



Картофель (Паслён клубненосный, лат. *Solánium tuberósum*)

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Abstract. The article discusses the main properties of potatoes 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 tubers are indicated, the use of potatoes is considered in various types of medicine and the effectiveness of its use in various diseases. Potentially adverse effects of potato were analyzed separately. on the human body under certain medical conditions and diseases. The scientific foundations of diets with its application are considered.

Keywords: potatoes , useful properties, potentially harmful effects, side effects, beneficial properties, contraindications, diets

Beneficial features

Chemical composition and presence of nutrients

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

Main substances (g / 100 g):	Raw white potatoes contain: ^[20]
Water	81.58
Carbohydrates	15.71
Squirrels	1.68
Fats	0.1
Calories (kcal)	69
Minerals (mg/100 g):	
Potassium	407
Phosphorus	62
Magnesium	21
Sodium	16
Calcium	9
Vitamins (mg/100 g):	
Vitamin B4	eleven
Vitamin C	9.1

Vitamin B-3	1.066
Vitamin B- 5	0.281
Vitamin B-6	0.203

The most useful potatoes are baked in their skins, which are often called jacket potatoes. It also benefits the use of boiled tubers, but fried potatoes should not be abused, since such heat treatment dramatically increases the content of fat and harmful substances that digestive enzymes do not cope well with.

Medicinal properties

The beneficial effect of potatoes on various processes in the human body is explained by the presence of a large number of useful elements in its composition. Firstly, potatoes are a rich source of ascorbic acid or vitamin C. Although in smaller quantities, they also contain B vitamins. Secondly, due to the high starch content, potatoes supply a significant amount of carbohydrates to the body and give a person energy and vitality. Thirdly, potato proteins provide the human body with 14 of the 20 essential amino acids.

In addition, in any form and with any heat treatment, potatoes are very rich in potassium. This mineral contributes to the fight against hypertension, as it promotes vasodilation. Potassium also has a diuretic property and is necessary for people suffering from gout, acidosis, cystitis and prostatitis. Promoting the removal of excess fluids from the body, potassium thereby helps it maintain a normal metabolism [7].

Iron, phosphorus, calcium, magnesium and zinc contained in potatoes help the growth and strengthening of bones. At the same time, it is important that the body maintains a balance of phosphorus and calcium, since an excess of phosphorus and a lack of calcium can lead to increased bone fragility and, as a result, to osteoporosis. [8].

Vitamin C, which is so rich in potatoes, is a powerful antioxidant that takes part in the neutralization of free radicals in the human body and thus helps prevent the destruction of cells and connective tissues. It promotes collagen production and aids in iron absorption [9]. Together with vitamin B, as well as magnesium, potassium, phosphorus and zinc, vitamin C has a positive effect on skin condition and relieves pain from minor burns [10].

Vitamin B6, combining with various enzymes, plays an important role in the processing of proteins and carbohydrates, and also takes part in the process of fat metabolism. In addition, B6 promotes the synthesis of hemoglobin and, in general, improves hematopoiesis [9]. Vitamin B9 (folic acid), in turn, is of great importance for DNA synthesis and red blood cell regeneration. Its presence in the body is especially important for women during pregnancy, since B9 is involved in the regulation of the formation of the structures of the fetal nervous system [8].

The presence of coarse dietary fiber in potatoes, in particular fiber, has a positive effect on cholesterol levels and helps prevent clogging of the arteries. Also, fiber helps to normalize the stool with constipation. True, it must be borne in mind that the bulk of dietary fiber, however, like other useful elements, is located in the potato peel or directly under it.

In traditional medicine

In traditional medicine, potato tubers themselves are not used directly, but products obtained during their processing, as well as leaves, flowers and fruits of the potato bush are used. For example, potato starch is commonly found in powders and ointments prescribed for various skin conditions. It is also

used as a binder in the manufacture of tablets. In addition, high-quality ethyl alcohol is obtained from potato starch.

The entire upper part (stems, leaves, flowers, fruits) of the potato bush contains glycoalkaloid solanine, toxic to humans and animals. However, scientific studies have shown that in small doses and in combination with other components, solanine can be useful. For example, it is used as a raw material for the synthesis of hormones in the pharmaceutical industry.

