A viewpoint toward medical plant of astragalus and its main characteristics, products and economical importance in Iran (Case study: Boldaji and lake Choghakhor in Chaharmahal and Bakhtiari Province)

Farhood Golmohammadi ¹

¹Assistant Professor in Islamic Azad University- Birjand Branch - Birjand, Iran

ABSTRACT: Medicinal plants are one of very valuable rescores in wide range of world and Iran natural resources. Herbal medicines against chemical and synthetic drugs have bad effects and minor side effects and or are completely harmless. Interest in ethnobotany has increased dramatically in recent years. Medicinal folklore over the years has proved to be an invaluable guide in present day screening of drugs. In recent years, use of ethnovanital information in medicinal plant research has gained considerable attention in segments of the scientific community. Iran has a long medical tradition and traditional learning of plant remedies. Some authors have investigated the traditional pharmacopoeia and medicinal plants in different areas of Iran. Iran is one of the most important habitats of Astragalus in the world. Astragalus spp are valuable for their forage, medicinal and industrial usage and soil conservation. Gum tragacanth is one of the most important herb gum, which is exudated from the stem of Astragalus gossypinus. Iran is the greatest producer of gum tragacanth. It is an important item of international trade in the food, pharmaceutical, adhesive, paper, textile, and other industries. Chemical structure of gum tragacanth is mixed of a complex of polysaccharides and inorganic elements. In this article author state results of his field research mainly in major problems, approaches and aspects of exploiting, products, economics, marketing and etc. of Astragalus spp in Boldaji and lake Choghakhor in Chaharmahal and Bakhtiari Province in south west of Iran as a major producer and exporter of this valuable medicinal plant and its by-products.

Key words: Astragalus, Gum tragacanth, Medical plant, products, Chaharmahal and Bakhtiari, Iran.

INTRODUCTION

Since ancient times man used various natural materials as a source of medicines. Plants have always had an important role to play in medicine and public health. The knowledge of use of medicinal plants and their properties was acquired by means of trial and error and transmitted from generation to generation. But this knowledge and transmission is in danger because transmission between older and younger generation is not always assured. Also interest in ethnobotany has increased dramatically in recent years. Medicinal folklore over the years has proved to be an invaluable guide in present day screening of drugs. In recent years, use of ethnovanital information in medicinal plant research has gained considerable attention in segments of the scientific community. Iran has a long medical tradition and traditional learning of plant remedies. Some authors have investigated the traditional pharmacopoeia and medicinal plants in different areas of Iran (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004).

Medicinal plants represent an important health and economic component of biodiversity. So, it is essential to make complete inventory of the medicinal component of the flora of any country for conservation and sustainable use. These plants play an essential role in traditional health care, about 80% of the world's inhabitants relying mainly on traditional medicines for their primary health care. Natural sources such as mountains and rangelands have been the source of medicinal agents for thousands of years, and some important modern drugs have been derived from natural sources, many based on their use in traditional medicine. In human history, people used various materials from nature to cure their illnesses and improved their health. Popular knowledge of plants used by humans is based on thousands of years of experience. By “trial
and error”, people learnt how to recognize and use plants, including those with magic-religious function. Iranians have been using herbal medicine for the treatment of some daily diseases, so lots of studies have been done for introducing wild medicinal plants in different parts of Iran.

Plants have played important role as sources of medicine for human being since ancient times. The knowledge of use of medicinally important plants has been passed verbally from generation to generation over times, and led to the discovery of a wide range of plant derived drugs. Ethnobotanical researches are conducted to prevent both loss of this knowledge and its destructive changes during transmission between generations. This information is also collected and documented by ethno-botanical studies for further investigations in future. Documenting this information is useful for recording local cultural traditions and gives us some of the important information necessary to protect our natural habitat (Chu, D.T. Wong, W.L. Mavligit, G.M. Mar 1988)&(Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Astragalus L., with about 2500–3000 species, is the largest genus of flowering plants in the world. In India, it has about 80–90 species, chiefly distributed in the temperate to alpine regions of the Himalaya with the main center of diversity in the cold deserts of Lahul-Spiti (Himachal Pradesh) and Leh and Ladakh (Jammu and Kashmir) (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Iran is a vast country of rich plant resources including considerable number of medicinal plants. Local communities in different parts of the country have developed a deep knowledge of various uses of plants during their old history. Traditional medicine and medicinal plants usage have been investigated in some parts of the country. Some pharmaceutical investigations have been conducted on especial disease or cytotoxic properties of different plant species based mainly on local ethno-botanical data in recent years. However, regarding the vast surface, richness of biodiversity of the country and remarkable divergence of culture and traditional customs distributed throughout this area, it is clear that a high number of ethno-botanical investigations should be conducted to help efficiently documenting and conserving this knowledge. An important part of ethno-botanical knowledge in Iran can be traced in the nomadic life. There were several nomadic tribes in Iran belonging to different ethnic divisions. The number and members of these nomadic people have faced a dramatic decrease in recent 50 years. Astragalus from family of fabaceae grows extensively in rangelands and mountainous region of Iran (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazilati, M. 2012)&(Zarre, Sh., Rajaij, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004).

Astragalus L. is the largest genus of flowering plants in Iran and has various complicated taxonomical difficulties in its classification. The genus Astragalus L. with nearly 3000, species is probably the largest genus among the flowering plants. Iran, possessing nearly 800 species, is one of the most important centre of diversity for this genus. Astragalus L. is the largest genus in the family Leguminosae (subfamily Papilionideae, tribe Galegeae). Widely distributed throughout the temperate region of the world, is principally located in Europe, Asia and North America, but also on mountains in Africa and South America. They are annual and perennial herbs or small shrubs. Astragalus species are divided in two main groups: the medicinal plants and the poisonous species. There is a great deal of research interest in Astragalus. The triterpenoid saponins known as astragalosides support the integrity of mucous membranes and epithelial cells in the respiratory tract through an antioxidant mechanism. The polysaccharides are of particular interest for their immune supporting properties. It also supports deep immune function by promoting normal levels of specific immune cells and aids in their function. It appears especially effective when immune function is stressed by environmental or endogenous challenges. Astragalus root has been used in traditional Chinese medicine for centuries as a restorative tonic; it is considered a sweet, warming herb with effects on many organs. It is used either alone or with other herbs to help with aging, improve energy, and stimulate the immune system during conditions such as the common cold, blood disorders, cancer and HIV/AIDS. It is also used as an adaptogen, which is meant to increase general resistance to stress and disease, and normalize disturbances in your body's ability to balance itself. The root is sold as a supplement in tablets of different dosages (Baskauf, C. J. Burke, J. M. 2009).

