

Journal of Healthy Nutrition and Dietetics

In issue:



Lemon



Garlic



Ginger



Buckwheat

A detailed description of the useful, healing and dangerous properties of each product



Vitamin B12

Top 20 foods rich in vitamin, why the body needs it, daily requirement, signs of deficiency and excess

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Lemon

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

Keywords: lemon, beneficial properties, potentially dangerous effects, side effects, contraindications, diets

Beneficial features

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

Main substances (g / 100 g):	Fresh lemon contains [1]
Water	88.98
Carbohydrates	9.32
Squirrels	1.1
Fats	0.3
Calories (kcal)	29
Minerals (mg/100 g):	
Potassium	138
Calcium	26
Phosphorus	16
Magnesium	eight
Sodium	2
Vitamins (mg/100 g):	
Vitamin C	53
Vitamin B4	5.1

Vitamin B5	0.19
Vitamin E	0.15
Vitamin B6	0.08

The pulp of lemon fruits contains citric and ascorbic acids, sugars, vitamins A, B1 and B2, flavonoids, coumarin derivatives, sesquiterpenes, pectins, potassium and copper salts. Lemon peel contains essential oil and flavonoids. The main constituents of the essential oil are the terpene limonene and the aldehyde citral.

Lemons contain 7.1% carbohydrates in the form of sugars. The latter are dominated by fructose and glucose, which are easily digested. The amount of pectins in the peel is 16% of dry matter, and in the pulp - 11%. The predominant fruit acid is citric acid. The acidity of fruits harvested in late autumn increases to 8%, the acidity of fruits picked in spring (April) ranges from 4% to 5%. Essential oils contained in the peel have a powerful bactericidal effect. The content of mineral salts (especially potassium) is high in lemons. Vitamin C is found in lemon fruits in a stable form, i.e. Lemon juice, which is heated for 5 minutes to boiling point, practically does not lose the initial amount of vitamin C (therefore, the benefits of lemon in combination even with very hot tea do not decrease).

In medicine

The increased content of vitamins in fruits determines the medicinal properties of lemon. Lemons (in its natural form, with tea, in the form of juice diluted with water) are prescribed for a lack of vitamins A and B, fever, mineral metabolism disorders, kidney stones, gout and rheumatism. Externally, lemon juice, diluted with water, is used for rinsing in inflammatory processes in the oral cavity and pharynx. With nausea and vomiting accompanying toxicosis of pregnant women, a freshly cut lemon is applied to the cavity between the mammary glands, using it as a retractor. With comedones, wipe the face with a slice of fresh lemon (before that, make a steam bath for the face). Lemon essential oil is used to improve the taste and smell of many medicines. ^[3,8]

In folk medicine

- With seborrhea, a face mask is used: one egg white is beaten with a teaspoon of lemon juice and applied evenly to the skin. Wash off with warm water after half an hour. The frequency of use of this remedy is once or twice a week.
- With hypoacid gastritis (which is characterized by low acidity), a recipe is useful: 250 g of yogurt is mixed with one grated lemon and egg yolk. Take 3 tablespoons three times a day before meals. The course of treatment is no more than 5 days.
- For constipation, combine the juice of one lemon with 400 ml of water and add honey to taste. Drink the drug daily on an empty stomach, about an hour before the first meal.
- To improve intestinal motility and eliminate constipation, a decoction is also advised: boil 300 g of figs in 4 liters of water until the amount of water decreases to 3 liters. Add the slightly boiled and mashed zest of one lemon to the boiled composition. Take the composition in an amount of approximately 200 ml several times a day, with a break of 3-4 hours.
- With an exacerbation of gallstone disease, a "cocktail" helps: dilute the juice of one lemon with 200 ml of water and add half a teaspoon of soda. Drink it all in one go after meals.
- With cholecystitis, the following course of treatment is recommended. Melt 0.3 kg of honey in a water bath and mix with two crushed lemons, from which the "pits" were previously removed. Leave the mixture in a dark place for 3 days. Take the composition on an empty stomach for 10 days, 3 tablespoons, diluting them in a glass of cold water.
- For gout, grind 3 large lemons, peeled from seeds, in a meat grinder and mix with finely chopped garlic (2 small heads) and pour all 1.5 liters of boiling water. Boil the mixture for

about 10 minutes and then insist for 3 days. Strain and take a tablespoon twice a day, after meals. The course of treatment is from one to two months.

