Taxonomical groups of vascular medicinal plants of Karakalpakstan

Section	Quantity			% of medicinal flora	% of total flora
	families	genera	species		
<i>Equisetophyta</i>	1	1	2	0.45	0.18
<i>Polypodiophyta</i>	1	1	1	0.22	0.09
<i>Pinophyta</i>	1	1	4	0.90	0.36
<i>Magnoliophyta</i>	<b>60</b>	<b>237</b>	<b>437</b>	<b>98.42</b>	<b>39.36</b>
<i>Magnoliopsida</i>	47	202	383	85.26	34.50
<i>Liliopsida</i>	13	35	54	12.16	4.86
Total:	<b>63</b>	<b>240</b>	<b>444</b>	<b>100</b>	<b>40</b>

**Table 2:** The leading families of medicinal plants

No.	Family	Genera	Species	%
1.	<i>Chenopodiaceae</i>	25	67	15.09
2.	<i>Asteraceae</i>	26	47	10.58
3.	<i>Fabaceae</i>	17	32	7.2
4.	<i>Brassicaceae</i>	19	26	5.58
5.	<i>Poaceae</i>	19	22	4.95
6.	<i>Polygonaceae</i>	6	20	4.5
7.	<i>Boraginaceae</i>	9	14	3.15
8.	<i>Caryophyllaceae</i>	8	14	3.15
9.	<i>Apiaceae</i>	7	11	2.48
10.	<i>Ranunculaceae</i>	7	10	2.25
Total		143 (59.3%)	263 (59.23%)	59.2

**Table 3:** Leading genera of medicinal flora

No.	Genus	Species	%
1.	<i>Artemisia</i> L.	15	3.37
2.	<i>Tamarix</i> L.	9	2.02
3.	<i>Atriplex</i> L.	9	2.02
4.	<i>Salsola</i> L.	9	2.02
5.	<i>Calligonum</i> L.	8	1.8
6.	<i>Astragalus</i> L.	8	1.8
7.	<i>Anabasis</i> L.	7	1.57
8.	<i>Chenopodium</i> L.	7	1.57
9.	<i>Amaranthus</i> L.	6	1.35
10.	<i>Acanthaphyllum</i> L.	5	1.12
11.	<i>Cuscuta</i> L.	5	1.12
12.	<i>Euphorbia</i> L.	5	1.12
13.	<i>Haplophyllum</i> L.	5	1.12
14.	<i>Ferula</i> L.	5	1.12
15.	<i>Suaeda</i> L.	5	1.12
Total		108 (24.26%)	24.24

**Table 4:** Medicinal plants of Karakalpakstan used in traditional medicine

Family	Botanical name	Local name	Part used	Forms of preparation	Traditional uses
<i>Apiaceae</i>	<i>Ferula foetida</i> (Bunge) Regel	sasiq gewrek	gum	fresh, extract	rheumatism, bronchial asthma, lounge tuberculosis, diabetes, liver disease
<i>Asclepiadaceae</i>	<i>Cynanchum sibiricum</i> Willd.	sutlimek	seeds		gall bladder diseases, dysentery
<i>Asparagaceae</i>	<i>Asparagus officinalis</i> L.	dari sarisebil	roots	extract	kidney diseases, hepatitis
	<i>Asparagus persicus</i> Baker	persiya sarise bil	roots	extract	urinogenital diseases
<i>Asteraceae</i>	<i>Bidens tripartita</i> L.	ushtarmaqli iyt oshagan	leaves	bath	dermal, liver diseases

Family	Botanical name	Local name	Part used	Forms of preparation	Traditional uses
<i>Asteraceae</i>	<i>Centaurea depressa</i> Bieb.	tigizqabikli	Flowers	decoction	jaundice
	<i>Cichorium intybus</i> L.	qadimgi shashirandi	Roots	decoction	hepatitis, kidney and stomach problems, nervous system disorders, diabetes
	<i>Helichrysum arenarium</i> (L) Moench	ulmas ut	Flowers	decoction	gall bladder diseases, hepatitis cystitis
	<i>Onopordum acanthium</i> L.	tikenekli onopordum	Aerial part	decoction	antibacterial, heart diseases hemorrhoids
	<i>Xanthium strumarium</i> L.	qadimgi oshagan	fruits, leaves	extract	antifungal, goiter, rheumatism
<i>Berberidaceae</i>	<i>Leontice ewersmannii</i> Bunge	iversman torsildagi	tubers	extract	siphilisy, itching, neurology
<i>Boraginaceae</i>	<i>Heliotropium arguzioides</i> Kar. & Kir.	semiz shop	whole plant		hepatitis and cirrhosis of liver
<i>Brassicaceae</i>	<i>Capsella bursa-pastoris</i> (L) Medik.	qadimgi shopan qalta	Aerial part	decoction	to stop internal bleeding, kidney problems
	<i>Eruca sativa</i> Mill.	unday	leaves	extract	dermal diseases
<i>Capparaceae</i>	<i>Capparis herbacea</i> Willd.	tikenli gewil	roots, fruits	extract decoction	jaundice, rheumatism
<i>Chenopodiaceae</i>	<i>Anabasis aphylla</i> L.	iyin siygek buyorguni	Shoots	extract	lounge tuberculosis
	<i>Halostachys belangeriana</i> (Moq.) Botsch.	qarabaraq	Leaves	decoction	increase blood pressure
	<i>Haloxylon ammodendron</i> (C. A. Mey) Bunge ex Boiss.	sekseyil	whole plants	extract	cardio-vascular diseases
	<i>Salsola richteri</i> (Moq) Kar. ex	sherkez	Aerial plants	extract	hypertonic, decrease blood pressure