Native to China, astragalus has been used for centuries in traditional Chinese medicine. Astragalus (huang qi) has been a foundational herb in Traditional Chinese Medicine for hundreds of years. It is included in formulas to support Wei Qi (Chi), or the conceptual “shield” which serves as a primary defense mechanism against pernicious threats to the system. It is sweet, and nourishing and often included in recipes for soups which are used for convalescence and general strengthening of the system. In Traditional Chinese Medicine it is said to tonify the “spleen” and hence is used for fatigue linked to decreased appetite. It is part of the Milk Vetch or Fabaceae family. It is traditionally used in its dried powdered form or as a strong decoction, made from boiling the dried root in water for an extended period (Chu, D.T. Wong, W.L. Mavligit, G.M. Mar 1988).

In the United States, the herb gained popularity in the 1980s. There are actually over 2,000 species of astragalus; however, the two related species Astragalus membranaceus and Astragalus mongholicus are the ones primarily used for health purposes (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Historically, astragalus has been used in traditional Chinese medicine, usually in combination with other herbs, to support and enhance the immune system. It is still widely used in China for chronic hepatitis and as an adjunctive therapy for cancer. It is also used as a folk or traditional remedy for colds and upper respiratory
infections, and for heart disease. The root of the astragalus plant is typically used in soups, teas, extracts, or capsules. Astragalus is generally used with other herbs, such as ginseng, angelica, and licorice (Chu, D.T. Wong, W.L. Mavligit, G.M. Mar 1988) & (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004). Gum tragacanth is a dried exudation obtained from the stems and branches of Asian species of Astragalus. It has been used as a stabilizer, emulsifier and thickener in food, pharmaceutical, cosmetic industries. Iran is the original source and one of the important places for diversity of Astragalus species. Phenolic compounds are believed to account for a major portion of the antioxidant capacity in many plants. Astragalus gossypinus and Astragalus parrowianus species, which is the producer of tragacanth, belongs to Fabaceae family. is mostly spread in Alborz and Zagros Mountains, Iran (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004).

| Table 1. Some of the major species of astragalus and major regions and provinces of growing them in Iran |
| Major species of astragalus | Major regions and provinces of them in Iran |
| A. adscendens | Mountains of Lorestan and Khuzestan provinces- south west of Iran. Main source for producing tragacanth in Iran and the world. |
| A. brachyclayx | Mountains of Kurdistan province- north- west of Iran. |
| A. gummifer | Main species for producing tragacanth in the world. Mountains of Kordistan province- north- west of Iran. Plus countries of Lebanon, Armenia and Syria. |
| A. microcephalus | Mountains of Fleur, Tehran and Mazandaran provinces- north center of Iran with 2500 height elevation from free seas and oceans. Plus countries of Armenia and Turkey. |
| A. pyncolaidus | Mountains of Markazi (Arak) province- west of Iran. |
| A. kurdicus | Mountains of Boushehr, Fars and Khuzestan provinces- south of Iran. |
| A. verus | Mountains of Bakhtaran and Hamadan provinces- west of Iran. Plus in a range of countries from Greece to Iran. |
| A. keratensis | Mountains of Khorasan and Systan and Balouchestan provinces- east of Iran. |
| A. cglenuus | Not found in Iran. |
| A. creticus | Not found in Iran. |
| A. leiociados | Mountains of Loresan, Kordistan, Ilam and Khuzestan provinces - west of Iran. |
| A. heratensis | Mountains and valley of Hrrirood river in Systan and Balouchestan provinces- east of Iran. |
| A. strobiliferus | Mountains and valley of Hrrirood river in Systan and Balouchestan provinces- east of Iran. |
| A. gossypinus | The Zagros and Alborz mountain ranges in provinces in south and north of Iran. The best quality of tragacanth in the world obtaining from this species. |
| A. Parravianus | The Zagros and Alborz mountain ranges in provinces in south and north of Iran. |
| A. schorobicus | The Zagros and Alborz mountain ranges in provinces in south and north of Iran. |

(Golmohammad, F. 2013)

| Table 2. Data about economic situation of astragalus and tragacanth in Iran and the world. |
| Items | information |
| Current prices ($/Lb) of gum tragacanth in New York Market | No. 1, ribbons: 36.00 to 40.00 Flaked powder: 12.50 to 14.00 70 percent |
| Share of Iran in producing tragacanth in the world | 70 percent |
| Characteristics of the best quality gum | Tasteless, whitish, yellowish or pale-brown in color and translucent in appearance. |

(Golmohammad, F. 2013)
Figures 1&2. Shrubs of astragalus in mountains and pasturelands in Boldaji District and near lake Choghakhor, Borujen County, Chaharmahal and Bakhtiari Province, Iran (By author. Aug 4, 2013).
Tragacanth Gum

Plant gums are adhesive substances that are carbohydrates in nature and are usually produced as exudates from the bark of trees or shrubs. Some plant gums, such as gum arabic are soluble in water, dissolving to give clear solutions. Others including gum tragacanth produce mucilages by absorption of large quantities of water. Plant gums originating from many countries have been an important item in international trade for centuries in food, pharmaceutical, paper textile and other industries. Depending upon their major use, plant gums may be broadly classified as ‘food’ and ‘non-food’ or ‘technological grade’ gums. The former can be used as food additives in various kinds of confectioneries, foods and beverages and include gum arable, gum tragacanth, gum karaya and gum carob. The latter category finds its major use in non-food industrial applications and include ‘gum ghatti’, ‘gum talha’ and a variety of other gums.

