

Ethnobotanics of Certain Medicinal Plants of Bukhara Region (Uzbekistan)

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Abstract

The article presents data on the ethnobotanical characteristics of 12 species of medicinal and food plants in the Bukhara region, where the climatic conditions are specific, hot and dry. These plants were used by the local population in ancient times and now as food and natural remedies. As a result of the study, data on the use of medicinal plants in food were collected on the basis of surveys of rural residents, housewives and elderly people of the city of Bukhara and the region. It is worth noting that due to the demand of the modern era, the study of the nutritional and therapeutic aspects of medicinal plants that grow naturally, their scientific and practical significance, determines the possibility of their use in folk medicine.

Keywords

Bukhara, Ethnobotany, Family, Species, Category, Flora, Folk Medicine, Local Population, Research

1. Introduction

Uzbekistan is located in the north of Central Asia, the main part of its territory is occupied by the Pamir-Alai, Tianshan Mountains and the Kyzylkum steppe. The plants of Uzbekistan consist mainly of single- and perennial therophytes. The predominance of therophytes in the vegetation cover corresponds to the vegetation cover of Central Asia [1].

The territory of the Bukhara region, located in the desert zone, includes natural and artificial ecosystems (desert, outlier mountains, tugai, reservoirs, cultivated areas, settlements). Here, due to the influence of the anthropogenic factor, the synanthropic flora was formed, and at present, the processes of its further adventization are taking place [2].

Foaming from plants with a useful property has been known since ancient times. Especially the use of medicinal plants is associated with the name of the Great Physician Abu Ali Ibn Sina. Ibn Sina cited data on almost 1000 types of medicinal plants in his work "Canons of Medicine", and also recommended some of them to be used as a food treatise [3]. Ibn Sina used more than 450 medicinal plants in the Bukhara region to treat patients throughout his life. Research on medicinal plants of Uzbekistan by K. Khadjimatov and O. K. Khadjimatov can be seen in their works [4] [5]. Scientific research of scientists is related to the use of medicinal plants in folk medicine and modern medicine. Information about these medicinal plants used as food is also provided [1].

The latest information about the modern flora of the Bukhara region can be found in the works of H. K. Esanov and others. [2] [6] [7] [8] [9] [10]. These works provide information on the distribution, significance, nutritional and medicinal properties of 59 families belonging to 294 genera, 529 kinds of natural higher plants found in the regions of the study. Among them, 50 families belonging to 147 genera, 186 kinds of higher medicinal plants were noted [2] [11]. As a result of research on medicinal plants in Bukhara region, 581 families and 261 species of medicinal plants belonging to 178 genera were found in the region. More than 100 species of these medicinal plants are used by the local population in folk medicine and as food.

Object and methods of research: The study was conducted in 2019-2021 in the Bukhara region. As a result of scientific research, more than 700 herbarium samples were collected. Herbarium samples are identified with such scientific sources as "Flora of Uzbekistan" [12], "Determinant of plants of Central Asia" [13], Cadastre of flora of Uzbekistan: Bukhara region [14] and H. Q. Esanov [11]; [15] Data from the results of the study on the use of medicinal plants in food were collected on the basis of interviews with residents, housewives and elderly people of the city of Bukhara and 9 villages of the region. In the Bukhara region, 12 types of medicinal plants that are widely used in food were analyzed. As a result of the analysis, 33.3% of the studied medicinal plants belong to the Amaranthaceae family.

Research results and discussion: Research on the ethnobotany of medicinal plants was conducted in 2019-2021. During the research, samples of the herbarium of higher plants of the Bukhara region were collected. Having determined their types and medicinal properties, the purposes of their use by the local population were studied. The purpose of using medicinal plants for food by the local population was revealed in the results of a survey of doctors and elderly people of the neighborhood. Medicinal plants found in the Bukhara region are used both as food and in the treatment of diseases. The population can prevent the transmission of various diseases by using these medicinal plants as food. The main factor in feeding the local population with different food products is the diversity of the climate and landscape of Uzbekistan (mountain, desert, Adyr).

