



Asparagus (lat. *Aspáragus*)

Eliseeva Tatyana, editor-in-chief of the EdaPlus.info project

Alena Tarantul, nutritionist

E-mail: eliseeva.t@edaplus.info, tarantul.a@edaplus.info

Abstract. The article discusses the main properties of asparagus and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The chemical composition and nutritional value of the plant are indicated, the use of asparagus in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of asparagus on the human body under certain medical conditions and diseases are analyzed separately. The scientific foundations of diets with its application are considered.

Keywords: asparagus, benefits, harm, beneficial properties, contraindications

Beneficial features

Table 1. Chemical composition of asparagus (according to [Food+](#)).

Main substances (g / 100 g):	Fresh asparagus [1]
Water	93.22
Carbohydrates	3.88
Sugar	1.88
Alimentary fiber	2.1
Squirrels	2.2
Fats	0.12
Calories (kcal)	twenty
Minerals (mg/100 g):	
Potassium	202
Phosphorus	52
Magnesium	fourteen
Calcium	24
Sodium	2
Iron	2.14
Zinc	0.54

Copper	0.189
Manganese	0.158
Vitamins (mg/100 g):	
Vitamin C	5.6
Vitamin E	1.13
Vitamin PP	0.978
Vitamin B1	0.143
Vitamin B2	0.141
Vitamin B6	0.091

The most common asparagus in the world (aka medicinal) is rich in biologically active substances. The roots of the plant contain asparagine (which was first isolated from asparagus), steroidal saponins, flavonoids, organic acids, traces of essential oil. Saponins, coniferin, succinic and chelidonic acids were also found in the grass. Asparagus shoots contain a lot of asparagine and arginine, there is a small amount of carotene, lysine.

Specific compounds found in the young stems of the plant include asparagusic (asparagus) acid, which changes the smell of urine after eating asparagus. The secretions begin to smell very unpleasantly of hydrogen sulfide, which was noted by both ordinary consumers of the product and the first researchers of this plant. Even Marcel Proust wryly wrote that asparagus "turns [his] chamber pot into a bottle of perfume." The comparatively rapid onset of symptoms helped link changes in urine odor to prior consumption of asparagus. The odor begins to change as early as 15 minutes after eating the stems of the plant and is usually excreted only within 4 hours, although the rate of elimination varies greatly (more than 40%) in different people.

Medicinal properties

Pharmacy asparagus exhibits diuretic and laxative, analgesic and antispasmodic, anti-inflammatory and antitumor properties. Asparagus extracts can have a beneficial effect on the nervous system and improve cognitive functions, dilate blood vessels and lower blood pressure, improve liver and kidney function, and stimulate the immune and digestive systems. All these and other medicinal properties of asparagus have been used by people for centuries in various therapeutic practices. And today, most of them are confirmed in laboratory experiments on animals, and some - in clinical studies involving humans.

- Antitumor potential

Saponins derived from old asparagus stalks (which are usually discarded in cooking) actually have potential inhibitory activity against tumor growth and metastasis. This saponin extract reduced the viability of breast, colon and pancreatic cancer cells depending on its concentration in a laboratory experiment. But it proved to be even more effective in suppressing the mobility of tumor cells by modulating the signaling pathway. ^[2]

A methanolic extract of white asparagus shoots activated the process of human cancer cell death and inhibited colon carcinogenesis in laboratory rats. ^[3] In addition, asparinin A isolated from asparagus showed antitumor properties in experiments in vitro ("in vitro") and in vivo ("in a living organism"). However, scientists continue to find new active phenolic compounds in asparagus that could potentially show a comparable antitumor effect. ^[four]

Asparagus polysaccharides (in vitro and in vivo) also had an anticancer effect against hepatocellular carcinoma. Thus, deproteinized asparagus polysaccharide showed strong selective cytotoxicity against

human hepatocellular carcinoma cells. Later it turned out that it can also enhance the action of the antitumor antibiotic mitomycin, provoke the death of a cancer cell and stop division in several cell lines. All this makes asparagus polysaccharides potential therapeutic agents for the treatment of liver cancer. ^[5]