Gum tragacanth is of the most important herbal gums extracted from Astragalus gossypinus Fischer. Iran is the most important producer of tragacanth and nowadays it is being used in various industries like food, health care services and pharmaceutics. Economic evaluation of tragacanth is performed based on its quality (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazilati, M. 2012).

Gum tragacanth is a gum which ooze naturally or by splitting in collar, stem or roots of thorny milk-vetch and release its moisture in air and dry on trunk of plant easily. No production. It has used in different industries and for diseases therapy (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Tragacanth is the dried gummy exudation flowing naturally or obtained by exudation from the trunk and branches of Astragalus gummifer and some other species of Astragalus (Leguminosae), found in western Asia (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazilati, M. 2012).

The natural plant exudate gum tragacanth is obtained from the stem of the bush like plant “goat's-horn”, Astragalus species. Gum tragacanth has been used commercially for over 2000 years and is currently widely used as an emulsifier and thickener in emulsion systems in different food, pharmaceutical and cosmetic applications. Gum tragacanth has a bland flavor and good stability to heat and acid and is allowed for food uses in accordance with the FDA Code of Federal Regulations as a food additive at the level of 0.2e1.3% by weight of the product. In Europe, gum tragacanth has E-number E413 on the list of additives approved by the Scientific Committee for Food of the European Community. The main area of commercial production is the Middle East with Iran, supplying 70% of the commercially used gum tragacanth, followed by Turkey and Syria as main producers. Gum tragacanth is known to confer very high viscosities when in aqueous solution, and is described
as a complex, highly branched, heterogeneous hydrophilic polysaccharide that may form complexes with salts, notably salts with divergent actions, such as Ca2þ salts (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Gum tragacanth is a naturally occurring complex, acidic polysaccharide derived as an exudate from the bark of Astragalus gummifer (Fabaceae family), a native tree of western Asia. Mostly, it is commercially produced in Iran and Turkey. The name tragacanth is originated from the Greek words tragos (goat) and akantha (thorn), indicating the curved shape of the gum. This biopolymer is an arabinogalactan type of natural gum and its structural, physicochemical, compositional, solution, thermal, rheological and emulsifying properties have been well characterized and studied. This biopolymer is a high-arabinose, protein containing, acidic heteropolysaccharide, which occurs in nature as mixed calcium, magnesium, and sodium salts.

The natural gum tragacanth is made from several species of Astragalus occurring in the Middle East, including A. adscendens, A. gummifer, A. brachycaulys, and A. tragacanthus. Also Astragaluspropinquus (syn. A. membranaceus) has a history of use as a herbal medicine used in systems of traditional Chinese medicine (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazilati, M. 2012).

Tragacanth gum has an ancient history and is widely used in Chinese and Iranian folk medicine. There are a number of published medicinal applications for tragacanth, either alone or in combination with other herbs for the treatment of diabetes mellitus, cancers, and constipation. Complex glucoarabinan polysaccharides isolated from a related Asian species (A. mongholicus) have been shown to stimulate the production of T-cells and antibody-producing plasma cells.15 – 16 Although pharmacological effects of tragacanth have been investigated in different diseases, its effect on wound healing has not been studied adequately.

Tragacanth is a natural gum obtained from the dried sap of several species of Middle Eastern legumes of the genus Astragalus, including A. adscendens, A. gummifer, A. brachycaulys, and A. tragacanthus. Some of these species are known collectively under the common names "goat's thorn" and "locoweed". The gum is sometimes called shiraz gum, shiraz, gum elect or gum dragon. The name derives from tragos and akantha, which means in Greek "goat" and "thorn", respectively. Iran is the biggest producer of the best quality of this gum.

Gum tragacanth is a viscous, odorless, tasteless, water-soluble mixture of polysaccharides obtained from sap which is drained from the root of the plant and dried. The gum seeps from the plant in twisted ribbons or flakes which can be powdered. It absorbs water to become a gel, which can be stirred into a paste. The gum is used in vegetable-tanned leatherworking as an edge slicking and burningish compound, and is occasionally used as a stiffener in textiles. The alkaloid it contains has historically been used as an herbal remedy for such conditions as cough and diarrhea. As a mucilage or paste, it has been used as a topical treatment for burns. It is used in pharmaceuticals and foods as an emulsifier, thickener, stabilizer, and texturant additive (code E413). Also, it is the traditional binder used in the making of artists' pastels, as it does not adhere to itself the same way other gums (such as gum arabic) do when dry. Gum tragacanth is also used to make a paste used in floral sugarcraft to create lifelike flowers on wires used as decorations for cakes. It makes a paste which air-dries brittle and can take colorings. It enables users to get a very fine, delicate finish to their work. Additionally, it has traditionally been used as an adhesive in the cigar-rolling process used to secure the cap or "flag" leaf to the finished cigar body, and to make pastels. Gum tragacanth is less common in products than other gums, such as gum arabic or guar gum, largely because most tragacanth is grown in Middle Eastern countries which have shaky trade relations with countries where the gum is to be used. Commercial cultivation of tragacanth plants has generally not proved economically worthwhile in the West, since other gums can be used for similar purposes. Gum tragacanth is also used in incense-making as a binder to hold all the powdered herbs together. Its water solubility is ideal for ease of working and an even spread. Only half as much is needed, compared to gum arabic or something similar.

In Saudi Arabia, a mixture of hydrated Tragacanth and ground dried Ziziphus spina-christi is used as a natural hair shampoo. Anecdotal claims point to its effectiveness in promoting hair growth (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazilati, M. 2012).

Several species of the genus Astragalus, growing wild in Iran, Iraq, Turkey, Afghanistan and adjacent Russia are the commercial sources of this exudate, obtained by tapping the branches or roots. Its hydrophilic and colloidal properties are of value in the manufacture of ice cream, liquors, lotions, sizings and other industrial products (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

Others including gum tragacanth produce mucilages by absorption of large plant at Khartoum to encourage export of value added powdered gum arable.

Gum tragacanth is the second most important commercial gum and is produced by several shrubby plants of the genus Astragalus, growing from Pakistan to Greece, particularly in Iran and Turkey. A. gummifer was considered to be the main tragacanth yielding species, but a field survey has established that A. microcephalus is the principal source of the gum. The exudate is produced spontaneously on the bark of the shrub, but the yield is often increased by making an incision and driving wooden wedges into it.