In folk medicine

Unlike traditional medicine, in folk recipes, the range of potatoes is much wider. Potatoes are used to treat colds, ulcers, cardiovascular diseases, get rid of allergic reactions, and some even claim the effectiveness of potatoes in the fight against cancer. However, before starting treatment with potatoes, you should consult a doctor, since improper or untimely use of potatoes can only aggravate the situation.

- **Juice**

It is believed that potato juice is effective in the fight against stomach ulcers and gastritis. It also normalizes the digestion process and relieves heartburn. The positive effect is mainly due to the presence of starch in the composition of the tubers - a good enveloping agent. In addition, juice is indicated for diabetics (mild to moderate diabetes), as it normalizes carbohydrate metabolism. Potato juice also helps to cleanse the body of toxic elements and toxins. For such purposes, it is often mixed with celery or carrot juice.

Before starting juice therapy, it is advised to exclude meat, fish, spices and spices from the diet for several days, replacing them with products of plant origin. This will help prepare the body for the intake of raw potato juice.

Usually, in case of violations of the gastrointestinal tract, it is recommended to drink one glass of juice after waking up on an empty stomach, then go to bed for another half an hour, and after another half an hour you can have breakfast. A ten-day course of treatment with juice should be replaced by a ten-day break. Then the course can be repeated again. For heart problems, it is advised to drink 100 ml of juice three times a day before meals. The course lasts three weeks, after which one week break is needed.

For the preparation of potato juice, you need to choose unsprouted healthy tubers. It is important that the peel does not have a greenish tint, which indicates the presence of a toxic substance in the tuber. It is also not recommended to squeeze the juice from February until the new potato crop, since solanine accumulates in it and the amount of useful elements decreases.

The selected potatoes must be washed, wiped and passed through a juicer. An alternative way is to rub the potatoes on a grater or pass through a meat grinder, and then strain through cheesecloth. It is best to drink the prepared juice immediately, because during storage it darkens, becomes reddish, and its vitamin activity is significantly reduced.

- **Compresses**

Potato compresses are used for various purposes. Firstly, it is believed that they help get rid of coughs. The effect is achieved by reducing the swelling of the airways and increasing the expectoration of mucus by warming the chest. To prepare a compress, you need to wash and boil 3-5 tubers in a peel. Then mash the potatoes, put them in gauze and apply to the back and chest of the patient, wrapping

him in a towel for 45-60 minutes. The procedure can not be performed on children under 4-5 years old. Also, the compress is contraindicated if the patient has a fever.

Secondly, potato compresses are recommended for joint pain. 200-300 g of raw potatoes must be grated and mixed with the same amount of grated horseradish roots. The resulting mass must be applied to the legs, covering with a cellophane film and insulating with a woolen cloth. Usually such a compress is done at night.

Thirdly, potato compresses can be useful if you have dark circles and “bags” under the eyes due to fatigue and lack of sleep. To prepare a compress, you need to wash and grate one potato on a fine grater. Then divide the resulting mass in half, wrap both parts in gauze and apply to the eyes for 10 minutes.

- Inhalations

In acute respiratory diseases, which are accompanied by a cough, it is recommended to do inhalation over potatoes. Potatoes are boiled without salt in a small amount of water. A towel is thrown over the head and the steam is breathed for 5-10 minutes.

- Decoction

In potato broth, there are many vitamins and minerals that tubers are rich in. Traditional healers claim that it can be used to relieve swelling and improve heart function. It is recommended to cook potatoes in their skins and without salt. Drink a warm decoction three times a week. It is also believed that potato broth baths are good for the skin of the hands, as they make it soft and promote the healing of minor wounds.

- Tinctures

In folk medicine, in addition to the tubers themselves, potato flowers are also used, from which tinctures are prepared. They are considered effective in the fight against fungi. According to the recipe, a small amount of flowers (about 1 tablespoon) is poured into 250 ml of boiling water and infused for 3-4 hours in a thermos. This tincture is stored in the refrigerator for no more than two days. For longer storage (within two weeks), the resulting tincture must be mixed with 30 ml of alcohol or vodka.