Chinese scientists isolated other active compounds from green asparagus that dramatically reduced the activation of cells leading to fibrous matrix production. The antifibrotic effect was due to the inactivation of fat-storing stellate cells of the liver. ^[6]

Indian scientists, based on ancient Ayurvedic traditions, considered asparagus extract as a replacement for synthetic chemotherapeutic agents that cause many side effects, have immunosuppressive properties and are cytotoxic. Unlike synthetic drugs, asparagus extract, on the contrary, showed immunomodulatory properties and helped in the recovery of the body after chemotherapy in experiments on mice. ^[7] Asparagus roots have also shown the ability to have a pronounced immunomodulatory effect on the body, at least in laboratory animals. ^[eight]

- Gastrointestinal organs

The protective effect of a methanolic extract of fresh asparagus roots was studied in various models of gastric and duodenal ulcers. As a rule, with ulcers provoked by various reasons, researchers found the therapeutic effectiveness of the effect of the extract on the state of the digestive tract. The exception was ulcers caused by aspirin and ethanol, for which asparagus extract was ineffective. At the same time, studies of gastric juice and mucous membranes showed that the root extract still significantly increased the protective factors of the mucous membrane (such as mucus secretion, cell mucus, cell lifespan), and also had a pronounced antioxidant effect. True, at the same time, it practically did not affect such aggressive factors as acid and pepsin. ^[9]

Asparagus, rich in rutin, reduced the severity of disease and tissue damage after colitis. Modulation of the colonic microenvironment with asparagus nutritional supplements in mice resulted in reduced inflammation, repair of organ mucosal damage, and reduced dysbacteriosis associated with colitis. ^[ten]

In animal experiments, the scientists also found some antidiarrheal activity in the ethanolic and aqueous extracts of asparagus root. ^[eleven]

- Kidneys and liver

In a number of animal experiments, ethanolic asparagus extracts prevented kidney stone formation. The asparagus preparation not only reduced the concentration of ions leading to the formation of stones (oxalate, phosphate, calcium), but also increased the level of magnesium, one of the crystallization inhibitors. ^[12]

Asparagus is considered an effective supplement for relieving alcohol hangovers and protecting liver cells from toxic damage. When comparing the biochemical properties of leaves and shoots of the plant, asparagus leaves rich in amino acids and inorganic minerals demonstrated particular efficiency in these processes. ^[13]

- Diabetes

Asparagus dietary supplements containing a source of active ingredients may open up new possibilities in the treatment of diabetes. One type of plant, asparagus racemosus, has been found to be able to stimulate insulin secretion and inhibit starch digestion. ^[14] But asparagus officinalis extract also controlled blood glucose levels by improving insulin secretion and β -cell function. At least, such

results have been obtained in laboratory animals with type 2 diabetes. Diabetic rats were treated with asparagus extract at doses of 250 and 500 mg/kg, which reduced elevated blood glucose levels in a dose- and time-dependent manner. ^[fifteen]

An aqueous extract of the lower basal part of asparagus was useful in preventing diabetic complications associated with hyperglycemia and hyperlipidemia. ^[16]

A clinical study in which 28 volunteers took 6 g per day of crushed lower "waste" parts of asparagus stalks per day for 10 weeks showed that this significantly reduced fasting plasma glucose levels. In addition, taking asparagus powder led to a decrease in blood pressure and total cholesterol. ^[17]

- Potency

Various parts of asparagus, as well as many other plants and fruits, have traditionally been used in folk medicine to improve male erectile function. But, unlike many other herbal preparations, asparagus extracts have been tested in the laboratory, where their activity was tested on male albino rats. It turned out that aqueous extracts of asparagus, whose effect was similar to the effect of testosterone, actually increased the erection of the penis and reduced the oscillation time in the phase of attraction to females. In addition, the resting phase after ejaculation was reduced, and the average frequency of mating increased. ^[eighteen]