It is one of the oldest gums known and its use has dated back from pre-Christian times. It is widely used in pharmaceuticals and cosmetics as a thickening agent in syrups, salad dressings and sauces; in textile sizing;
and as an adhesive. It dissolves readily in cold water to give a solution of very high viscosity which is additionally highly resistant to strong acidic conditions, and the gum is therefore used primarily as a stabilizer and thickener in acid preparations.

The best quality gum is tasteless, whitish, yellowish or pale-brown in color and translucent in appearance. The lower grades are generally more strongly colored than the higher grades. The gum is obtained in two basic physical forms, namely ribbons (superior quality) and flakes (inferior quality). These two forms are obtained from different sub-species of the shrub. Both types of the shrubs normally do not grow in the same locality. The best type of gum is obtained from artificial incisions rather than from natural exudations. Abundant rainfall prior to the tapping season, and dry conditions during the harvesting season, constitute optimum climate for gum production.

Plants are widely scattered and gum is usually collected unsystematically by villagers. Gum production is labor intensive and is carried out from remote hostile areas of Iran and Turkey. After collection the gum is cleaned and selected by hand into five 'ribbon' (superior quality) and five flake (inferior quality) grades, which may range in price from US$ 10 to 62 per Kg. The best quality gum is of Iranian origin (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V., 2004).

Iran and Turkey are the main producing countries, about 70 percent of the supplies originating from Iran alone. Iran's average annual production potential has been estimated at 400 tonnes. The gum is also known to be produced in Afghanistan and Syria, but export consignments are very rare. Iran's export of tragacanth was 91 tonnes in 1987, which with a growth rate of 56% reached 142 tonnes in 1988. The export volume further increased to 176 and 257 tonnes in 1989 and 1990, respectively. Thus, there had been an increase of 182% in 1990, over what was exported in 1987. With this growth rate, it is expected that Iran may very soon be able to export 400 tonnes of the product. Turkey is the second largest producer and exporter. Exports from Brazil and India are actually re-exports (Ghomeshi Bozorg1, P. Vahabi, M.R. Fazlitali, M. 2012).

Tragacanth finds markets in many different countries, but the European Community, the United States, Japan and former Soviet Union are the major importing regions.

Demand for gum tragacanth fell greatly during 1980s, from several thousand tonnes to 200-300 tonnes per year, for several reasons. Iran/Iraq war made supplies erratic. The Iranian government tried to fix price that made the gum non-competitive and high inflation rates in Turkey had the same effect. In addition, demand for gum tragacanth fell suddenly and drastically after xanthan gum, a fermentation derived product developed in the 1970s, was finally approved for food use. Gum tragacanth has unacceptably high microbial contamination levels, previously controlled through fumigation with ethylene oxide (ETO). This process was forbidden around 1987, because of carcinogenicity of ETO. The alternative methods of bringing down the microbial counts also cause chemical changes in the gum and accordingly are not acceptable. Iran's recent recovery in tragacanth export market suggests that with a correct understanding of the world tragacanth market and supply of premium product there lies vast prospect for securing a bigger and better market for gum tragacanth. Deliberate cultivation of gum producing Astragalus species may be rewarding in appropriate regions. However, little is known about genetic factors that enhance gum yield and quality.

Chaharmahal And Bakhtiari Province And Boldaji District

Chaharmahal and Bakhtiari Province (Persian: Ostān-e Chahār-Mahāl-o Bakhtiārī) is one of the 31 provinces of Iran. It lies in the southwestern part of the country. Its capital is Shahrekord. Its distance to capital of the country namely Tehran is 543 km. It has an area of 16,332 square kilometers and a population of 842,000 (2005 estimate).

The province is mainly active in the agriculture sector. Most of the industrial sector is clustered around the center of the province. The province has the potential to become a vibrant tourist attraction because of its natural resources.

The history of the province is tied to that of the Bakhtiar tribe. The Bakhtiar tribe can be divided into two sub-tribes, Haft Lang and Chahar Lang with various territorial affiliations and they are the main speakers of Lurish language. As the name of the province dictates with the combining grammatical feature of "-o-" which is Persian for "and"; the other group of peoples in this ancient province are the Chahar Mahali's. These peoples and the Lur's live side by side and share almost similar customs. Very slight differences exist between them but most are almost unnoticeable. However there is often quite a bit of intermixing of the peoples through marriage. The cities of Shahrekord, Broujen, Ben, Naalch and Saman fall in the Chahar Mahali area of the province and are generally not inhabited by Lurs. The Bakhtiar territories at times have also come under Isfahan and Khuzestan province.

The people of this province have a history of having a simple living and being a capable people who are determined and effective warriors and fighters whenever circumstances made it necessary. They have gained such a reputation as being excellent, if not the best, horsemen in Iran. The people of this province, while having the more common Pahlevani wrestling/combat style of the deep rooted traditional Zurkhane, which exists
everywhere in all provinces, also have their own style of wrestling/unarmed combat as well (as do other provinces). The style is called Jangi (Jang means War and hence Jangi "war'ish" or "war like").

The province has various unique traditions and rituals relative to the 'tribal' lifestyles. Special forms of music, dance, and clothing are noteworthy.

Boldaji (Persian: Also Romanized as Boldājī and Būldāji) is a city in and the capital of Boldaji District, in Borujen County, Chaharmahal and Bakhtiari Province, Iran. At the 2006 census, its population was 19850, in 2,598 families in 2013. Its height from free sees and oceans is 2260 m. Its distance to capital of the country namely Tehran is 609 km. Its distance to center of Chaharmahal and Bakhtiari Province namely Shahrekord is 66 km.

Lake Choghakhor is a shallow ecologically and economically important water body in eastern part of Iran. During last decade Lake Choghakhor has been influenced by some man-made impacts such as water level fluctuation, agricultural discharge and fish (Cyprinids) introduction causing a serious problem in its trophic states (Golmohammadi, F. 2013).

