



## Strawberries (lat. *Fragaria* )

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

*Alena Tarantul*, nutritionist

Email: [eliseeva.t@edaplus.info](mailto:eliseeva.t@edaplus.info), [tarantul.a@edaplus.info](mailto:tarantul.a@edaplus.info)

**Abstract.** The article discusses the main properties of strawberries 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 berries are indicated, the use of strawberries in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of strawberries on the human body under certain medical conditions and diseases are analyzed separately. The scientific foundations of diets with its application are considered.

**Keywords:** strawberries , useful properties, potentially dangerous effects, side effects, contraindications, diets

## Beneficial features

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

100 g of fresh strawberries contain [1]:					
Main substances:	G	Minerals:	mg	Vitamins:	mg
Water	90.95	Potassium	153	Vitamin C	58.8
Carbohydrates	7.68	Phosphorus	24	Vitamin PP	0.386
Sugar	4.89	Calcium	16	Vitamin E	0.29
Alimentary fiber	2	Magnesium	13	Vitamin B6	0.047
Squirrels	0.67	Sodium	one	Vitamin B1	0.024
Fats	0.30	Iron	0.41	Vitamin B2	0.022
calories	32kcal	Zinc	0.14	Vitamin A	0.004

Strawberries are most useful fresh. Like other berries, it contains a large amount of essential nutrients, but, in addition, it is low in calories. Moreover, this fruit has a low glycemic index - 40 units, and can be used in diabetes. Frozen strawberries lose some of their beneficial properties, but still bring much

more benefits compared to strawberry jam and jam. After heat treatment, the berries are deprived of a significant part of vitamins and minerals, and absorb a large amount of sugar.

### **Medicinal properties of strawberries**

Strawberries are the richest source of such nutrients as vitamins A, B, C, E and minerals (potassium, phosphorus, calcium, magnesium, calcium, iron, iodine, manganese). In addition, the berry contains a whole range of non-nutritive biologically active components (phenolic compounds), which together have a synergistic effect on the body, improving health and preventing the development of various diseases. In particular, strawberries contain ellagic acid and flavonoids, including anthocyanins, catechins, kaempferol, quercetin, etc.

Note that one of the main advantages of phenols is their ability to fight free radicals. This struggle is expressed in the neutralization of the destructive effect of active oxygen on cells. Thus, these compounds contribute to the protection of the body and reduce the risks of developing diseases that arise due to oxidative stress (cardiovascular diseases, obesity, type 2 diabetes, various inflammatory processes, and even cancer).

The mechanism of protecting the body from cardiovascular diseases is simple - phenols help reduce the level of "bad" cholesterol and improve the functioning of the endothelium (the inner lining of blood vessels). The latter is a special endocrine organ, "scattered" throughout the body. It is responsible for the production of substances that control such important processes as blood clotting, contractile activity of the heart, metabolic support of the brain <sup>[5]</sup>.

As for the fight against diabetes, then, firstly, it is believed that the berry is quite safe for people with an already developed disease. Secondly, after conducting an experiment in which 1000 women of different ages took part, British scientists came to the conclusion that a high concentration of adiponectin contained in strawberries restores the sensitivity of body cells to insulin and thus reduces the risk of developing diabetes.

With cancer, things are not so obvious, but scientists have recorded improvements in the condition of patients with a precancerous condition of the stomach after adding strawberries to their diet. It is assumed that antioxidants slow down the division of pathogenic cells and prevent the development of inflammatory processes. Scientists claim that the red pigments anthocyanins are also a good prevention of cancer of the mucous membranes. Experiments on mice have shown that there are substances in strawberries that inhibit the growth of breast tumors and significantly complicate the process of metastasis in breast cancer.

However, as recent studies show, phenolic compounds not only fight the influence of free radicals and related diseases, but are also able to protect and even "repair" damaged DNA. They improve cell metabolism and supply peripheral tissues with oxygen and glucose.

If we talk about the vitamin complex traditionally rich in berries, then you should pay attention to the fact that, in addition to vitamins of groups B, E and A, strawberries have a very high content of vitamin C (higher than that of lemon). In addition, it successfully combines the presence of ascorbic and folic acids and iron, which makes it very useful for iron deficiency anemia. Vitamins C and E also have an important effect on the condition of the skin, promoting the synthesis of collagen and elastin.