There is evidence of a positive effect of asparagus root extracts and on the development of eggs. In one study, asparagus extracts effectively stimulated the secretion of the hypothalamic-pituitary-gonadal system and the number of ovarian follicles in adult female rats. ^[19]

- Brain and nervous system

A whole body of research (which we will discuss in more detail below) speaks of the positive effect of asparagus preparations on the state of the brain and nervous system. The results show that asparagus has anti-depressant and anti-stress properties. Means based on it improve the quality of sleep and relieve mental stress, improve memory. They have a preventive effect in Alzheimer's disease and a therapeutic effect in cognitive impairment.

- Antivirus activity

Indian experts have found that asparagus extract can exhibit antiviral activity against influenza A virus and herpes simplex virus type 1. ^[20] However, these results were obtained in the laboratory, "in vitro", so it is premature to say that asparagus "for breakfast" will cure the flu. To make this possible, many additional studies are needed.

In medicine

Asparagus extracts in capsules, tablets and other forms from domestic and foreign manufacturers are freely sold among other herbal supplements with biologically active components. The instructions for them recommend the use of asparagus preparations as an adaptogen, immunomodulator, diuretic, tonic and cleanser.

Despite the fact that asparagus is included in the Pharmacopoeias of various countries, including China, France, Bulgaria, Portugal, Venezuela, Mexico, etc., in our country its therapeutic use by representatives of official medicine is episodic. Although there are cases of systemic use by some doctors of asparagus decoctions for the treatment of kidney diseases, cardiac neuroses, and hypertension.

Nutritionists specializing in eco-nutrition willingly "prescribe" asparagus for the treatment of diseases of the liver, prostate, bladder, kidneys, as well as diabetes, gout, atherosclerosis and heart pathologies.

In folk medicine

In folk medicine, all parts of the plant are used - from roots to berries, but the harvesting of raw materials takes place at different periods:

- rhizomes are harvested in early spring or late autumn,
- the grass is cut during the flowering period,
- berries - at the time of their full ripening.

Asparagus rhizomes in folk medicine are used in the initial stages of hypertension and venous insufficiency. They are also prescribed to create a diuretic effect and relieve inflammation of the urinary tract. To reduce toothache, healers advise simply chewing pieces of fresh asparagus root. However, most often raw materials from the underground part of the plant are used in the form of decoctions and infusions.

To create an infusion of asparagus roots, they usually take a tablespoon of dried raw materials in a glass of boiling water. When preparing a decoction, the same amount of raw materials is poured into 1.5 glasses of water, which are first brought to a boil, and then kept on low heat for about 2 more minutes.

To prepare a decoction of grass, you will need 2 tbsp. l. dry raw materials for half a liter of water. The grass is first boiled for 5 minutes, and then left to infuse until cool. Take this decoction for half a cup three times a day.

Although many of the healing effects of the underground and aboveground parts of the plant are the same, in folk medicine there is a certain tradition of using asparagus decoctions and infusions, taking into account the disease.

- **Infusion of asparagus rhizomes:** nephrolithiasis, cystitis with difficulty urinating, dropsy, epilepsy, tachycardia. In the latter case, dry grass (2 tsp) is added to the still hot decoction of the roots (350 ml) and infused for 2 hours, closed. To restore the heart rhythm, take this remedy 3 times a day before meals, 2 tbsp. l.
- **Infusion of young stems and herbs:** diseases of the stomach, kidneys, heart.
- **Infusion of asparagus seeds:** impotence.
- **A decoction of the rhizome:** neurosis and hysteria, pyelonephritis, cystitis, prostate adenoma, urolithiasis, diabetes mellitus.
- **A decoction of rhizomes and young shoots:** inflammatory rashes on the skin, eczema, acne, scrofula.
- **A decoction of asparagus fruits:** diarrhea, dysentery, impotence.