Some traditional healers use tinctures from the flowers to treat cancerous tumors. According to the recipe, 1 tablespoon of flowers should be poured with two glasses of boiling water, and then infused for about 30 minutes. After that, leave for about 3 hours in a sealed container in the oven. The resulting liquid must be drunk three times a day, 100 ml. The course of treatment is 3 weeks. However, such treatment must be used very carefully, since the concentration of alkaloids in the flowers of the plant is much higher than in the tubers.

in oriental medicine

In the classical oriental treatises on medicine, there was no mention of potatoes, because at the time of their writing, potatoes were not yet known in those parts. However, for example, in modern Tibetan medicine, it is believed that this vegetable benefits the nervous system (the Rlung system in terms of Tibetan medicine), which regulates all processes in the body.

gradual depletion of the Rlung system leads to aging of the body, and the use of potatoes helps to maintain and strengthen this system, slowing down aging. Potatoes also have antidepressant properties

and help the body recover from stress. In addition, it is considered a prophylactic against insomnia. Moreover, potatoes have a positive effect on the work of the cardiovascular and digestive systems.

Potatoes are often excluded from the number of healthy vegetables, since oriental medicine classifies them as "cooling" foods, that is, those that slow down metabolism. In fact, it is easy to compensate for this by adding "warming" salt, black and red pepper, garlic, dill or ghee to the potatoes.

In Tibetan medicine, it is believed that "disease enters and exits the body through the skin." The "exit" of the disease is usually accompanied by skin inflammation, which thinly sliced potatoes can cope with. Applying raw potatoes is also advised in case of first and second degree burns.

In scientific research

Potato has long been and does not cease to be the object of scientific research in various areas. Such interest is explained by the fact that potatoes are a product that can provide millions of people with food and a complex set of useful elements at a minimal price. Researchers are studying ways to improve the methods of planting, growing, harvesting and storing potatoes, developing methods for selecting potatoes for certain modes of growing them, and selecting environmentally friendly technologies for protection against harmful organisms and pathogens.

In addition, potatoes are actively researched in medicine. Pigs have shown that raw or cooked potatoes, eaten cold, have beneficial effects on the intestines and strengthen the immune system ^[11]. Also, American scientists have developed a variety of "golden" potatoes, which contains more vitamins and minerals. Thus, it provides almost 42% of the daily value of vitamin A and 34% of vitamin E for a child ^[12]. This variety is planned to be brought to developing countries, where people suffer from a lack of wholesome and healthy food.

The researchers also concluded that the virus that most commonly infects potato plants is very similar to one of the proteins that cause Alzheimer's disease. Now they are using this similarity to create antibodies that would help at least slow down the onset of the disease ^[13]. Americans also believe that purple potatoes help kill cancer stem cells in the colon. Experiments on mice have shown that the flesh of baked purple potatoes removes inflammation and inhibits the growth of tumors ^[14].

Ethyl alcohol is obtained from the waste generated during the processing of potatoes, but Russian scientists talk about the possibility of obtaining other high-quality antimicrobial agents ^[15]. Finally, in the UK, potato starch has been used to produce biodegradable medium-density fibreboard (MDF), which is highly sustainable ^[16].

Weight regulation

Despite the fact that the potato occupies a leading position among the most high-calorie vegetables, it is unfairly considered a forbidden product for people who follow their figure. Scientists from the US National Nutrition Center conducted a study and found that due to the large amount of potassium in its composition, the potato helps to remove excess fluids from the body and thus can even lead to the loss of extra pounds.

Overweight problems arise only if potatoes are eaten fried or seasoned with fatty sauces. Boiled, stewed or baked, potatoes can even become the basis of an unloading diet if, instead of fish and meat, they are consumed with other vegetables and spices.

Due to the fact that potatoes have good taste and high nutritional value, rich in vitamins and minerals, easy to digest, they are widely used in baby and diet food. Potatoes are usually recommended for

patients with chronic renal failure, cardiovascular diseases, arterial hypertension, atherosclerosis, and gastrointestinal diseases. However, potatoes are not recommended for people suffering from severe forms of diabetes and obesity ^[17].

In cooking

Potato is a versatile vegetable that is used in recipes around the world. Potatoes are an indispensable ingredient in soups and a good side dish. In addition, it is put in salads, pies, meat dishes, pancakes are made on its basis. Cooking potatoes is easy. Both by itself and as part of various dishes, it is most often boiled, stewed or baked in the oven.