Strawberries contain 20% of the daily intake of manganese. This element is important for the body in terms of the synthesis of serotonin and maintaining the proper functioning of enzymes. Manganese also nourishes intervertebral discs and, along with calcium, phosphorus and magnesium, helps strengthen bones.

In addition, strawberries contain a fairly large amount of dietary fiber that is not absorbed in the small intestine. They have a positive effect on the digestive processes, improve intestinal motility, and also feed the beneficial bacteria that live in the colon.

Finally, it is no coincidence that strawberries are considered a symbol of sensuality and voluptuousness. Scientists have confirmed that this berry is a natural aphrodisiac that enhances sexual desire. By the way, small bright dots on the berry are seeds that contain a lot of biologically active zinc, which has a positive effect on sex hormones.

### **The use of strawberries in medicine**

Although strawberries have a lot of useful properties, they have not yet been widely used in the pharmacological field. Basically, it is used in the form of natural oil, which is obtained by dry pressing the seeds. Often it can be found among the components of various ointments and creams, the action of which is aimed at treating diseases of the skin. As part of such drugs, oil is usually responsible for regulating the process of keratinization of cells and maintaining a high level of skin moisture.

Also, essential strawberry oil is used in aromatherapy, as part of a comprehensive treatment for mental disorders. Experts consider this fragrance "cheerful", so it is especially often used in the fight against depressive states. By the way, strawberry flavoring is added to many preparations (lozenges, tablets, syrups, potions) to improve the taste and smell of medicines.

### **The use of strawberries in traditional medicine**

Since in our area many people have grown and continue to grow strawberries in their gardens, they began to actively use them in the self-treatment of various diseases. Moreover, in the recipes of traditional medicine, not only the berries themselves are used, but also the leaves, and sometimes even the roots of the plant. However, in no case should you rely only on strawberries. After consulting a doctor, you can use folk remedies as an auxiliary.

- Tea

Given that strawberries are a good diuretic, traditional healers recommend adding berries to tea during exacerbation of kidney failure, nephritis, urolithiasis, and also during inflammation of the urinary tract. Usually, for cooking, they take one tablespoon of tea leaves and half a glass of small berries for 0.5 liters of boiling water.

With metabolic disorders and the inability of the body to completely remove uric acid, a person develops gout, a disease that affects the joints. During crisis exacerbations of this disease, traditional healers recommend brewing tea from strawberry and currant leaves. As a rule, take 70 g of dry raw materials per 250 ml of boiling water. This tea should be drunk several times a day for a week.

A hot drink made from strawberry leaves is also believed to help with colds and inflammation of the gastrointestinal tract. Note that it is best to collect leaves during the flowering period, when all the beneficial substances accumulate in the ground part of the plant. After harvesting, they must be washed and laid out to dry naturally. Usually choose a cool place without access to bright sun. From time to time, the leaves need to be turned over.

- Juice

In some cases, strawberry juice is used instead of berries in folk recipes. For example, with osteochondrosis of the spine, it is necessary to mix it with carrot juice in a ratio of 2 to 1. This drink is

taken for a month twice a day for half a glass an hour after eating. In addition, strawberry juice along with a decoction of valerian root helps to overcome insomnia. To prepare the drink, you need to boil a teaspoon of the crushed root in 200 ml of water for 3 minutes, and then add a tablespoon of this broth to a glass of strawberry juice and drink it at night.

The combination of strawberry juice with hot milk is considered a good helper in the treatment of chronic bronchitis. Add 4-5 tablespoons of hot milk to a glass of fresh juice and drink daily until the condition improves. Also, with the help of this berry drink, the treatment of the prostate gland in men is carried out. It is recommended to mix in a blender 1 glass of strawberry juice, 1 banana, half a pear and 1 tablespoon of brewer's yeast. The mixture is drunk 250 ml three times a day before meals.

- infusions

An infusion of strawberries is often recommended for minor constipation or colds as a diuretic and diaphoretic, respectively.

To prepare the drug, 5-6 medium-sized berries and 1 cup of boiling water are used. Brewed mashed fruits insist in a thermos for about 20-30 minutes, then filter and take a drink half a glass before eating. You can also rinse your mouth with this remedy to prevent gum disease and freshen your breath.