Also in folk medicine in some countries, beautiful, but tasteless asparagus berries are used to treat gout, whooping cough and diabetes. Often, for this they are simply dried, ground, and the resulting powder is used for brewing, replacing coffee with it. However, it should be borne in mind that asparagus berries in large quantities are harmful to health, therefore it is more expedient to take preparations based on them in therapeutic doses - teaspoons rather than glasses.

in oriental medicine

Traditional Chinese medicine uses 9 types of asparagus (asparagus). Among them, the species with the most pronounced therapeutic effect is *light asparagus*, also known as *South Vietnamese* or *Cochin asparagus* (after the name of the region in the Mekong Delta). Its Chinese healers have been using it for at least 2 thousand years.

Asparagus is classified in this tradition as a "bitter" and "very cold" product, affecting the Lungs Meridian and the Kidney Meridian. However, it is practically not used on its own, but is part of multicomponent recipes that are prescribed for the treatment of diseases of the respiratory system, spleen, and kidneys.

In particular, asparagus preparations facilitate breathing by moistening the lungs, and are therefore indicated for dry coughs. They are also effective for sticky and/or bloody sputum and are therefore indicated for pulmonary tuberculosis and bronchitis.

Since the condition of the skin indirectly depends on the normal functioning of the lungs, it is believed that long-term use of preparations based on the asparagus root ensures its elasticity and softness.

In order not to harm the digestive tract and the spleen, people who are contraindicated in "cold" should refrain from eating asparagus. According to traditional and modern views, asparagus should also be avoided by pregnant women due to the threat of miscarriage.

In the healing formulas of Chinese medicine, Cochin asparagus can be found next to ginseng, calamus, rhemania, coltsfoot and other herbal ingredients. The following are examples of healing combinations and their purpose:

- **Fu Zi Tian Men Dong San** - to strengthen Qi, prolong activity and slow down the aging process. The formula includes asparagus, aconite, costus, calamus and a number of other plants.
- **San Cai Tang** - to get rid of fluid deficiency, diabetes, dry mouth and fever associated with Yin imbalance. The composition of the product, in addition to asparagus, includes ginseng and sticky rhemania common in the East.
- **Tian Men Dong Wan** - to restore appetite, get rid of pulmonary pathologies caused by typhoid fever, as well as stop coughing and wheezing caused by damage to internal organs. In this recipe, asparagus is "helped" by a wide bell, coltsfoot, black cohosh (*cimicifuga*), etc.
- **Tian Men Dong Jiu** - to restore the functions of numb limbs, get rid of dryness and sore throat, normalize the activity of the gastrointestinal tract with constipation.

The fruits of asparagus in Chinese traditional medicine restore potency and, in general, improve erectile function. For a therapeutic effect 1 tsp. dry crushed berries are poured with boiling water (200 ml) and insisted for about 7-8 hours in a warm oven (or oven). Take the remedy 3-4 times a day for 30 minutes. before meals 1 tbsp. l.

In Mongolian folk medicine, asparagus berries are already recommended for lumbar pain and swelling (as a diuretic). In traditional Indian therapeutic practices, asparagus racemos roots are used to prepare remedies for the treatment of epilepsy. Also, asparagus (colloquially - shatavari / Shatavari) is mentioned in Ayurvedic ancient Indian texts, in sections devoted to the treatment of stomach ulcers, diarrhea, dysentery, and oncological diseases.

In scientific research

Asparagus is a popular subject of scientific research. One of the reasons for this was the wide and effective use of asparagus in folk medicine in different countries, where this plant has created an

excellent reputation for itself as a universal remedy. Today, scientists are actively testing the many therapeutic properties that asparagus is popularly known for. And one of the most popular was the topic of the influence of asparagus extracts on the working capacity of the brain and the state of the nervous system. Examples of such work are given below:

Asparagus root methanol extract has significant antidepressant activity (in laboratory rodent models). ^[21]

To evaluate the effect of the plant root extract on the condition of the animals, they were given preparations of asparagus at doses of 100, 200 and 400 mg/kg daily for 7 days, and then subjected to the "forced swimming test" and "learned helplessness test". In both cases, behavioral factors clearly indicated an antidepressant effect of the extract, which, according to scientists, is mediated by the serotonergic and noradrenergic systems, as well as increased antioxidant protection.

