

Medical Properties and Usage of *Astragalus Sp.*

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ABSTRACT

The medical use of *Astragalus* in treatment was known in the time of the famous Greek doctor Dioscorides, who lived in the MS.I. century. It contains a large group of plants belonging to the Leguminosae (beans or legumes) family, known as “huang-qi” by the Chinese. In ancient times, it has a long history as an immune system booster and a source of healing against diseases.

Astragalus products are very safe for most adults to consume orally as well as to use topically. Pharmacological studies have shown *Astragalus* has both cosmetic and therapeutic use. It also helps maintain the overall health of the digestive system by promoting metabolism and heals stomach ulcers by promoting a healthy balance of gastric juices and stomach acid in the stomach. *Astragalus* powder, which can be added to soft drinks or other liquids, is recommended to be consumed in the treatment of some illness. After the roots of the plant are ground into powder, it can be used for medicinal purposes by adding to foods and meals. For this, it is of great importance to develop to analyze phytochemicals of *Astragalus*, which has a large number of species, and to clinically determine its usage areas.

Keywords: *Astragalus sp.*, Medical Properties, Tonic Powder.

INTRODUCTION

Astragalus is plants with a hairy stem, usually with slightly fragrant, yellow or other forms of flowers. They are perennial plants that grow in sandy, well-drained, full sun soils. When *astragalus* blooms in spring, they are pollinated by bees, moths and butterflies. The plant usually matures after four to five years of growth. It can be harvested in Spring or Autumn for different uses. *Astragalus* species are mostly distributed in the Mediterranean Region, northern and eastern parts of China, Mongolia and Korea. Usually 12 to 18 pairs of leaflets are found on hairy stems of *Astragalus* and they have a long, flexible root about the length and diameter of an index finger.

The root is covered with a hard, wrinkled, and yellowish to brown skin that can break down into many woolly fibers. The roots have a slightly sweet flavor reminiscent of licorice and have a hard, starchy texture. Roots can be boiled in water and added to soups. The solution obtained by boiling the roots in water can be used for therapeutic purposes [1,2]. Typically, *Astragalus* roots can be boiled and added as cooking water to foods such as casseroles or rice. However, after the root is boiled in water, it should be removed and discarded. It is generally recommended that this boiling time last from half an hour to an hour. *Astragalus*, which can be consumed between 10-30 grams daily, is known as a mild adaptogen that helps the body adapt to physical and emotional stress [3,4]. The first information about *Astragalus* is mentioned in the work called *Shen Nong Pen Tsaio Ching*, written by the Chinese herbalist Shen Nong about 5000 years ago. In this work, the author explained the use of more than 300 plants in traditional Chinese medicine [5].

The medicinal properties of *Astragalus* species were known to European botanists in the 1700s. Members of the Lakota tribe, one of the Native Americans, have been chewing given root for a long time to relieve back pain and cough. Lakota women, on the other hand, consumed *Astragalus* roots to increase breast milk production. In addition, *Astragalus* roots have benefited from the steam of boiling the roots for the treatment of respiratory diseases. The Cheyenne tribe in America used the root and leaves of sage to relieve skin irritations caused by poison ivy. The extracts obtained from the roots of the plant were used to treat open wounds [6].

In Traditional Chinese Medicine, it is used to “revive life energy (*qi* or *ch'i*) and strengthen body resistance”. *Astragalus* extracts, which are used for shortness of breath, general weakness and loss of appetite, are also used as a diuretic and in the treatment of colds, flu, stomach ulcers and diabetes [7,8]. In Western countries, it has been defined as a laxative, diuretic, tonic, pectoral and antipyretic. Sliced root, whole root, encapsulated products, teas, tinctures, and other product forms are widely available in health and natural food stores. The sliced root is dried or consumed with honey [9].

Today, the sliced or whole root of the plants, capsule products obtained from the roots, *Astragalus* teas, tinctures (the product obtained by mixing the roots, stems, flowers, leaves or branches of the plants with vegetable alcohol-sugar cane-vinegar or water) and other product forms are widely available at health and natural products stores. The sliced roots are consumed dried or treated with honey. The roots of the

plant are stored in fine powders for later use in teas or soups. However, *Astragalus* are plants with commercial potential and are used worldwide as herbal supplements in other forms such as capsules, concentrated liquids, injections, ointments and tinctures [4]. Anti-aging implications of *Astragalus membranaceus* (Huangqi): A well-known Chinese tonic. Nowadays *Astragalus* is widely used and widespread in the production of products that strengthen the immune system and stimulate it. Due to the yellow and golden color of the roots of the plant, it is known as “yellow energy” in countries where traditional medicine practices are common, such as China [1,10].