In order for the dish to turn out as tasty as possible, you should choose the right potatoes. According to the density of the pulp, it is customary to divide it into 4 types: A, B, C and D. Type A potatoes contain a minimum of starch and are poorly boiled. It is most often used for salads. Type B potatoes are good for making chips, and type C are good for deep frying. Type D is the most mealy variety and is best for casseroles and mashed potatoes.

However, the label is usually only on imported potatoes. In case of its absence, you can navigate by color. Red varieties of potatoes ("red-tamb", "rozeval", "sheri") are characterized by a high content of antioxidants and do not crumble during cooking. Usually such potatoes are well stored in the winter. White varieties ("erow", "tiras", "gypsy") contain a lot of vitamin C and, as a rule, such potatoes boil well. Yellow varieties ("symphony", "rosalind", "adretta") are rich in carotene and retain their shape when cooked.

Combination with other products

According to adherents of a healthy diet, traditional combinations of potatoes with meat, fish or eggs are unacceptable. It is believed that starchy foods do not mix well with animal proteins. So, to digest potatoes, the body secretes alkaline enzymes, which are dissolved by hydrochloric acid, produced by the stomach to process meat. Thus, not fully digested foods enter the intestines, where the fermentation process can begin with the active release of toxins.

A combination of potatoes with vegetable oil, sour cream, cheese, green vegetables, as well as legumes is considered healthy and useful.

Beverages

Drinks made from potatoes have a specific taste, but are considered very beneficial for the body. Raw potato juice and potato broth are recommended to drink as a cure for various diseases. Often beets, celery or carrots are added to potato juice. In addition, a traditional drink is prepared from the tubers - natural live kvass. With the addition of oatmeal from potatoes, you can even make jelly, which is considered a soothing detoxifier.

Dangerous properties of potatoes and contraindications

Despite the exceptional usefulness and importance of potatoes in the diet, it can be consumed only with some reservations:

- only potato tubers should be eaten, since the upper part of the bush (stems, leaves, flowers and fruits) contains the alkaloid solanine, which can cause poisoning of the body;
- green and sprouted potatoes should also not be eaten due to their toxicity;

- juice from raw potatoes can be prepared up to a maximum of February, since after that solanine begins to accumulate in the tubers themselves and in their peel;
- during the preparation of potatoes at a temperature of 120 degrees and above, the amino acid asparagine contained in its composition is transformed into a carcinogenic substance acrylamide, therefore, any other method of heat treatment, except for frying, is preferable;
- potatoes are not recommended for obese people;
- potatoes should be used with caution in patients with severe diabetes.

Botanical description

From a botanical point of view, the potato is a perennial tuberous plant of the nightshade family. But in everyday life, the potato is often referred to as the "second bread" because, along with wheat, rice, corn and sugarcane, it is one of the five most important agricultural crops in the world ^[1,2].

Story

The history of the potato has more than one millennium, and scientists believe that for the first time wild species of this plant began to be eaten as early as the 5th century BC. ancient Indians who lived in South America. When and how the potato left its homeland is not known for certain, but it is believed that it came to Europe through the Iberian Peninsula and the British Isles in the middle of the 16th century ^[3].

In Spain, and especially in Ireland, potatoes quickly became a solid staple of the diet of the locals, however, in the rest of Europe they were not very popular and for a long time were considered the creation of the hands of the devil. Nevertheless, information about the true value of potatoes nevertheless spread over time throughout the Old World and, contrary to initial mistrust, they began to grow and use it in Germany, the Netherlands, Belgium, France and other European countries.

The first who, at the end of the 16th century, described the potato and assigned it the modern scientific name *Solanum tuberosum* (lat. tuberous nightshade), became the Swiss botanist Kaspar Baugin ^[4]. As for the everyday name of the potato, it varies depending on the country. So, for example, the Russian name "potato" comes from the German word "kartoffel", which in turn was borrowed from the Italian language. In Italy, potatoes were called "tartufoli" by analogy with truffles (it. tartufo), since its tubers, like truffle tubers, are located underground.

The English name "potato" comes from the Spanish word "patata". The Spaniards, in turn, adopted the name from the Indians, combining their words "papa" (potato) and "batata" (sweet potato). In France, potatoes are still called "pomme". de terre" (fr. earthen apple) ^[5].