Aqueous extracts of asparagus stalks prevent memory impairment in mice. ^[22]

The effect of asparagus extracts on memory and acetylcholinesterase-related activity in a scopolamine-induced amnesia model was studied in an experiment with 60 mice divided into 6 groups. In three of them, the animals received low (1.6 ml/kg), medium (8 l/kg) and high (16 ml/kg) doses of the extract. The results showed that the average dose significantly improved cognitive impairment in mice in the novel object recognition test, the Y-maze, and several other tests. Analysis of biochemical parameters confirmed the behavioral parameters and suggested that the asparagus stem extract protected learning and memory function in mice by enhancing the activity of the cholinergic nervous system. Potentially, such an extract could prevent cognitive impairment in age-related diseases such as Alzheimer's disease.

Fermented asparagus extracts reduce mental stress and improve sleep efficiency in healthy adult males under psychological stress. ^[23]

Japanese scientists conducted a double-blind, placebo-controlled, crossover study that looked at the effects of asparagus on sleep and stress-related hormones. Actual sleep time did not differ significantly between the "asparagus extract" and placebo groups. However, when participants were divided into two categories based on sleep efficiency or average sleep time, it was found that the drug was effective in modulating sleep status among people with low sleep efficiency or excess sleep time.

Weight regulation

Due to its low calorie content (about 20 kcal), very little fat (0.12 g/100 g), diuretic properties, as well as a balanced complex of vitamins and minerals, asparagus is considered an excellent product to include in diets aimed at getting rid of extra pounds.

Indirect evidence that eating asparagus can help with weight management comes from the results of experiments with laboratory animals fed a high-fat diet. ^[24] A high-calorie diet predictably led to obesity and negatively affected the liver of animals. But when the subjects were given supplements of asparagus (water and ethanol extracts) for 8 weeks in parallel, measurements showed that they had a significantly reduced level of weight gain. In addition, the levels of total serum cholesterol and "bad" cholesterol (low density lipoproteins) became significantly lower, the overall antioxidant capacity increased and a number of other indicators improved.

And although it is impossible to directly transfer the results of experiments with animals to humans, reviews of people who have tried a diet with the inclusion of asparagus have allowed some specialized publications to include asparagus in the top 10 best products for weight loss. In addition, due to the

abundance of dietary fiber, green asparagus retains a feeling of satiety longer, prevents overeating and simplifies the process of losing weight.

In cooking

The unusual sweetish taste of fresh asparagus, giving off a slight aftertaste of sulfur, has been appreciated by people for a very long time. In one of the most ancient cookbooks of the ancient Roman semi-legendary gourmet Apicius "De re coquinaria" you can already find recipes for dishes from this plant. Historians claim that asparagus lovers were Julius Caesar, Louis XIV, Thomas Jefferson, Leo Tolstoy.

Before cooking green asparagus, the lower part of the sprouts is usually broken off, and the remaining stalk is most often cleaned, although this rule is not universal. Some cooks do not clean asparagus, but simply choose the most tender young shoots. At the same time, in any case, the best product is the one that was prepared on the day of harvest.

The simplest and probably the most popular way to cook the plant remains a quick boil for 3-4 minutes. The stems of the plant are tied into a bundle (up to 10 pieces) and lowered vertically into a narrow pan with enough boiling water so that the heads remain on the surface and "reach" for a couple. Overcooked asparagus becomes unpalatable, and this method allows you to synchronize the boil time of the tougher stalks and the more tender tops. However, other methods of preparing stems in our country are also quite common. Today, asparagus is baked, stewed, fried, canned, added to soups and side dishes.

In the classic version, boiled asparagus is served with hollandaise sauce, but it also goes well with cheese, fish, seafood, rice, beans, vegetables, bacon, beef, rabbit, chicken, eggs.