Due to the fact that strawberry leaves contain phytoncides - substances that protect plants from the adverse effects of the environment, they are used to combat inflammation in the body. For example, an infusion of leaves with the addition of berries is used to gargle with laryngitis and sore throat. To prepare this remedy, you can take both fresh berries and leaves, and dried ones. For 0.5 liters of boiling water, usually 2 tablespoons of chopped fresh raw materials or 1 tablespoon of dry raw materials are enough. Boil with boiling water, the drink should be left to infuse for 2-3 hours, and then applied 3-4 times a day.

Among the folk recipes there is also an infusion that helps to alleviate the condition with tuberculosis. To prepare it, you need to dry 10 stems with berries. Then they are crushed and pour 1 liter of boiling water, insisting for about an hour. Take 2 glasses daily for a month.

Folk healers believe that even neuroses can be dealt with with the help of strawberry infusions. There are several recipes, one of which suggests combining a teaspoon of dried strawberry and wild strawberry leaves with a tablespoon of hop cones. The mixture is poured with two glasses of boiling water and infused for several hours. You need to drink this remedy twice: one glass in the afternoon, and the other before bedtime. According to another recipe, instead of hop cones, add a teaspoon of red clover flowers to strawberry and strawberry leaves and also pour two cups of boiling water. After straining, add a teaspoon of honey to the infusion and drink 250 ml per day.

- Decoction

Strawberry decoctions are made mainly to combat gout, nephritis, colitis, hemorrhoidal bleeding and indigestion. For the preparation of a remedy, fresh or dried leaves and roots are usually used. According to the recipe, 1 tablespoon of raw materials should be poured into 0.5 liters of water and boiled under the lid for 10 minutes. Then strain and consume 2 times a day, 100 ml before meals. You can store the broth in the refrigerator for no more than 2 days.

## Outdoor use

Strawberries are considered an effective remedy in the treatment of long-healing wounds, ulcers, eczema, and diathesis. In order to make a bandage, you need to knead a few berries to a puree state,

apply to a problem area and bandage, leaving for 30-40 minutes. Used for external use and strawberry leaves. With furunculosis, compresses are made from them. To prepare a medicinal mixture, the raw materials are washed, crushed and poured with a glass of boiling water. It is recommended to wrap the dishes in which the infusion is located in a blanket and leave overnight. Then compresses are made with this infusion.

### **Strawberries in oriental medicine**

According to ancient Chinese medicine, strawberries belonged to the category of foods with a cold and wet nature. With the help of medicinal products prepared on the basis of these berries, they treated hemorrhoids, bleeding, and got rid of worms. The leaves and roots of the plant were used for diseases of the liver, gallbladder, and also for problems with the joints. It was believed that infusions on the leaves helped with skin itching, and the juice of the plant treated female diseases.

In Tibetan medicine, strawberries were considered a real elixir of life and the secret of longevity. They were used to slow down the aging process. Also, ancient doctors believed that strawberries help strengthen the lungs and used it to treat respiratory diseases. In addition, the berries were used for stomach problems.

### **Strawberries in scientific research**

Due to a predominantly sedentary lifestyle and a diet high in sugar and animal fats, more and more people are suffering from various gastrointestinal problems. Scientists from the University of Massachusetts tried to approach the issue by looking for a dietary product that can relieve symptoms or help prevent the development of diseases, and one was found.

Experiments on infected mice have shown that regular daily consumption of strawberries reduces inflammation that occurs in the gastrointestinal tract and also stops bloody diarrhea. The serving size of the berries given to mice is about 3/4 cup of human strawberries. By the way, in mice that received strawberry extract as a dietary supplement, the condition did not improve so much, so it is crucial to consume whole berries. By the way, they, among other things, contribute to the restoration of healthy intestinal microflora <sup>[6]</sup>.

The beneficial effect of strawberries on the intestines is also noted by another group of scientists who conducted their research at Ohio University. They tracked patients for six months with esophageal changes that usually precede cancer. All patients daily consumed 60 g of freeze-dried strawberries. As a result, 30 out of 36 people showed significant improvements. Scientists attribute this effect to the action of antioxidants, which reduce inflammation and slow down the division of cancer cells <sup>[7]</sup>.

Promising results from a Spanish-Italian study were recently published that examined the effects of strawberry extract on the development of breast cancer in women. So far, the experiment has only been conducted on animals, but the scientists confirmed that the mice whose diet contained the berry supplement had much smaller tumors than those animals that did not receive it. In addition, phenolic compounds, which cause such an effect, also inhibited the spread of metastases <sup>[8]</sup>. Note that the concentration of phenols in strawberries may vary depending on the variety.