Since ancient times, the local population was engaged in agriculture, cattle

breeding and handicrafts, so a lot of physical labor was involved. Physical labor requires the consumption of high-calorie food by the body. For this reason, a lot of meat and fat products were consumed as part of the diet of the majority of the population. Due to the hot climate (temperature +40°C + 45°C) in the region of California in the summer, the body's need for high-calorie products (meat, protein, lipids) decreases. Therefore, local residents often eat food and dishes made from plants in the summer season. This makes it possible to easily digest food in the body. Some medicinal plants used for food by local residents of the Bukhara region are given (Table 1).

Table 1. Medicinal food plants found in the Bukhara region.

№	Scientific name	Translation in Uzbek language	Part of the plant used for food	Importance
1	<i>Allium sabulosum</i> Steven ex Bunge	Qum piyoz	Stem and seeds	It stimulates the appetite, is rich in vitamins and helps the digestive process.
2	<i>Amaranthus retroflexus</i> L.	Qayrilgan machin, yovvoyi gultojixo'roz, eshaksho'ra	Leaves and seeds	It has a mild taste, is nutritious, rich in vitamins.
3	<i>Atriplex tatarica</i> L.	Tatar olabutasi	Leaves and seeds	Nutritious, has a pleasant and mild taste. It is rich in iron, starch and vitamins.
4	<i>Capsella bursa-pastoris</i> (L.) Medikus	Oddiy jag'-jag', achambiti	The aboveground part	It gives the dish an unusual taste and smell, stimulates the appetite
5	<i>Chenopodium album</i> L.	Oq sho'ra	Leaves and seed	Gives a pleasant and mild taste. It is rich in iron, starch, vitamins A and C
6	<i>Chenopodium rubrum</i> L.	Qizil sho'ra	Leaves and seed	Gives a pleasant and mild taste. It is rich in iron, starch, vitamins A and C
7	<i>Cyperus rotundus</i> L.	Salomalik hilol, doirasimon salomaleykum	Nodes	Prepare spices, salads, or drinks that give the taste of coffee or cocoa.
8	<i>Mentha longifolia</i> (L.) Huds.	Yalpiz, osh yalpiz	Leaves and stems	They give a pleasant aroma and taste, improve the digestive process.
9	<i>Portulaca oleracea</i> L.	Sabzavot semizo'ti	Leaves and seeds	They give a pleasant taste and strength, refresh the body
10	<i>Rumex halacsyi</i> Rech.	Xalachi otqulog'i	Root, leaves, stem, and fruit	It has a pleasant and mild taste. The green color can be obtained from the stem and leaves.
11	<i>Spinacia turkestanica</i> Iljin.	Turkiston ismalog'i	Leaves and seeds	Nutritious, improves digestion in the body and enriches with vitamins
12	<i>Taraxacum bicornis</i> Dahlst.	Qo'shshox qoqio't	From the stem, flowers and leave	Fragrant wine, salads, and decoctions of jam and leaves are prepared from flowers

The medicinal plant, which is used as the food shown in the table, contains an abundance of vitamins and is used in the daily consumption of the local population as an appetizing food. Especially *Allium sabulosum*, *Cyperus rotundus*—mainly in the summer and autumn seasons, *Amaranthus retroflexus*, *Chenopodium album*, *Chenopodium rubrum*—more in the spring season, *Mentha longifolia*—all year round, *Capsella bursa-pastoris*—winter and spring season, *Portulaca oleracea*, *Rumex halacsyi*—the first month of spring and summer, *Atriplex tatarica*, *Spinacia turkestanica*, *Taraxacum bicorne*—consumed in the spring season. Plants that are consumed in the spring, give strength to the body, providing people with a large amount of vitamins.