Dessert dishes are also prepared from asparagus, in which this vegetable culture is "friendly" with grapefruit, raspberries, strawberries, and honey. And in Japan and Italy, sweet candies are generally made from the roots of the plant. By the way, in the northern Italian province of Bolzano-Bozen, asparagus is always served as an appetizer for the best wines, since it is believed that its shoots can emphasize the taste and aroma of an exquisite drink.

In cosmetology

In medical cosmetology, shoots and roots of medicinal asparagus are used in the treatment of allergic and atopic dermatitis, urticaria, eczema, purulent skin lesions caused by the spread of cocci, as well as psoriasis, lichen planus. Asparagine from various parts of the plant is used in the treatment of vitiligo.

Asparagus contains a lot of folic acid, which makes the skin velvety and prevents the appearance of fine lines. Due to the rejuvenating effect, some spas prepare their own asparagus gruel for restorative procedures. Such a "technology" has survived to this day since the "gallant age". At the same time, the effectiveness of asparagus components in the prevention of skin aging is also scientifically confirmed. In particular, Japanese scientists have found that enzyme-treated asparagus extracts can prevent skin aging by significantly reducing the response to oxidative stress in dermal fibroblasts. ^[25]

A number of Asian and European brands include asparagus extracts in their products as the main active ingredient. As an example, we can mention face masks from Dr.Jart + (South Korea), Vegetable Beauty fluid cream (Italy), Casmara Renovating Regenerating serum (Spain), etc. For the preparation of masks and creams at home, dry, aqueous and alcoholic extracts of asparagus.

Dangerous properties of asparagus and contraindications

Since the asparagus components can irritate the mucous membranes, stimulating the secretory activity of the digestive tract, with chronic inflammation and especially with exacerbations of diseases of these organs, it is better to refuse to use asparagus.

Green asparagus contains a lot of fiber, which is difficult for the digestive system of children to cope with. Therefore, up to 2 years, this vegetable should not be included in the child's diet at all, and then it is better to start a culinary "acquaintance" not with raw, but with boiled asparagus.

Also, an allergic reaction can sometimes occur to asparagus components in both a child and an adult, with the appearance of urticaria. In rare cases, skin rashes can appear even with a simple touch on young shoots.

Selection and storage

When buying asparagus, you should choose evenly colored bright shoots with tightly pressed shiny scales 15-20 cm long and 1-2 cm in diameter. The tops of the shoots should be dense, small in size, and the stem should be elastic to the touch.

To determine the freshness of the product, you can focus on the cut, which will be dry for stale asparagus. This is important, because it is desirable to eat asparagus on the day of harvest to preserve the richness of taste and aroma. If this fails and the preparation of the dish needs to be postponed for a day or two, then it is better to wrap the shoots with a damp cloth and place in the refrigerator. In this case, the asparagus bundle should be untied and the shoots spread out in one layer, otherwise the inner stems in the bundle may begin to rot.

About a week, asparagus can be stored on the middle shelf of the refrigerator, if you cut off the dry ends of the stems, and the stems themselves are immersed 2-3 cm in water and wrapped in cling film. At temperatures from 0°C to -1°C and a humidity of 90%, the shoots can be stored for up to a month, but if the humidity rises during this period, an unpleasant bitterness will appear in the taste.

It is believed that frozen asparagus shoots can lie unharmed until the start of the next season. But not all chefs share this view. Some people believe that when asparagus is thawed, it loses much of its special flavor and is more suitable for stuffing and adding to hot dishes.

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Asparagus - useful properties, composition and contraindications

Eliseeva Tatyana, editor-in-chief of the project EdaPlus.info

Alena Tarantul, nutritionist

E-mail: eliseeva.t@edaplust.info, tarantul.a@edaplust.info

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Abstract. The article discusses the main properties of asparagus and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The chemical composition and nutritional value of the plant are indicated, the use of asparagus in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of asparagus on the human body under certain medical conditions and diseases are analyzed separately. The scientific foundations of diets with its application are considered.