Another group of researchers from Italy and Spain was studying strawberries in terms of their effect on blood counts. Their experiment involved 23 volunteers who had previously taken a blood test. For a month, they consumed 500 g of strawberries daily. After 1 month, they again donated blood for analysis. The results of all participants showed a significant reduction in "bad" cholesterol and maintenance of "good" cholesterol levels. In addition, lipid profiles improved and levels of antioxidant

biomarkers increased. 15 days after removing strawberries from the diet, the indicators returned to their original positions. Scientists believe that this effect is due to the activity of anthocyanins <sup>[9]</sup>.

A joint study of American and British scientists, which lasted 18 years, demonstrated the effectiveness of strawberries and blueberries in preventing heart attacks in women. 93,600 volunteers aged 25 to 42 filled out a questionnaire about their diet and physical condition every 4 years. It turned out that over 18 years, 406 heart attacks were recorded among these women, but among those who regularly consumed strawberries and blueberries, the number of attacks was 32% less.

Despite the fact that this experiment did not take into account additional factors, such as age, heredity, body weight, the presence of bad habits, etc., scientists came to the conclusion that eating these berries 3 times a week contributes to a significant reduction in the risk of cardiovascular diseases. in general and heart attack in particular <sup>[10]</sup>.

A team of Serbian, Italian and Spanish researchers conducted experiments on rats, trying to find out whether the introduction of strawberry extract on the condition of the gastric mucosa, especially after drinking alcohol. As a result of the experiment, it was concluded that strawberry extract (at the rate of 40 mg per 1 kg of animal weight) not only improves the condition of the gastric mucosa, thanks to its antioxidants, but also activates the body's enzymes.

Moreover, in those rodents that received berry extract for 10 days before drinking alcohol, there was a much less intensive development of peptic ulcer in comparison with those animals that did not receive it <sup>[11]</sup>.

### Strawberry Weight Regulation

100 g of strawberries contain only 32 kcal, so they are often included in various diets, and sometimes they even become a staple. However, the dietary charm of this berry is not only in its low calorie content, but also in the fact that it supplies the body with the fiber necessary to improve the digestion process. In addition, strawberries provide the body with a powerful vitamin and mineral complex.

However, nutritionists still categorically do not recommend making a diet of berries alone and sit down on the so-called strawberry mono -diet. First, it is an allergenic product. Secondly, strawberries are high in acids, which can put a lot of stress on the kidneys.

It is best to develop a balanced diet, in which, in addition to the strawberries themselves, there will be carbohydrates (fruits, greens, potatoes, oatmeal, whole grain bread) and proteins (chicken, turkey, fish, kefir, milk, cottage cheese, low-fat yogurt). All flour products, sugar and fats of animal origin (sausage, lard, fatty meat, cream, butter, etc.) fall under the ban. Strawberries are consumed at 600-700 g per day.

Indicative menu that can be adjusted according to your needs and taste:

- **Breakfast:** mix strawberries with banana, apple and season with low-fat yogurt or spread strawberry-curd mixture on two slices of bread;
- **Dinner:** mix boiled asparagus with chicken / turkey fillet, strawberries, cucumber and parsley, season with olive oil and lemon juice, sprinkle with pine nuts or stew sea fish with beets, carrots and onions, and then eat strawberries with banana and low-fat yogurt;
- **Dinner:** mix a few potatoes with celery sprigs, onions, low-fat cottage cheese, strawberries and season with low-fat yogurt and lemon juice or boil potatoes with carrots and cauliflower, and for dessert a slice of bread with strawberry-curd spread.

For **second breakfast** and **lunch** , you can make oatmeal with strawberries and low-fat yogurt, strawberries with kefir, or a strawberry-banana milkshake.

### **Strawberries in cooking**

Strawberries can be found in almost every cuisine in the world. We traditionally use it as a separate dessert or serve it with ice cream, cream, yogurt, waffles, pancakes. Chocolate-covered strawberries are also popular, and at home, people usually eat strawberries with sugar. These berries are often used to make fillings for pies, pies and cakes. In addition, strawberry-based drinks (juices, lemonades, smoothies , cocktails, etc.) are popular with us.

However, in other countries there are other traditions of using strawberries in cooking. For example, in addition to sweet dishes, these berries go well with seafood and poultry. They also go well with lettuce, arugula , spinach, cucumber, avocado, cheese, pine nuts, so they are often added to salads. As a dressing, olive oil with lemon juice is usually used. These berries are also used to make a delicious strawberry-wine sauce, and they are also added to Spanish cold gazpacho soup . In China, they even released a series of strawberry-flavored chips.