The results of the study show that medicinal plants used by the local population mainly serve to improve the taste of food and normalize the process of digestion of food in the body. In addition, these natural medicinal plants are used in the adaptation of the human body to the climate, in the absence of vitamins and in the prevention of certain diseases. For example: *Mentha longifolia* was widely used in ancient times as a medicinal and nutritional supplement from this plant [4]. The locals use this plant to protect dried fruits (apricots, apples, plums, nuts) from various insect pests. In the summer it is widely used as an appetizer by mixing it with dairy products. The terrestrial chemical composition of the plant consists of 0.08% - 0.15% ascarbic acid, 0.3% - 0.5% essential oils. The maximum amount of these substances is found in the leaves before the appearance of the buds of the plant, and it has a very pleasant smell, light yellow color, and the composition includes menthol, mentone, pulegone, carvacrol and also a small amount of linalool. People used *Mentha longifolia* for several thousand years, the ancient Greeks and Jews prepared a fragrant perfume from it. The great physician Abu Ali Ibn Sina used longifolia ointment for strengthening the stomach, for digestion, for stopping vomiting of mucus and blood, for treating yellow sickness, for internal bleeding. For varicose veins and people with low blood pressure, it is not recommended to consume a lot of mint. Excessive use of mint weakens sexual potency in men. Local residents use mint as a medicine for various diseases, prepare pleasant drinks, salads and dishes.

Portulaca oleracea is a highly nutritious and medicinal plant that grows in the wild among vegetation. Modern medical investigations have showed that *Portulaca oleracea* has antibacterial effect and possesses certain inhibitory effect on dysentery bacillus, typhoid bacillus, *Escherichia coli* and *Staphylococcus aureus*. It is known as “natural antibiotics” with non-toxic side effects [16] [17]. *Portulaca oleracea* has different names in various ethnic groups in Nigeria. It is known as “Ntioko”, “Ntilimoke”, “Ntiike” or “Idiridi” in Igbo; “Esan omode” or “Papasan” in Yoruba; “Babbajibji” or “Halshen saniya” in Hausa and “Eferemakara” in Efik [18] [19]. In Uzbekistan, this plant is called “semiz ot”. *Portulaca oleracea* has been widely used in Uzbekistan as a medicinal and food remedy since ancient times. Local elderly people noted that the seeds of this plant have the property of purifying the human body. For this reason, the population noted the use

of mainly leaves and seeds of the plant as a medicinal and food product.

The locals of Bukhara use *Portulaca oleracea* as food. These medicinal plants are widely used as food in China, Russia, Korea, India and other countries. During a survey of the properties of medicinal plants, elderly people of the local population noted that the seeds of the plant have the ability to cleanse the human body. For this reason, the population noted that the leaves and seeds of the plant are mainly used as medicinal and food products [20]. The upper part of the plant contains glucose, galactose, fructose, sucrose, maltose, raffinose, carotenoids (lutein, β -carotene), fatty acids (α -linolenic), organic acids (mainly oxalate, nicotine), flavonoids (liquiritin), betazianins, phenolcarbonate acids, steroids (cytosterol, campesterin, stigmasterin), terpenoids (glutathione, β -amyryne, butyrospermol, parkeol, 24-methylene, 24-dihydroparkeol), alkaloids, saponins, nitrogen-preserving compounds, norepinephrine, vitamins V1, s (up to 300 mg%), α -tocopherol (e), RR and K (up to 2.4%), consisting of mucus and sticky substances. The seeds contain olein, linol, and palmitins [21] [22] [23].

It is also used in the treatment of diseases such as impotence, depression, eye inflammation, diabetes, dysentery, asthma, liver and kidney diseases, urination disorders (cystitis and urethritis), hemorrhoids, headache, as a natural antioxidant (anti-inflammatory agent against snakes and insect bites) released by the body from this plant [24].

Portulaca oleracea—is consumed by the local population by preparing various food products (somsa, bichak, dumplings, manti). When preparing a dish from this plant, its leaves are collected, crushed and cooked with the addition of onions, eggs, and various spices [4] (Figure 1 and Figure 2).

In the Bukhara oasis, species such as *Spinacia turkestanica*, *Mentha longifolia* and *Portulaca oleracea* are widely used as food. Local residents use the leaves of plants such as *Atriplex tatarica*, *Spinacia turkestanica*, *Chenopodium album* and *Chenopodium rubrum* to prepare various dishes such as somsa, manti, bichak.