Astragalus contain large amounts of phytochemicals such as polysaccharides, saponins, flavonoids, amino acids and trace elements, choline, betaine, gluconic acid, sitosterols, linoleic acid, gamma-aminobutyric acid, and asparagine as other phytonutrients. Zinc, iron, copper, magnesium, manganese, calcium, potassium, sodium, cobalt, rubidium, molybdenum, chromium, vanadium, tin, silver, tantalum, hafnium, europium and thorium can be counted among the mineral substances found in *Astragalus*. The presence of all these phytochemicals in the plant makes it possible to treat various physical, psychological and mental ailments [11]. The yellow part in the core of the plant's roots is medically important, and the thin-long *Astragalus* roots can be white, yellow or cream in color. Its taste and smell are similar to licorice (*Glycyrrhiza glabra*) root, which is widely used in traditional medicine.

When harvested, the roots of the plant are cleaned and moistened in water for a while, then cut into slices and stored or used for different purposes. The roots of the plant are widely used in traditional medicine to strengthen and support the immune system. Due to its energizing feature, it is used as a tonic by mixing with different drinks [12,13]. It is thought that the active phytochemicals in *Astragalus* roots are effective on the mitochondria that provide energy to the cells in body. Some recent studies show that given roots may have anti-aging properties and may be a factor in maintaining metabolic hormone balance [4].

In traditional medicine, *Astragalus* extracts are widely assumed to be beneficial for the health of the spleen, liver, lungs, circulatory system, and urinary tract. It is also known to be beneficial for arthritis, asthma, certain nervous conditions, high blood sugar and high blood pressure. *Astragalus* spp are used as a nutritional supplement to treat colds and upper respiratory tract infections, as it helps to strengthen the immune system. *Astragalus* spp also useful for strengthening the immune

system, which is weakened due to radiation or chemotherapy treatments, especially in cancer treatments. Pharmacological and clinical studies confirm the immunostimulating, antibacterial, antiviral, anti-inflammatory, adaptogenic, and liver protective and diuretic effects of *Astragalus* extracts. It also has strengthening and stamina-increasing properties [9,14]. Like ginseng, they have adaptogenic properties. Adaptogens are harmless, body-enhancing biological molecules that cause minimal disturbances in an organism's function. Adaptogens are generally tonics containing various plant extracts. They are known as phytochemicals that have a "non-specific effect" that normalizes bodily functions in all cases [14].

Although polysaccharides in general have immunostimulating activity, no single compound is responsible for their far-reaching effects on metabolism. *Astragalus* is one of the few herbs used in traditional Chinese medicine for fu-zheng therapy. Based on the use of herbs such as ginseng and *Astragalus* in cancer therapy, patients who receive Fu Zheng therapy are assumed to live longer than those who receive modern Western medicine cancer therapy [5]. In the fu-zheng treatment, plant extracts such as *Astragalus* help the patient to treat the disease or live longer by strengthening the patient's defense mechanism or normalizing the patient's metabolic energy. This activity is believed to come from the polysaccharides found in *Astragalus*, particularly astragalan I, II and III. Other components that may contribute to these beneficial effects in the plant include saponins and triterpenes [15]. Studies have found that gnat acts as a non-specific immune system stimulant, helping to preserve adrenal cortical function during radiation or chemotherapy treatment. *Astragalus* treatment has the feature of increasing the activity of the bone marrow suppressed by chemotherapy and radiation by causing more production of white blood cells (white blood cells), which are the protective cells of the immune system [1].

In this way, it helps strengthen the immune system by increasing the ability of white blood cells to "swallow" invading particles such as bacteria or viruses. It is assumed that there is a significant increase in survival rates for patients receiving fu-zheng therapy, as *Astragalus* has a mitigating effect of gastrointestinal toxicity in patients receiving traditional cancer treatments [16]. *Astragalus* roots are included in many herbal formulas used for therapeutic purposes and are often used together with Ligusticum (a plant whose roots are widely used in traditional Chinese medicine) and Ginseng. It is generally accepted in traditional Chinese medicine that root

extracts can be more beneficial for the young and ginseng for the elderly.

It is recommended to strengthen immunity and to consume more tonics prepared from ginseng and *Astragalus* roots, and to add reishi mushrooms to those who are often sick in autumn and winter. Similarly, it can be added to juicy dishes, cereal dishes to minimize the entire family from catching colds during the cold winter months [12].