Figure 4. Map of the Chaharmahal and Bakhtiari Province and its situation in south west of Iran.

**Rangelands And Astragalus**

Rangelands are the most important renewable resources that unfortunately, in our country, they have been subjected to destruction because of mismanagement and abuse. One of the ways of range improvement and rehabilitation is to sow and enhance the establishment and growth of high-grade range species in them specially by identifying the most suitable sites to grow the high grade pasture species of Astragalus. In this way, Astragalus gossypinus Fischer is one of the most important range plants in semi humid regions of Iran, which is very critical for soil conservation and people's economic life. Nevertheless, the grazing pressure and overuses cause habitat destruction (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004).

The other most common use of Astragalus is as forage for livestock and wild animals; however a number of species are toxic for cattle and in many cases this toxicity could be transferred to humans through meat and milk. From a chemical point of view the biologically active principles of Astragalus species consist of saponins, polysaccharides and phenolics, while the toxic compounds include imidazoline alkaloids, nitro toxins and selenium derivatives. In this order, we must consider and study the relationships between environmental factors and vegetation in order to find the most effective factors in the separation of the vegetation types in rangelands of Iran. In order to better understand and manage rangeland ecosystems, it is important to study the relationship between environmental factors and plants in these ecosystems. One of the main components of rangelands is vegetation, the absence and presence of which is controlled by environmental variables such as climate, soil and topography. Several species, including A. alpinus (bluish-purple flowers), A. hypoglottis (purple flowers), and A. lotoides, are grown as ornamental plants in gardens(Andrew, A.J., Liston, A. Popovich, S. J. 2004).
**Botanical Classification**

Fabaceae is the second largest family based on species diversity. Astragalus species are spread widely throughout the temperate regions of the world (Europe, Asia, North America, South America, and mountains in Africa). There are 3 forms of the Astragalus species; they can be annual or perennial herbs or small shrubs. Astragali radix, known as huang chi in China, has a warm, pleasant taste and is used as a stimulant, tonic, and diuretic. Traditional Chinese medicine practitioners use Astragalus as a tonic in the treatment of the spleen, kidneys, and lungs and blood disorders. Astragalus species are recommended for all types of immune disorders caused by poor or low immune system function. The pharmacological activity of the root extract of this plant extract includes antiviral and antibacterial activity, liver protection, and anticancer activity, as well as blood pressure lowering and diuretic effects. In addition, Astragalus species contain saponins, polysaccharides, and phenolics, while the toxic compounds include imidazoline alkaloids, nitro toxins, and selenium derivatives. The lipids of legumes have not been investigated in any great detail because of the low lipid content (Scherson, R. A. Vidal, R. and Sanderson, M. J. 2008).

Astragalus is considered one of the most diverse genera in the family Leguminosae (nom. alt. Fabaceae). Although a large number of works have been carried out on the genus, no monograph is available except some regional accounts and revisions chiefly at sectional level. It may be due to the sheer size of the genus (ca. 3000 spp.) and diverse nature, the genus is quite variable in habit and habitats, size of the plants, nature of indumentums, stipules, leaf rachis, types of inflorescence, relative length of petals, pods etc. Usually, genus is divided into eight to ten subgenera and more than 245 sections. The genus is most diverse in the Irano-Turkish region of South-Western Asia (1000-1500 spp.), the Sino-Himalayan Plateau of South Central Asia and the Great Basin and Colorado Plateau of Western North America. However, the centre of origin and diversity of Astragalus is Eurasia, specially the drier mountainous parts of South-Western and South-Central Asia and the Himalaya (Scherson, R. A. Vidal, R. and Sanderson, M. J. 2008).

Astragalus (As-trâ-ga-lus) is a large genus of about 3,000 species of herbs and small shrubs, belonging to the legume family Fabaceae and the subfamily Faboideae. The genus is native to temperate regions of the Northern Hemisphere. Common names include milkvetch (most species), locoweed (in North America, some species) and goat's-thorn (A. gummiifer, A. tragacanthus). Some pale-flowered vetches are similar in appearance, but vetches are more vine-like.

Description of the herb astragalus: Perennial plant, native to northern China and Mongolia, that bears small yellow flowers. It has a thick root with a yellowish, fibrous, tough skin that has a slightly liquorice taste (Baskauf, C. J. Burke, J. M. 2009).

Parts used: The dried roots, and extracts thereof are used (Andrew, A. J., Liston, A. Popovich, S. J. 2004).

Properties: A Chinese herb with properties that strengthen vitality, stamina, disease resistance, and improves the ability to cope with physical and emotional stress. It contains numerous triterpenesaponins (astragalosides I-V and soyasaponin I) as well as polysaccharides (astragalcan, astragluconAMem-P) and isoflavones (calycosin and formononetin).

Ecology: Astragalus species are used as food plants by the larvae of some Lepidoptera species including many case-bearing moths of the genus Coleophora: C. cartilaginella, C. colutella, C. euryaula, and C. onobrychiella feed exclusively on Astragalus, C. astragalella and C. gallipennella feed exclusively on the species Astragalusgymisphyllos, and C. hippocromica is limited to Astragalusgombo (Scherson, R. A. Vidal, R. and Sanderson, M. J. 2008).