Italians who are obsessed with pasta came up with a recipe in which pasta dough is kneaded with strawberries. If you like experiments, then preparing such a dish is not difficult at all. For the dough you will need: 2 cups flour, 1 cup fresh strawberry juice, 2 eggs, 1 tablespoon olive oil, 1 teaspoon honey, salt, pepper. The dough should be thick, then it needs to be rolled out as thinly as possible, and then cut into strips. It is best to boil such a pasta in milk.

Quite interesting in taste is an appetizer of strawberries with black pepper and spices. For cooking, you need 300 g of strawberries, 50 g of butter, spices and pepper to taste. The berries are cut in half, sprinkled with spices and sent to the oil heated in a pan for 3 minutes.

Note that nutritionists recommend combining strawberries with dairy products (especially if you eat them in large portions), since the calcium contained there can help neutralize excess acids that enter the body from berries.

### **Strawberries in cosmetology**

The cosmetology market is full of products containing strawberry extract. We are talking about cleansing creams, lotions, face masks, moisturizing hand creams, shampoos and balms. Given that strawberries produce a whitening effect, they are often used in brightening masks.

Spanish and Italian scientists have conducted research that gives hope for an effective sunscreen based on strawberries. In the lab, they placed the berry extract on human skin cells and exposed them to ultraviolet light equivalent to 90 minutes of sun exposure in the summer. The extract was found to have a protective function and reduce DNA damage. Scientists hope that the new tool will help protect the skin from ultraviolet radiation, prolonged exposure to which causes the development of various skin diseases, including cancer. <sup>[12]</sup>.

By the way, strawberries are often used in case of sunburn. The berries are mashed and applied to the affected areas of the skin in order to relieve discomfort and help the skin recover faster.

The most popular use of berries in home cosmetology is the preparation of face masks. Usually they are applied for 15-20 minutes, and then washed off with warm water or chamomile tea. For dry skin, the following options are recommended:

- 1 egg yolk, 1 teaspoon olive oil, 1 teaspoon sour cream. To give a thicker consistency, you can add brown bread crumbs. This mask should have a tonic effect.
- 1 teaspoon strawberry puree, 1 teaspoon sour cream, 1 teaspoon starch and 1 teaspoon almond oil. This mask makes the skin more elastic and nourishes it.

When caring for oily skin, the following recipes may suit you:

- 1.5 tablespoons strawberry puree and 1 egg white. This mask eliminates excess fat and helps fight blackheads.
- 2 tablespoons of strawberry puree and half a tablespoon of white clay. The mask refreshes and dries the skin.

If you are the owner of combination skin, then this mask should suit you:

- 1 teaspoon low-fat smooth cottage cheese, 1 teaspoon strawberry puree, 1 teaspoon cream and 1 teaspoon olive oil. This remedy nourishes the skin and restores the sebaceous glands.

If you have a normal skin type, then instead of masks, you can use strawberry water. To prepare it, you need to take 100 g of berries, turn them into puree and pour 1 glass of warm boiled water. After 30 minutes, strain and apply the liquid to a cleansed face with a cotton pad.

### **Dangerous properties of strawberries and contraindications**

Strawberries, like any other product, are beneficial if you follow the measure in its use. Do not rush to eat the first berries. Of course, there are early ripening varieties of this plant, but, unfortunately, strawberries are often subjected to aggressive chemical treatment to speed up their ripening.

Note that this berry is a strong allergen, so it was not previously recommended to give it to children at an early age. However, now experts believe that the earlier children come into contact with allergenic products, the less likely they are to develop allergies. Naturally, you should start with small portions and monitor the reaction of the body. Also, modern experts consider unfounded warnings against the use of strawberries by pregnant women. If you did not have allergies before pregnancy, then a moderate portion of berries will not bring any harm.

But still, it is recommended to exclude strawberries from the diet when:

- cystitis and inflammation of the bladder;
- exacerbation of an ulcer;
- gastritis with high acidity;
- attacks of gout;

You should also limit the use of strawberries while taking enalapril -based antihypertensive drugs , since the combination of the drug with strawberries will increase the burden on the kidneys.