Phytochemical Properties

The plant contains components such as formononetin, astraisoflavone, astrapterocarpan, 2'-3'-dihydroxy-7,4'-dimethoxyisoflavone and isoliquiriti-genin as pigments. Besides these, there are also D-β-asparagine, calicosine, cycloastragenol, astragalosides VIII, choline, betaine, kumatanin, sucrose, glucuronic acid, β-sitosterol and soysaponin I. Astragalan is a polysaccharide fraction that helps protect the body from diseases such as cancer and diabetes. It is rich in antioxidants that protect cells from damage [1,17]. In addition, *Astragalus* has antibacterial and anti-inflammatory properties and can be used for therapeutic purposes for skin irritations and skin injuries. Studies have shown that *Astragalus* has antiviral properties and stimulates the immune system. Therefore, it has the potential to be used in the treatment of colds and viral diseases. In traditional Chinese medicine, it is a common practice to boil the dried roots of given in 9-15 g doses in a liter of water and drink it [11].

Today, especially *Astragalus* roots are used in the treatment of many diseases for therapeutic purposes. Strengthening the immune system in diseases such as colds, upper respiratory tract infections, allergies, fibromyalgia (a chronic, long-term disorder that causes pain in the muscles and bones in the body, general fatigue, sleep problems and cognitive disorders), anemia, HIV/AIDS in traditional medicine. It is also used to treat chronic fatigue syndrome (CFS), kidney diseases, diabetes, and high blood pressure. *Astragalus* roots are added to soups, teas and other beverages and used as a disease preventative [5].

The use of *Astragalus* tonic as a general tonic to protect the liver and fight bacteria and viruses is common in some societies [18]. The dried root is consumed in different ways for medicinal purposes. Consuming the roots by adding honey and frying them on fire is another form of consumption. But the unprocessed, unsweetened root itself has a sweet, licorice-like flavor. *Astragalus* root extracts are also applied topically

to the skin to increase blood flow to some parts of the body and speed up the healing of wounds. Some types of pregnant contain a toxic substance called "swainsonine" and can cause poisoning in animals. Swainsonine is an α -mannosidase inhibitor in the endoplasmic reticulum and Golgi apparatus. It also has the ability to activate natural killer cells. Swainsonine, which is found in some species of *Astragalus*, causes neurological toxicity and may impair memory and cause cognitive impairment. It is assumed to have liver cancer preventive properties [8]. Recent studies in China recommend low and moderate doses to help alleviate the symptoms of serious heart patients, lower cholesterol levels, and improve heart function, due to the antioxidant properties of *Astragalus* components [6].

In traditional Chinese medicine, it is known as an herb that acts on both the spleen and lungs. It is also supposed to be beneficial for spleen deficiency symptoms such as diarrhea, fatigue, spontaneous sweating, and loss of appetite. It is known that especially tonics containing *Astragalus* rejuvenate the lungs and prevent frequent colds and shortness of breath [13,14]. It is also known to be beneficial in the treatment of excessive weight loss, night sweats, chronic ulcerations and wounds, numbness and paralysis of the limbs, and edema. In experimental studies, *Astragalus* extracts showed antibacterial activity in vitro against *Shigella dysenteriae* (dysentery bacteria), *Streptococcus hemolyticus*, *Diplococcus pneumonia* and *Staphylococcus aureus* [18].

In traditional Chinese medicine, Shi-Quan-Da-Bu-Tang, a formula containing *Astragalus* and *Ligusticum*, has been found to be highly effective in stimulating hemopoietic factors and interleukin production. It also strengthens the activity of chemotherapeutic agents, prevents recurrences, prolongs survival, and adversely affects antineoplastic agents. It has been shown to reduce their toxicity [19]. It has been found that the "saponins" contained in *Astragalus* have a positive effect on the function of the heart by preventing the formation of lipid peroxide in the myocardium and reducing blood coagulation. *Astragalus* extracts have been proven to be effective against experimentally induced glomerulonephritis and are also recommended for headaches, abdominal pain, joint pains and menstrual disorders due to blood stasis.