	Litv.				
<i>Convolvulaceae</i>	<i>Convolvulus arvensis</i> L.	qoy pashegi	leaves, roots	extract	burn, ulcer, tuberculosis
<i>Elaeagnaceae</i>	<i>Elaeagnus orientalis</i> L.	jiyde	leaves, fruits	extract, fresh or dried fruits	high blood pressure
	<i>Elaeagnus oxycarpa</i> Schlecht.	jigildik	seeds	extract	high blood pressure
<i>Ephedraceae</i>	<i>Ephedra distachya</i> L.	qosmasaqli qizilsha	shoots	extract	gastro-intestinal diseases, rheumatism, bronchial asthma, cough
<i>Fabaceae</i>	<i>Alhagi persarum</i> Boiss & Buhse	parsi jantaq	flowers	decoction	astringent for dysentery, stomach disorder
	<i>Alhagi pseudalhagi</i> (Bieb.) Fisch.	qadimgi jantaq	Aerial parts	decoction	stomach disorder
	<i>Glycyrrhiza glabra</i> L.	boyan	roots	decoction	gastritis, bronchial asthma, cough
	<i>Melilotus officinalis</i> (L.) Pall.	dari qasqa jonishqa	leaves	powder	to remove pus from the wounds
<i>Lamiaceae</i>	<i>Mentha asiatica</i> Boriss.	aziya jalpizi	aerial parts	decoction	sedative, gastro-intestinal problems
<i>Malvaceae</i>	<i>Althaea armeniaca</i> Ten.	sharbexiya	roots	decoction	expectorant, anti-inflammation, pains in the small of the back
<i>Moraceae</i>	<i>Morus alba</i> L.	aq tut	leaves, bark, fruits	decoction fresh	kidney, hypertonia, bronchitis, anemia, diabetes

Family	Botanical name	Local name	Part used	Forms of preparation	Traditional uses
<i>Moraceae</i>	<i>Morus nigra</i> L.	qara tut	leaves, bark, fruits	decoction fresh	fruits juice against cough, laxative, anemia
<i>Papaveraceae</i>	<i>Papaver pavoninum</i> Srenk	pavliniya koknari, jabayi koknar	flowers	extract	dermal diseases
	<i>Roemeria refracta</i> DC.	iymek remeriya	flowers	extract	kidney
<i>Peganaceae</i>	<i>Peganum harmala</i> L.	adiraspan	aerial parts	smoke, bath	antibacterial, radiculitis
<i>Plantaginaceae</i>	<i>Plantago lanceolata</i> L.	qalemush atqulaq	leaves	extract	liver diseases
	<i>Plantago major</i> L.	ulken atqulaq	leaves	fresh leaves, extract	applied for injury to bleeding stop, gastritis, colitis
<i>Polygonaceae</i>	<i>Rheum turkestanicum</i> Janisch	tuye japiraq	roots	extract	stomach disorders
<i>Portulacaceae</i>	<i>Portulaca oleracea</i> L.	semiz ot	whole plants	fresh	fresh juice to stop bleeding, hemoptysis, eye inflammation
<i>Ranunculaceae</i>	<i>Thalictrum isopyroides</i> C.A.Mey.	dong maraloti	Roots	extract	nervous system diseases
<i>Rhamnaceae</i>	<i>Zizyphus jujuba</i> Mill.	jiyan jiyde	Fruits	fresh, extract	hypertonia, rheumatism, tuberculosis
<i>Rosaceae</i>	<i>Amygdalus spinosissima</i> Bunge	bodomcha	seeds	Oil	asthma, cough, intestinal problems
	<i>Crataegus pontica</i> C. Koch.	dolana	flowers	ethanol extract, fresh fruits	heart diseases, against diarrhea
	<i>Rosa canina</i> L.	it murin	fruits	decoction	vitamin bearing, against diarrhea, diuretic
<i>Rubiaceae</i>	<i>Rubia tinctorum</i> L.	wayranboyaw	rhizome	extract	against kidney stone, anemia, liver diseases
<i>Salicaceae</i>	<i>Populus ariana</i> L.	toran`gil	leaves		against parasitic, fever, skin burning
<i>Scrophulariaceae</i>	<i>Verbascum songaricum</i> Schrenk	siyirquyriq	leaves	decoction	boiled leaves applied to swelling and wounds
<i>Solanaceae</i>	<i>Datura stramonium</i> L.	bangiduana	leaves, seeds	extract	tooth pain, seeds oil for cure hemorrhoids
	<i>Hyoscyamus niger</i> L.	qadimgi minduwana	leaves	extract	plaster from leaves applied to swelling, juice for ear pain
<i>Urticaceae</i>	<i>Urtica dioica</i> L.	qishitqish shop	leaves	extract	kidney, vitamin bearing
<i>Zygophyllaceae</i>	<i>Zygophyllum oxianum</i> Boriss.	palati	leaves	fresh	leaves applied to wounds

#### 4. Conclusions

To sum up, medicinal Flora of the Republic of Karakalpakstan is pretty various, since in this territory grows a large number of medicinal plants, which usually have a significant stock of raw materials, which is the rational use can serve for the production of pharmaceutical products based on vegetable raw materials.

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