### **Interesting Facts**

- Rounded or cone -like fruits, which we are accustomed to consider as strawberries, from a botanical point of view, are the receptacle of the plant, and the real fruits are small yellow grains, the so-called nuts. However, if we use the usual terminology, then the largest strawberry in the world was grown by the Japanese farmer Koji Nakao . Scientists believe that the weight of 250 g of the berry was achieved due to mutations that occurred as a result of too low temperature effects <sup>[13]</sup> .



- Impressive with its size is a 100-kilogram pie with strawberry filling, which, according to tradition, is prepared annually at a festival dedicated to this berry in Baikal'sk. A monument to strawberries was recently opened here. Large-scale strawberry festivals and holidays are also held in Balakovo (Russia) and Plant City (Florida, USA), and a corresponding thematic museum has opened in Belgium.
- Strawberries and cream are a traditional treat for fans at Wimbledon. During this Grand Slam tennis tournament, berries harvested in Kent are delivered early in the morning to the arena where the competition takes place. There they are cleaned, laid out in transparent bowls and poured with cream. According to the organizers, during the tournament (2 weeks) tennis fans eat about 28 tons of strawberries under 7000 liters of cream.
- The image of strawberries in general has deeply entered into all spheres of public life, especially those associated with romance. The well-known Turkish melodramatic series, which is called "Strawberry Aroma", tells the story of the love of a girl who dreams of becoming a confectioner and an enviable wealthy groom. It was strawberries as a "berry of love" that became a symbol of the relationship of young people. Various dream books describe the appearance of strawberries in a dream in a similar way. In particular, Wangi's dream book believes that berries dream of realizing "tempting pleasures", and eating strawberries - to complete harmony in love.
- The real results of odor research in the field of romantic and sexual attachments are not so unambiguous and depend on many concomitant factors. A Chicago study by Dr. A. Hirsch, a neurologist, shows that men who have had frequent sex during the current month perceive the smell of strawberries as more preferable compared to men who have not had sex during this time <sup>[14]</sup>.

### **How to choose and how to store strawberries**

There are no special secrets for choosing fresh strawberries. It is necessary to smell the berries, they must exude aroma. They should also not have external damage and brown spots. The berry should be elastic and not wrinkled. The color is red without white areas that indicate immaturity. You should also take strawberries with green tails, otherwise they will quickly release the juice.

Berries are a perishable product that should be stored in the refrigerator for no longer than 3 days. If you want to make preparations for the winter, then the most useful for the body will be frozen berries, which retain almost all the useful elements. Now the method of open freezing is popular, when you wash the berries, peel them from the tails, put them on a board or tray in one layer and send them to the freezer. When the strawberries are frozen, they can be transferred to a container or bag.

There are also traditional methods of preserving and processing strawberries into jams and compotes. However, when cooked, strawberries lose all of their vitamin C and many other nutrients. Many do not process strawberries, but grind them fresh with sugar in a ratio of 2 to 1. However, such an amount of granulated sugar eliminates the usefulness of the berries. It is better to dry strawberries at a temperature not exceeding 50 degrees. This will save most of the vitamin and mineral complex.

Note that in our time, making preparations for the winter is optional, because fresh berries can be enjoyed all year round. Even in the off season, strawberries brought from China, Turkey, Armenia, and Egypt are on the shelves. True, often such berries do not have the usual aroma and taste, many consider them "plastic". The thing is that large retail chains specifically make orders to breeders for breeding varieties that bring large yields and can be stored for a long time during transportation. These berries differ in taste and smell, but the composition of useful properties in most cases remains intact.

A few words should also be said about the chemical processing that strawberries undergo. The one that is imported to us from abroad is placed in special chambers before transportation, where the concentration of carbon dioxide is increased by 250 times. Thus, metabolic processes in the berry slow down, although this does not cause much harm, and even helps to retain more minerals. However, almost any strawberry is processed during flowering and ripening, and, I must say, the berry absorbs pesticides and nitrates very easily.

There are many ways on the Internet to find out at home whether berries have been chemically treated. However, according to scientists, all these methods are absolutely non-working, because micrograms of harmful substances get into each berry and this does not affect its physical properties (aroma, density, juice release rate, etc.). Reliable results can only be obtained in laboratory conditions.