**Therapeutic Uses Of Astragalus**

Astragalus membranaceus (Latin); membranous milk-vetch root (English), huang qi (Chinese), ogi (Japanese), and hwanggi (Korean) is one of the important “Qi tonifying” adaptogenic herbs from the Chinese materia medica. The Chinese species A. membranaceus and the related A. membranaceus var mongholicus (synonym: A. mongholicus) are defined in the Pharmacopoeia of the People’s Republic of China as Radix Astragali. It has been prescribed for centuries for general weakness, chronic illnesses, and to increase overall vitality. The genus Astragalus is a very large group of more than 2,000 species distributed worldwide, and is commonly known as milkvetch root. Currently, much of the pharmacological research on Astragalus is focused on its immune-stimulating polysaccharides and other active ingredients useful in treating immune deficiency conditions. Astragalus has demonstrated a wide range of potential therapeutic applications in immunodeficiency syndromes, as an adjunct cancer therapy, and for its adaptogenic effect on the heart and kidneys. Astragalus root has been used to promote immune function and as a tonic to build stamina. Ancient Chinese texts record the use of Astragalus for tonifying the spleen, blood, and qi. Traditional Indications In Traditional Chinese Medicine (TCM), Astragalus is classified as an herb that tonifies the qi and is indicated for symptoms of spleen qi deficiency such as diarrhea, fatigue, and lack of appetite. It also raises the yang qi of the spleen and stomach, thus addressing prolapses of organs such as the uterus, stomach, or anus. In this capacity it can also address uterine bleeding. Astragalus tonifies the lung qi and is used in cases of frequent colds, spontaneous sweating, and shortness of breath.1 Other traditional indications include wasting disorders, night sweats,2 chronic
ulcerations and sores,1 numbness and paralysis of the limbs, and edema (from deficiency).1 Its properties are sweet and slightly warm. Astragalus is typically prescribed as a dried root, powdered, or in a decoction. Classically, it is prescribed in combination with other Chinese medicinal herbs, depending on the desired therapeutic effect and the specific TCM diagnosis (Baskauf, C. J. Burke, J. M. 2009).

Active Constituents: The main constituents of Astragalus membranaceus include polysaccharides, saponins, flavonoids, amino acids, and trace elements.

Polysaccharides: The polysaccharides found in Astragalus have received a great deal of attention, especially the polysaccharide fraction F3. They have been shown to play a role in immunomodulatory actions. Polysaccharides A, B, and C have been identified as glucans, and polysaccharide D as a heteropolysaccharide (Chu, D.T. Wong, W.L. Mavligit, G.M. Mar 1988).

In below author categorize some most important sides of Therapeutic uses of Astragalus:

Improved adrenal gland and digestive function.

Strengthens and boosts the immune system by improving the ability of the macrophages (type of white blood cells) to fight and devour bacteria, fungi and viruses and is also thought to promote the production of interferon in the body.

People with regular colds and flu can benefit from this herb as it helps to build up natural resistance.

Cancer patients also benefit from astragalus, as the addition of this herb makes some cancer medication more effective, thereby allowing less toxic dosages to be used in treatment.

It is further indicated for use by cancer patients undergoing chemotherapy and radiation as a supportive measure to prevent liver damage, as this herb exhibits good liver protecting qualities.

It increases metabolism and encourages sweating, while promoting healing and providing energy to combat fatigue.

A Chinese study has also indicated that the herb improves sperm motility (spontaneous motion), as well as reducing high blood pressure and enhancing the immune system.

It helps to improve circulation after a heart attack and helps to protect the tissue in these cases as well.

It has been found in tests to relieve angina pain without the side effects of medicine normally used for this purpose.

As the herb is useful to treat bladder infections caused by Proteusbacteria, it is also of value in fighting the formation of kidney stones.

In patients with diabetes it is used to improve not only blood flow but also helps improve fasting blood sugar levels.

In China, the root is peeled and dried, covered in honey and sold as a sweet on a stick.

Supports deep immune function: Gaia Herbs' Astragalus Supreme is specially designed to provide deep-level immune support while assisting the body in adapting to daily stress. The herbs in this formula work together to encourage overall immune system health, stamina, and endurance to physical and emotional stress.

Astragalus Supreme also provides antioxidant protection to cells and tissues.

Research of biotechnology firms are working on deriving a telomerase activator from Astragalus. The chemical constituent cycloastragenol (also called TA2T) is being studied to help combat HIV, as well as infections associated with chronic diseases or aging. However, the National Institutes of Health states: “The evidence for using astragalus for any health condition is limited. High-quality clinical trials (studies in people) are generally lacking. There is some preliminary evidence to suggest that astragalus, either alone or in combination with other herbs, may have potential benefits for the immune system, heart, and liver, and as an adjunctive therapy for cancer”. Research at the UCLA AIDS Institute focused on the function of cycloastragenol in the aging process of immune cells, and its effects on the cells' response to viral infections. It appears to increase the production of telomerase, an enzyme that mediates the replacement of short bits of DNA known as telomeres, which play a key role in cell replication, including in cancer processes.

Supplement use: Extracts of Astragalus propinquus (syn. A. membranaceus) are marketed as life-prolonging extracts for human use. A proprietary extract of the dried root of A. membranaceus, called TA-65, “was associated with a significant age-reversal effect in the immune system, in that it led to declines in the percentage of senescent cytotoxic T cells and natural killer cells after six to twelve months of use”. Telomerase activation was suspected to pose an increased risk of cancer because telomere shortening is a mechanism that limits cell proliferation. However, short telomeres result in chromosome instability, so there is also a potential mechanism for telomere lengthening to protect against cancer.

There's a special chemical in astragalus that actually slows down the aging process right where it happens, inside of our cells, where the blueprint of our cells resides.

Recent research has shown that this special chemical derived from astragalus can "turn on" an enzyme called telomerase (HTERT). Telomerase acts to maintain or lengthen telomeres, which extend the lifespan of your DNA. If you imagine DNA as a shoelace, telomeres are the plastic aglets at each end. It serves as a protector for your DNA because it keeps it from fraying or damaging. As you age, your telomeres shorten due to wear and tear, which gives your cells an expiration date. However, telomerase helps to preserve telomeres by
making them longer. Telomerase is usually "off" in adult cells, except in immune cells, in egg and sperm cells, and in malignant cells, like those found in cancer (Chu, D.T. Wong, W.L. Mavligit, G.M. Mar 1988).

- The length of body telomeres is important: Researchers have discovered correlations between telomere length and susceptibility to certain aging-related diseases, like cardiovascular diseases (heart attacks, atherosclerosis, and strokes), diabetes, and cancer.

**Safety Precautions, Side Effects And Cautions Of Astragalus**

The herb should not be taken in the presence of fever or during an illness. It should rather be used when recuperating from an illness and to maintain good health. People taking blood thinning medication, or beta-blocker medication should be careful when using this herb, as it may cause bleeding when taken together with warfarin and make beta-blockers less effective.