It is known that they contain three ingredients that make them have such a positive effect on human health. These components are saponins, flavonoids and polysaccharides, the majority of which are found in some plants, including fruits and vegetables. Saponins are known for their ability to

lower cholesterol, improve the immune system, and prevent cancer [1]. Saponins have the ability to lower cholesterol and are known to improve the immune system. Saponins obtained from many plants are also used experimentally in cancer treatment. Various studies have shown that polysaccharides, another component found in the plant, have anti-microbial and anti-inflammatory properties [20,21]. The flavonoids are important for intracellular communication and have antioxidative properties. By controlling and neutralizing free radicals in the cell environment, they can help neutralize viruses that cause heart diseases, cancer and immunodeficiency. Polysaccharides are known to have antimicrobial, antiviral, and anti-inflammatory properties, among other health benefits [3].

The components of saponin, polysaccharides (astragalin I, II and III) and triterpenes found in *Astragalus* are thought to stimulate the bone marrow to produce more white cells and also allow white blood cells to function better. It has been observed that when used together, *Astragalus* can increase the effects of platinum-based chemotherapy drugs such as cisplatin. *Astragalus* has also traditionally been associated with arthritis, asthma, nervous disorders, Hodgkin's disease, shortness of breath, persistent infections, fever, certain allergies, systemic lupus erythematosus, anemia (when combined with Chinese angelica), kidney disease, hepatitis, stomach ulcers, gas, bloating and diarrhea. It is used as an herbal remedy for general digestive ailments [9].

At recommended doses, the use of *Astragalus* products for therapeutic purposes has no serious side effects and can generally be used safely. There is no evidence as to whether *Astragalus* is safe for breastfeeding mothers and infants. People with autoimmune diseases are advised to talk to their doctor before taking them, and products derived from *Astragalus* are generally considered safe for adults. The most commonly reported side effects are diarrhea and other mild gastrointestinal effects. However, it can affect blood sugar levels and blood pressure and can be risky for people with certain health conditions such as blood diseases, diabetes or hypertension. *Astragalus* may interact with drugs that suppress the immune system, such as drugs taken by transplant recipients and some cancer patients [22]. Several moth species contain the neurotoxin swainsonine and have caused locoweed poisoning in animals. Other species of *Astragalus* contain potentially toxic levels of selenium. *Astragalus* can be effective on drugs that suppress the immune system. *Astragalus* products should not be taken if they have an autoimmune disease such as rheumatoid arthritis or lupus,

or if they are using cyclophosphamide, drugs used to reduce the likelihood of rejection in organ transplant recipients, or corticosteroids [2].

Usage of Astragalus in Traditional Medicine

As it is an herbal preparation, there are no exact or standard doses available for *Astragalus* formulations, but there are general guidelines. In summary, as shown in Table 1, extracts of *Astragalus* species have been used in traditional medicine in different forms since ancient times. Most adults will tolerate 600 mg to 2 g of powdered ghee root in 3-4 divided doses. 2 ml to 5 ml of liquid extract or tincture can be taken three times a day. *Astragalus* tea can be prepared with 6 g to 12 g of dried

root in 350-400 mL of water [17]. Chinese Medicine does not recommend giving the herbal formulation of marshmallow to children unless they have a fever. The powder of the herb is slightly sweet and can be sprinkled or sprinkled on food. Most authorities on traditional Chinese medicine recommend boiling 9-15 grams (3 to 5 tablespoons) of the herb or root a day as a decoction, keeping it in water for a few minutes and then brewing it as a tea [1]. When desired, it is possible to prepare a very mild but effective tonic. It can be consumed in large doses. In powder form, a teaspoon or even a tablespoon can be taken two to three times a day.

Table 1. The Use of *Astragalus* Sp. in Traditional Medicine

Preparation	Dosage rate	Daily intake
Standart preparations	600 mg-2 g/day	3-4 times
Tincture or liquid	2-5 ml (ticture or liquid)	3 times
Tea	6-12 gr (dried roots)	350-400 mL in hot water (infusion)
Chinese medicine	9-15 grams (3 to 5 tablespoons)	Boiling herb or root a day as a decoction, keeping it in water for a few minutes and then brewing it as a tea
Tonic	In powder form, a teaspoon or even a tablespoon	Can be taken two to three times a day.

3 to 6 grams of dried *Astragalus* root or 250 to 500 milligrams of *Astragalus* root powder in half a liter of water three times a day can be drunk hot or cold 3 to 4 times a day. It can be drunk after boiling by mixing in doses up to. If desired, 30 gr. It can be boiled or drunk in larger quantities. *Astragalus* can also be prepared as a tonic by boiling other herbs used in medicinal wines, or as an alcoholic extract or tincture in standard doses. It is known that the plant is very beneficial for health, especially if the roots are boiled and consumed as hot tea. *Astragalus* teas are known to have an appetizing effect and improve the functioning of the digestive system. In traditional Chinese herbal medicine, *Astragalus* root is soaked overnight in honey water, then roasted in a dry pan until golden brown.