Figure 1. Green manta rays from *Portulaca oleracea*.

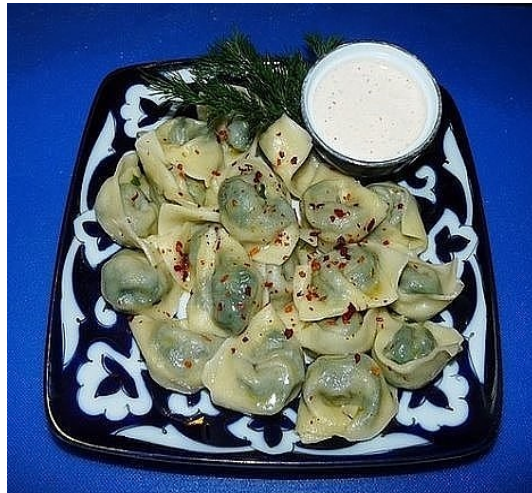


Figure 2. Green dumplings from *Atriplex tatarica*.

Especially in the 50 s of the XX century, when there was a shortage of grain crops, local residents collected seeds of *Chenopodium album* and *Chenopodium rubrum* plants, ground them in a mill and used them in baking with the addition of wheat and corn flour. Studies of local elderly data have shown that, especially in the 1950s, when there was a shortage of grain, locals collected *Chenopodium album* and *Chenopodium rubrum* seeds, ground them in a mill, and used them to bake wheat and corn flour (**Figure 3**).

Capsella bursa-pastoris is a very common cosmopolitan species. It has been used by humans as a vitamin food and medicinal plant since ancient times. *Capsella bursa-pastoris* grows in the far north and in all regions except the steppe zones, among crops such as weeds in meadows, roadside areas, populated lands, fields and arable land.

Atriplex tatarica from the peeled seeds cook porridge, the taste is vaguely reminiscent of buckwheat, prepare pancakes, mashed potatoes, tortillas, casseroles, bake bread. Bread is also baked with dried leaves, ground into powder. Young leaves (scalded with boiling water to remove the bitterness) and dried can be put in soup, borscht, salad. The useful properties of quinoa allow recipes to make curative, and food nutritious for the human body [25].

It has many useful properties. In particular, it is recommended for radioactive damage [26]. Diuretic for cystitis, pyelonephritis, urolithiasis, nephritis, cholelithiasis, cholecystitis, gout, rheumatism, hemorrhoids [18] [27], in collections—for menopause [28]. In the collection (decoction) has a normalizing effect on mod 011eli toxic hepatitis, has anti-allergic properties [29], a derivative of diosmetin has a therapeutic effect in varicose veins, phlebitis, hemorrhoids [30].

The upper part of the plant contains hisopin glycoside, borsoic acid, 0.12% vitamins C and K, flavonoids, organic (malic, citric, tartaric, and other) acids, choline, acetylcholine, inosites, saponins, additives, and other active substances [31].

Since *Capsella bursa-pastoris* contains a lot of vitamins and is an appetite



Figure 3. Green dishes from *Spinacia turkestanica*, *Mentha longifolia* and *Portulaca oleracea*.



Figure 4. Dishes made from *Capsella bursa-pastoris*.

stimulant, it is used in daily consumption by the local population. From this plant, the local population also prepares various national dishes in early spring, such as somsa and green dumplings. These dishes are served as the main dish on the holiday table on the day of Navruz. Dishes from this plant are used to increase immunity, strengthen strength, meet the body's need for vitamins and treat various diseases (internal bleeding, diseases of the urinary tract and liver) (Figure 4).

2. Conclusion

As a result of scientific ethnobotanical research conducted in the Bukhara region, the local population introduced 12 types of food crops and medicinal

plants. It is established that these plants have a high nutritional value with medicinal properties. Their specific biological properties increase the body's immunity, ensure the intake of vitamins in the body. These types of medicinal plants in Uzbekistan increase the body's resistance to various diseases, especially in the hot climatic conditions of Bukhara.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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