The evidence for using astragalus for any health condition is limited. High-quality clinical trials (studies in people) are generally lacking. There is some preliminary evidence to suggest that astragalus, either alone or in combination with other herbs, may have potential benefits for the immune system, heart, and liver, and as an adjunctive therapy for cancer. NCCAM-funded investigators are studying the effects of astragalus on the body, particularly on the immune system.

Astragalus may interact with medications that suppress the immune system, such as cyclophosphamide. It may also affect blood sugar levels and blood pressure. Some Astragalus species can be toxic. For example, several species native to North America contain the neurotoxin swainsonine. The toxicity of Astragalus taxa varies.

Astragalus is considered safe for most adults. Its possible side effects are not well known because astragalus is generally used in combination with other herbs.

Astragalus may interact with medications that suppress the immune system, such as the drug cyclophosphamide taken by cancer patients and similar drugs taken by organ transplant recipients. It may also affect blood sugar levels and blood pressure.

People should be aware that some astragalus species, usually not found in dietary supplements used by humans, can be toxic. For example, several species that grow in the United States contain the neurotoxin swainsonine and have caused "locoweed" poisoning in animals. Other species contain potentially toxic levels of selenium.

Tell all your health care providers about any complementary health practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

Because of its long history of traditional and clinical use, astragalus is considered to be safe. However, it may increase the risk of bleeding, so caution is advised to those with bleeding disorders or those taking drugs that may increase the risk of bleeding. Also avoid using astragalus while pregnant or breastfeeding, due to harmful effects seen in preliminary studies.

**Medicinal Plants Trade And Threat**

Harvesting and gathering of herbs from wild led to the impoverishment of various biotic communities in many areas. Excessive harvest of roots, bulbs, seeds and flowers which are essential to the survival of the plants themselves often leads to the premature death of plants. A big threat for the medicinal plants collected from wild is the tread of these plants in large scale. Some medicinal plants in the area are collected from wild for sale in markets. Another big threat for these plants is overgrazing of sheep and gout herds, which is very common in the different regions of Iran. Special attention should be given to promising plants in these areas and protect them from extinction by excessive exploitation. In addition, due to overgrazing by animals like goats, sheep, and horses the populations of the medicinal plants are also decreasing day by day in Iran.

**Medicinal Plants In Iran**

Although the flora of Persia is thus fairly well known, there are still very few works on the overall vegetation. With approximately six thousand recorded species of ferns and flowering plants, Persia harbors one of the richest florals of the Near Eastern countries, which is surprising, given that more than two-thirds of the country's surface consists of deserts, semi deserts, and steppes. Equally surprising is the great diversity in vegetation cover: subtropical forests on the southern Caspian coastal plain and the northern foothills of the Alborz, dry-adapted woodlands in the western Persian mountain ranges, dwarf shrubs and thorn cushion formations in the central areas, and semi desert shrub lands (including numerous species derived from a zertropical African flora) in the coastal areas along the Persian Gulf. This varied geo botanical landscape reflects the great contrasts of climate within the country and the evolution of the flora. Many plant genera evolved or diversified primarily on Persian territory, particularly in the mountain regions; examples of such indigens include taxa of Astragalus, Acantholimon, Acanthophyllum, Nepeta, Onosma, and Cousinia. The flora and vegetation of Persia are also enriched by remnants of floras that were once far more widespread. Medicinal plants are an
important element of medical system. These resources are usually regarded as part of cultural traditional knowledge.

Many people in Mediterranean region who consult with spiritual healers, homeopaths and herbalists are utilizing traditional therapies. These are the first choice for problems such as liver diseases, inflammation, skin diseases, infertility, impotence, diabetes, obesity, epilepsy, psychosomatic troubles, and many other diseases.

The demand for medicinal plants has increased globally due to the resurgence of interest in and acceptance of herbal medicine. Most of the demand is being met through collection of large quantities of medicinal plants and plant parts from wild populations. The methods of extraction employed are almost invariably crude and unsystematic. As a consequence, the rates of exploitation may exceed those of local natural regeneration. Also, the natural habitats are quickly being depleted. There is thus an urgent need to develop and implement conservation strategies for exploited medicinal plant species. The medicinal plant is propagated through seeds (Andrew, A.J., Liston, A. Popovich, S. J. 2004).

The seed of many medicinal plant species are dormant and do not germinate unless specific environmental signals or events occur. One of the main problems preventing sustainable use of medicinal plants native to arid lands is that they can germinate within the native environment, but fail to show good germination under laboratory conditions or when cultivation is attempted. Seed dormancy is a common phase of the plant life cycle, and several parts of the seed can contribute to dormancy. The seeds of most angiosperms are dormant at maturity, and dormancy must be lost before germination can occur.

With approximately six thousand recorded species of ferns and flowering plants, Persia harbors one of the richest floras of the Near Eastern countries, ranging from subtropical forests to dry-adapted woodlands, dwarf shrubs and thorn cushion formations, and semi desert scrublands (Zarre, Sh., Rajaiy, M., Ebrahimzadeh, H., Habibi, M. Niknam, V. 2004).