When applied topically, *Astragalus* creams can heal sunburns and other minor skin injuries such as bruises and contusions. Plant extracts can stimulate the immune system by reducing the negative side effects associated with chemotherapy, especially in cancer patients. Plant extracts can stimulate the immune system by reducing the negative side effects associated with chemotherapy, especially in cancer patients [2]. *Astragalus* is famous for its anti-aging effect. In fact, the primary use of this herb in Chinese Medicine is to promote

longevity. A component of *Astragalus*, called cycloastragenol, is known to increase telomerase, an enzyme that promotes telomere health. Telomeres are the ends of DNA, they get shorter each time a cell divides. Therefore, telomere length is a more reliable indicator of biological age and longevity than a person's chronological age [5]. *Astragalus* powder, which can be added to soft drinks or other liquids, is recommended to be consumed in the treatment of anemia. After the roots of the plant are ground into powder, it can be used for medicinal purposes by adding to foods and meals.

Therapeutic Effects of *Astragalus* for Wounds & Some Diseases

When applied topically, *Astragalus* ointments can be used to treat minor wounds such as scrapes or shallow cuts on the body surface due to its antibacterial properties. In particular, the root is made into a concentrated solution that can be taken by softening in a neutral alcohol and diluting in water to strengthen the immune system and cardiovascular (cardiovascular) function. *Astragalus* root extract (liquid) or tincture should be taken three times a day in doses of 2 to 4 milliliters. It is recommended to take 2-3 capsules a day from

tablets (approximately 500 mg) brought into capsule form for commercial purposes.

Pharmacological studies have shown that the use of *Astragalus* in combination with ligustrum (*Ligustrum lucidum*) is good for breast, cervix and lung cancers [16]. For *Astragalus* ointment, around 10% *astragalus* root could be applied to the skin surface. It is not recommended to be applied to open wounds; it would be beneficial to consult a specialist before use. It has been shown that some polysaccharides, saponins, flavonoids, amino acids, organic compounds, dietary fibers and some minerals (zinc, copper, magnesium and calcium) are phytochemically present in *Astragalus* oil. These components are known to contribute to the overall function of celandine oil [11]. *Astragalus* oil has both cosmetic and therapeutic use. Ingestion of linseed oil is known to help boost your immune system, raise normal cholesterol levels and produce antibodies. It also helps maintain the overall health of the digestive system by promoting metabolism and heals stomach ulcers by promoting a healthy balance of gastric juices and stomach acid in the stomach.

Side effects

Although *Astragalus* is very beneficial for health, some people may experience side effects. In fact *Astragalus* is very useful for strengthening the immune system, specially for weak immune system, usage of *Astragalus* products are not recommended for those with an overactive immune system. It should not be used by people with multiple sclerosis, lupus and rheumatoid arthritis unless approved by a doctor. It has been shown that it can have harmful effects in those with this disease. It can reduce or eliminate the immunosuppressive (immunosuppressive) effects of cyclosporine and cortisone class drugs used for suppression of the immune system, due to the stimulating effect of the gum on the immune system. Therefore, it is not recommended for patients using these drugs [23].

Among the reported side effects of this medicinal plant is as abdominal bloating, loose stools, low blood pressure and dehydration are the main ones. It is not recommended to be given to children with fever, as it may cause an increase in body temperature in various diseases. *Astragalus* products may interact with some other herbal products, including antihypertensives and immunosuppressants, and some prescription medications that have these properties [1]. As a result of application of the Ames test, which is applied to determine whether any component causes mutations in DNA,

it has been shown that some *Astragalus* products may possibly have a mutagenic effect. In traditional medicine, *Astragalus* is usually mixed with other herbal products and applied for therapeutic purposes. Its use alone is not very common [13].

Toxicity

Astragalus sp has traditionally had a long history of use since ancient times, mainly by boiling the dried roots of the plant and mixing its extracts with honey. Using similar solutions obtained by keeping them in ethanol and other alcohol derivatives for a long time is known as another consumption method [9]. Some *Astragalus* extracts are described as an adaptogen, classified in the Chinese Materia Medica as a Qi and blood tonic. It is used in traditional Chinese medicine to treat general fatigue and to increase liver and spleen functions [24,25]. Highly purified and fractionated root extracts obtained from *Astragalus sp* have been examined in some studies for their toxicological potential.