## **Growing features**

Before talking about the features of growing strawberries, it is necessary to understand what kind of berries we are talking about. Initially, the names "forest strawberries" or "garden strawberries" were called the spherical fruits of green strawberries or garden strawberries, however, in the scientific classification, the name "strawberries" was assigned to the berries of nutmeg strawberries. According to botanists, their main difference is that strawberries (muscat strawberries) have dioecious flower stalks, that is, there are bushes with male and female flowering, and for strawberries (green and garden), the male pollinator is in the flower itself.

The same story is with the name "Victoria", which has long been in use to refer to a variety of garden strawberries, which used to be called strawberries. Due to the confusion that has arisen, Victoria is now called the fruits of nutmeg strawberries.

If we talk about the most favorable place for planting strawberries, then these are flat areas of soil, well lit and at the same time closed from the wind. The plant does not like drought, but it does not tolerate stagnant water well. To get a good harvest, experienced gardeners recommend changing the planting site approximately every 3 years. It is best to plant berries after peas or early vegetables, but after cucumbers and onions, they are not advised.

Strawberries are usually planted in late summer or early autumn. You can also transfer strawberry seedlings to the soil in early spring, but this should not be delayed. The plant propagates thanks to the "antennae" - shoots emerging from the lateral buds. When leaves with adventitious roots form on them, they are carefully separated and transplanted. The best strawberry seedlings are obtained from two-year-old bushes. You can also grow planting material from strawberry seeds. First, they are mixed with wet sand, and a month later, when 1-2 leaves appear, the seedlings are transplanted into pots.

Strawberry care includes mandatory measures to remove weeds, as well as maintaining soil moisture. Before flowering, "rain watering" is allowed, but with the advent of flowers and berries, it is better not to allow water to come into contact with the ground part of the plant. In heavy rains, bushes are even advised to cover with a film. In the spring, it is recommended to fertilize strawberries with mineral fertilizers.

Recently, planting strawberry bushes under agrofiber has become popular. This polypropylene material is non-toxic, breathable, protects the soil from drying out and waterlogging, excludes the contact of berries with the soil, which makes them clean and prevents the development of fungal diseases. Another equally popular way is to grow strawberries in PVC pipes (both horizontally and vertically). This method saves planting space, creates mobility (the pipe can be easily moved) and allows you to get a clean crop.

Moreover, now there are many ways to grow berries right in the apartments. In order for strawberries to take root on the balcony and not stop blooming, it is best to choose remontant varieties that can produce crops several times a season. It is also important to choose the right soil mixture (sand, humus, coniferous earth in equal amounts). It is recommended to plant strawberries in pots of at least 3 liters in volume.

By the way, now the Internet is actively advertising a set of miracle buttocks "Fabulous Collection" for year-round growing strawberries on the windowsill. Manufacturers offer to buy a complex consisting of seeds and specially prepared soil. According to them, the first harvest can be obtained within 3 weeks after planting, and in the future, the bush will bring up to 10 kg of berries. Judging by the reviews of people who have tried this "miracle set", the advertising description is absolutely untrue, and these homemade strawberries often do not produce a harvest not only after 3 weeks, but also after several months.

### Strawberry varieties

Among the most popular varieties of remontant strawberries are the following:

- **Chamora turusi** - large fleshy berries of dark red color, rounded-comb shape. It tolerates cold well, but is unstable to drought.
- **Lorde** is a remontant frost -resistant variety that usually produces large berries that are bright red in color and round-conical in shape.
- **Albion** - cone-shaped berries of bright red color with a characteristic glossy sheen. A whimsical variety that does not tolerate extreme heat, is unstable to frost, and with an excess of moisture gives too watery berries.
- **Alba** - large berries of an elongated conical shape, characterized by special juiciness and sweet and sour taste. They tolerate drought and cold well, and are also suitable for transportation.
- **Giant** - large round-conical berries with a bright strawberry aroma. Refers to high-yielding varieties. Seedlings are relatively unpretentious, but like regular watering.

So, the importance of strawberries for the body is difficult to overestimate, because, in addition to a large dose of vitamin C, it contains many minerals and antioxidants. In addition, the berry is a dietary product that is suitable for diabetics and for those who simply follow their figure. Moreover, it is increasingly becoming the object of scientific research and, according to scientists, can be used to develop new drugs.

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### **Strawberry - useful properties, composition and contraindications**

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

*Alena Tarantul*, nutritionist

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

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**Abstract.** The article discusses the main properties of strawberries 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 berries are indicated, the use of strawberries in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of strawberries on the human body under certain medical conditions and diseases are analyzed separately. Considered scientific basics diets With her application.