Varieties

Given that the potato is an unpretentious plant, it can be grown on a wide variety of soils, regardless of the climatic conditions and temperature fluctuations ^[6]. That is why this crop is cultivated in more than a hundred countries of the world with a temperate, subtropical and tropical climate. However, to obtain a quality crop, you need to know which variety is suitable for the soil and weather conditions of a particular area.

There are a huge number of varieties of potatoes (about 4000), ranging from various wild species in South America to species carefully bred by breeders. Usually, varieties are divided into categories depending on the ripening time: 70-80 days (early ripening), 90-120 days (mid-ripening), 140-150 days (late-ripening) ^[1].

In addition to well-known varieties such as Adretta , Riviera, American or Granada, which correspond to the traditional ideas about the appearance of potatoes (brown skin and light yellowish flesh), there are also very unusual varieties with colored flesh or variegated external color. For example, potatoes of the Vitelotte variety have a rich purple color of the pulp, while potatoes of the All variety Blue both the skin and the flesh are blue. The Bikini variety has an unusual red-yellow skin, the Christina tubers have a dark red skin, and the Shetland potato is black on the outside.

Growing features

Potato is considered a perennial plant and in its homeland, in South America, it is often found in the wild. However, in Europe it is grown as an annual plant. Depending on the variety, a potato bush can reach 30 to 150 cm in height and have 4 to 8 stems. The color of the leaves varies from light green to dark green with a brown tint ^[1]. At the tips of the stems, small inflorescences of white, pink or lilac usually appear, depending on the variety.

Closer to autumn, fruits form on the bush - small fleshy berries of green-white color. The tops and berries contain the poisonous substance solanine, which protects the plant from harmful bacteria and insects. The tubers used for food are located underground. On the outer part of the potato there are so-called eyes (from 3 to 15 buds on one tuber), which subsequently develop into young shoots. Potatoes can be grown in any open field, in greenhouses and even in pots.

The planting time of this plant depends on the timing of the maturation of the tubers. Early varieties are usually planted when the soil warms up to 10°C, although some gardeners choose lunar days for planting potatoes. However, the preparation of planting material begins 30-40 days before disembarkation. Tubers the size of a chicken egg, selected in the fall, are scattered on the floor or laid out in one layer in boxes and stored at a temperature of 12-15 ° C, always in the light and at high humidity.

The planting of potatoes itself can be carried out in different ways, depending on the density of the soil. In hot climates and light loose soil, pits are made for potatoes, while in humid climates in damp soil, ridges are cut under the potatoes, raising the planting above ground level. Sometimes seed propagation is used. To do this, take seeds from ripe potato fruits and plant them in boxes, leaving them in a lighted place. Seedlings 13-15 cm high are transplanted in early May.

Growing potatoes is certainly accompanied by pest control. The Colorado potato beetle and wireworm are a real scourge for potato plantations. Larvae and adults of the Colorado potato beetle eat both the leaves of the potato bush and the tubers themselves. As for the wireworm, the danger is only the larva of this insect, which gnaws through the roots and tubers, which leads to the withering and decay of the plant. To get rid of these pests, you have to use chemicals.

Selection and storage

You should not take a green or already sprouted potato, it contains alkaloids that can provoke poisoning. Small holes, deep grooves and brown spots indicate that the potato has been exposed to pests. High-quality potatoes should be firm and resilient without external damage and defects. If the potato gives in to the pressure of the nail and liquid begins to ooze from it, it is most likely that nitrates were used during cultivation. And when you pierce the skin of a good, pesticide-free potato with your fingernail, you will hear a crisp crispy sound.

If you need to choose potatoes for storage for the winter, then varieties of medium and late ripening are suitable. It is also worth paying attention to the size of the root crop. Medium and small tubers contain more nutrients. In addition, the maturity of the potato depends on the thickness of the peel - the

thicker it is, the more mature the potato is considered and the better it should be stored. Cleaned from the ground and dried tubers are best kept at a temperature of 2-7 ° C. Also, potatoes need to be sorted out from time to time, getting rid of rotten root crops in order to avoid the spread of infections.

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Potatoes - useful properties, composition and contraindications

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