In order to examine the possible effects of *Astragalus* extracts on rats, the solution obtained by boiling a total of 900 g of raw dried *Astragalus* root was administered to Wistar rats in low (45 g/kg), medium (90 g/kg) and high (180 g/kg) doses for 90 days. At the end of the experimental period, no deaths were observed in the rats, and no clinical abnormalities or statistical body weight concerns were observed in the rats [14]. Although no statistically significant findings were found in the nutritional characteristics, hematological, clinical and urinalysis parameters of rats exposed to medium and low doses, gastric ulcers and pinpoint petechiae were observed macroscopically in 8 out of 10 animals in the high dose group. Some traces of inflammation were found microscopically.

In another study, the parenteral toxicity of *Astragalus sp* root extracts was examined in rats and dogs [26]. For this purpose, *Astragalus sp* roots were pulverized and administered intraperitoneally to Sprague-Dawley rats and intravenously to beagle dogs for 90 days. At the end of the experimental period, no deaths or changes in pathological and clinical parameters were observed at doses of 39.9 g/kg/day in rats and 19.95 g/kg/day in mice.

In the bacterial strain tests used, it was not observed to have any mutagenic effects on bacteria. In studies conducted on mice, it was found that they did not cause any chromosomal abnormalities. In these studies, an increase in the frequency of micronucleated cells was observed in male Crl:NMRI BR mice. In this study, no mortality or toxic effects were observed

in male and female Han:WIST rats exposed by gavage to the mixture of 0, 400, 800, or 1200 mg/kg body weight/day for 28 consecutive days, and no organ dysfunction was detected. Based on these results, it is possible to say that the consumption of *Astragalus* extracts is not likely to cause any health problems for human health [27].

Astragalus products are very safe for most adults to consume orally as well as to use topically. Little is known about its potential side effects, as it is often used medicinally by mixing it with other herbs. Some species of *Astragalus* are known to have traces of a neurotoxin called swainsonine. Any dose above 25 grams daily can weaken the immune system. While the risk for pregnant or nursing mothers is unknown, pregnant and nursing mothers should consult their doctor before taking any herbal remedy [2,28]. *Astragalus* products should not be used in transplant patients, as they may act against immunosuppressive drugs for transplant patients. Patients using beta-blockers or anticoagulants, phenobarbital or diuretics should consult their doctor before use. People who are allergic to *Astragalus* products and legumes may have an allergic reaction [29].

It can also increase the body's growth hormone production. People who have diabetes or need to monitor their blood sugar levels regularly should be careful when taking given products as they can lower their blood sugar levels. *Astragalus* can interfere with the body's ability to excrete lithium and cause this chemical to build up in the system [30]. *Astragalus* may be safe when used orally and appropriately. (Doses up to 60 grams daily for up to 4 months have been used without reported adverse effects). Some possible side effects with oral use include rash, itching, nasal symptoms, or stomach discomfort, but these are uncommon. *Astragalus* may interact with medications that suppress the immune system [31].

Some *astragalus* species, usually not found in dietary supplements, can be toxic to livestock. 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. Too much selenium can lead to diarrhea, irritability, nausea, skin rashes, and nervous system problems [32]. Little is known about whether it's safe to use *astragalus* during pregnancy or while breastfeeding. Some research in animals suggests that *astragalus* can be toxic to the mother and fetus.

CONCLUSIONS

Astragalus extracts are described as an adaptogen, classified as a blood tonic. It is used in traditional Chinese medicine to treat general fatigue and to increase liver and spleen functions. *Astragalus* products are very safe for most adults to consume orally as well as to use topically. Some possible side effects with oral use include rash, itching, nasal symptoms, or stomach discomfort, but these are uncommon. *Astragalus* products are not toxic at any dosage. When *Astragalus* products taken in low or moderate doses, the side effects are negligible, but at a higher dose it is presumed to suppress immune system function. However, *Astragalus* are plants with commercial potential and are used worldwide as herbal supplements in other forms such as capsules, concentrated liquids, injections, ointments and tinctures. As a well-known tonic *Astragalus* is widely used and widespread in the production of products that strengthen the immune system and stimulate it. Due to the yellow and golden color of the roots of the plant, it is known as "yellow energy" in countries where traditional medicine practices are common.

It is of great importance to develop studies on the application of *Astragalus* products, which have been widely consumed throughout the ages as relaxing and therapeutic in traditional medicine, in modern medicine, to analyze the phytochemicals of *Astragalus*, which has a large number of species, and to clinically determine its usage areas.

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