In this regard, Chaharmahal and Bakhtiari province- south center of Iran has good ethno botanical potential for medicinal plants. This study is the one of the first contributions to the ethno botany of this region. Author has gathered from this province some considerable knowledge about local medicinal plants for treating common health problem that is ready to be further investigated in the laboratory with emphasizing on medical plant of astragalus and its main characteristics and economical importance in Chaharmahal and Bakhtiari province- south center of Iran (Golmohammadi, F. 2013).
Figure 6. Author during the research in a nomadic region in lake Choghakhor near (7 Kms) Boldaji District and lake Choghakhor – as a main growing regions of astragalus - in Borujen County, Chaharmahal and Bakhtiari Province, Iran. (By author. Aug 2, 2013).
Figures 7 & 8. Honey and traditional Iranian sweet candy (Gaz in Persian) that obtaining from astragalus pastures and its by-products – and author- in stores of Boldaji District and near lake Choghakhor, in Borujen County, Chaharmahal and Bakhtiari Province, Iran and author. (By author. Aug 6, 2013).
Figures 9 & 10. Author during the research in a nomadic region – as a main source of pressure to pastures of astragalus by overgrazing their sheep and goat herds and etc.- in lake Choghakhor near (7 Kms) Boldaji District– as a main growing regions of astragalus - in Chaharmahal and Bakhtiari Province, Iran. (By author. Aug 4, 2013).
Figures 11&12. Author during the research in a nomadic region – as a main source of pressure to pastures of astragalus by their sheep and goat herds and etc. - in lake Choghakhor near (7 Kms) Boldaji District and near lake Choghakhor – as a main growing regions of astragalus - in Borujen County, Chaharmahal and Bakhtiari Province, Iran. (By author. Aug 2, 2013).
Figures 13&14. Changing pasture lands of astragalus toward agricultural lands during three past decades in mountains and field of lagoon by nomadic and rural people of lake Choghakhor near (7 Kms) Boldaji District— as a main growing regions of astragalus - in Borujen County, Chaharmahal and Bakhtiari Province, Iran. (By author. Aug 4, 2013).
Figures 15 & 16. Honey of astragalus and some forest fruits in stores of Boldaji District and near lake Choghakhor, in Borujen County, Chaharmahal and Bakhtiari Province, Iran. (By author. Aug 9, 2013).

CONCLUSION

Approach to use of medicinal plants and plant products become more prominent its role in the global economic cycle, so increasing use of them is not limited only to growing developing countries, but in the developed countries have a lot of development.

For centuries, plants have been a major source for drug discovery. Today in medicinal plants culture, organic culture is noticeable because of undesirable effects of chemical fertilizers. Another important problem about medicinal plants is microbial quality, so it is necessary to evaluate utilization of organic culture on microbial contamination of medicinal plants. Following the widespread use of plants as sources of foods, medicines and cosmetics in the world and Iran, issues in their manufacturing cycle, The replacement of the herbs allied drugs and adulterants very seriously and essential.

Traditional knowledge about medicinal plants is very valuable and old people of cities have so much information about it. Death of these people contributes to the loss of this knowledge. Therefore it is necessary to be recorded this information. Traditional methods for the identification of medicinal plants and their medicinal effects are essential.

Iran was one of the foremost developed countries in ancient times and from time immemorial many medicinal plants are well-known. In this country use of herbal medicine can be traced to the remote past. Traditional usage of medicinal plants focuses on the knowledge of medicinal plants that people have developed over generations; this knowledge is generally held and used only within a limited circle of people such as within specific indigenous or rural communities.

Iran with a great diversity of climate is habitat to grassland and forest vegetation; increased use of rangeland by-products in different industries, existence of cheap labor in less developed countries and strong market demand in developed countries has caused higher importance and attention to utilization of these valuable plants.

Collected species of astragalus by author during this research, have medicinal characteristics (body strengthen, anti-cancer, relieve indigestion, anti digestive problems, relieve bladder and urinary tract abnormalities, anti poor blood and pain relief and ...), economic value and nutrient value in the area of Boldaji in Chaharmahal and Bakhtiari Province.

Take advantage from secondary products of forests and rangelands has been done from the past. Medicinal plants are one of secondary products of forests and rangelands that improve richness of rangelands. These plants are used in traditional medicine. Tragacanth is one of the important medicinal and industrial
products of Iran's rangeland, which is obtained from Tragacanth Astragalus. Tragacanth uses in the pharmaceutical, loom, food, paper, cosmetic industries. Astragalus L. (Fabaceae) as the largest genus of vascular plants on earth contains an estimated number 2500-3000 annual and perennial species and 245 taxonomic sections

To preserve and restore the habitats of astragalus, retaining and development of genetic resources, employment and exploitation of production platform by locals rangelands of astragalus in pastures and rangelands in Boldaji District, in Borujen County, Chaharmahal and Bakhtiari Province, Iran, responsible officers and local people specially rural and nomadic resistances must participate with each other and doing practically and realistic solution in this way.

According to the importance of medicine plants and their substantial contribution in the international trade, the investigation of countries comparative advantage and type of the world market structure of these products specially astragalus is essential.

In this regard, we must find and approaching ways for increasing Total Gross income from the astragalus products such as cost including wage labor, transportation, supervision of expert observers and reclamation operations and state share under the ownership interest that deposit to the treasury, and finally the amount of net income from tragacanth operating gained under contract enforcement for local people.

Due to overgrazing by animals like goats, sheep, and etc. that belonging to nomadic and rural people, the populations of the medicinal plant of astragalus are also decreasing day by day in Boldaji District and near lake Choghakhor, in Borujen County, Chaharmahal and Bakhtiari Province, Iran. Officials and policy- makers must planning for making balance between number of goats, sheep, and etc. that belonging to nomadic and rural people and capacity of these pastures.

Another problem is Changing pasture lands of astragalus toward agricultural lands during past three decades in mountains and fields by nomadic and rural people in lake Choghakhor near (7 Kms) Boldaji District and near lake Choghakhor – as a main growing regions of astragalus - in Borujen County, Chaharmahal and Bakhtiari Province, Iran. Officials and policy- makers must make rules for avoiding of these bad works in the future and also return these agricultural lands to its origin namely pastures of astragalus.

Also in these orders that mentioned above, policy- makers must identify scientific situation of medicinal plants for society and parallel to it to give some information about the situation of this valuable plants to them.

In the end, people and policy- makers must establish in a participatory approach, a comprehensive plan for sustainable use of astragalus and its products in present and future.

ACKNOWLEDGEMENT

Author of this article is very thankful and grateful from computer engineer Mr. Abdol hossein Allamehzadeh – Staff Technical member in Razi Petrochemical Company in Bandare Imam Khomeini, Khuzestan Province – Iran, and Mr. Amrollah Yousefi – retired sport teacher from Instruction and Education Organization, Shiraz, Fars Province – Iran, for their very valuable efforts, motivations and helps in writing, gathering information and data, pictures, and doing its field work of this field research.

REFERENCES


Golmohammadi F. 2013. Author participation and observations in pastures and rangelands of Astragalus in Boldaji District and lake Choghakhor, in Borujen County, Chaharmahal and Bakhtiari Province, Iran.