- For hypertension, the composition is used: half a lemon and an orange (along with the peel and seeds) are crushed with a meat grinder and mixed with a teaspoon of granulated sugar. Store in the refrigerator and take 0.5 teaspoon four times a day after meals.
- For arthritis, a course of treatment is prescribed for a month: peel the shells of 7 boiled eggs from the films and boil for 5 minutes, then crush. Combine the eggshell with the juice of 7 lemons and soak the infusion for a week. Strain and add 400 mg of honey and chopped garlic (5 heads) to the mixture. Infuse the composition in a dark place for 7 days. Take once a day, in the middle of the day, after meals, dividing one dose of 4 teaspoons into 4 stages, each with a break of 10 minutes.
- A proven folk remedy helps with tuberculosis: 4 whole raw eggs are placed in a glass jar and poured with the juice of one large lemon. The jar is closed, wrapped in paper and kept for a week until the eggshell is completely dissolved. Then the egg-lemon mixture is poured with vodka (the jar is filled to the top). Take the infusion for a month, a tablespoon three times a day after each meal.
- For bronchitis, the following recipe is used as an expectorant: bake 4 lemons in the oven at medium temperature until softened, let cool. Mash the lemons with a spoon, squeeze out the juice and mix the juice with the pulp with 400 ml of boiling water, 3 tablespoons of red wine and 4 tablespoons of honey. Drink the composition in one go.
- With hoarseness, a debilitating cough and loss of voice, a decoction is useful: mix the juice of 0.5 kg of carrots with a tablespoon of sugar and the zest of one lemon, bring to a boil and cook over low heat for an hour, boiling until the volume is reduced by half. Take 0.5 tablespoon every 2 hours throughout the day.
- Angina is treated with a drink: 250 ml of hot milk is mixed with the juice of one lemon and 2 tablespoons of honey. Drink hot, in small sips.
- General tonic based on lemons, especially useful after suffering a debilitating flu: Grate 10 large lemons together with the zest on a coarse grater, lightly knead the grated lemon mass with a spoon, add 5 cups of liquid honey and 10 small heads of chopped garlic. Mix all the ingredients, insist in a warm place for 7 days. Take 4 teaspoons daily.

Externally:

- When sweating hands, use the composition: glycerin, lemon juice and vodka are mixed in a ratio of 0.5: 0.25: 0.25. This mixture is generously lubricated hands after each wash. Lemon juice is also recommended to wipe the feet with excessive sweating.
- Brittle nails are strengthened by systematic rubbing using a slice of lemon.
- Rough skin on the heels is treated with compresses from the peel of a squeezed lemon.
- To the calluses on the legs (previously steamed in hot water), apply the top of a lemon, cut off with a small amount of pulp. The lemon top is pressed tightly against the corn, fixed with a bandage and left overnight. ^[2,8]

in oriental medicine

Avicenna used freshly squeezed lemon juice in the treatment of patients with heart disease. The healer also practiced the use of lemon for jaundice, toxicosis in pregnant women.

In ancient Chinese medicine, lemons were used to heal wounds, pneumonia, and scurvy.

In the countries of Asia Minor and the Middle East, lemon was an indispensable ingredient in many dishes: in this way, cholera was prevented.

In scientific research

The healing properties of lemon were described in his scientific works by the Armenian scientist, naturalist and doctor Amirdovlat Amasiatsi (15th century).

At the beginning of the 20th century, two major studies on lemon juice treatment were simultaneously published by L. Gdanský and K. Drexler. The books were published in 1910 in Pskov and St. Petersburg, respectively.

In modern science, interest in the medical potential of the famous citrus remains. The effect of daily consumption of lemons (in the direction of improving performance) on blood pressure is highlighted in the work of Japanese researchers Y. Kato, T. Domoto, M. Hiramitsu and others.

The European Nutrition Herald published the results of a study by Dutch scientists on the chemical composition of lemon peel and its use in cholesterol-lowering products (2002).

Indian researchers have proposed data on the substance hesperidin (extracted from lemons), which restores liver function (2005).^[9,10]

Weight regulation

How to use lemon for weight loss? Nutritionists offer a lot of recipes aimed at cleansing the body of toxins and toxins, accelerating metabolism: the systematic use of water with lemon juice, a honey-lemon diet, the aromatic effect of essential lemon oil (according to the Alan Hirsch system). Back in the 19th century, Johann Schroth proposed a scheme for detoxifying the body with lemons (using fresh lemon juice).

In cooking

The pronounced taste and aroma of lemons are appreciated by chefs and gourmets. Lemon zest is added to pastries, puddings, pastry cream; marmalade, jam, ice cream, candied fruits are prepared from lemons. Lemon juice is used as a marinade in the preparation of meat and fish; add juice to dressings for vegetable and fruit salads. Sauces are prepared on the basis of lemons; salted lemons are one of the traditional national dishes of Moroccan cuisine. Fresh sliced lemon is served as an appetizer to a range of alcoholic drinks.^[9]

In cosmetology

For the preparation of lemon-based cosmetics, use the peel, zest, lemon pulp, lemon juice or lemon essential oil.

Lemon for the face

- Skin prone to comedones is helped by rubbing with lemon juice. First you need to steam your face over a steam bath.
- For oily skin with enlarged pores, rubbing with the composition is useful: combine beaten egg white, 100 ml of vodka and juice of one lemon.
- Mask for oily skin prone to acne: dilute 2 tablespoons of white clay (in powder) in 2 tablespoons of alcohol, add 15 drops of lemon juice. Keep the mask on your face for a quarter of an hour and rinse with cold water.
- For normal or sensitive skin, a homemade lotion is prepared: the juice of half a lemon is mixed with a teaspoon of glycerin and a quarter cup of water.

- Mask for whitening freckles with dry skin: mix lemon juice, cream and hydrogen peroxide (5%) in equal proportions. Apply to face with a cotton swab and rinse with warm water after half an hour.
- Nourishing milk for dry skin: mix 200 ml of fresh cream, 1 beaten egg, 100 ml of vodka, juice of one lemon and a teaspoon of glycerin. Rub everything thoroughly and wipe the face and décolleté area with the composition before going to bed.
- Nourishing mask for dry skin: prepare flour from dried lemon peel by grinding the peel in a coffee grinder. Mix a teaspoon of this lemon flour, egg yolk and sour cream. Hold the mask for 20 minutes, applying to the face and neck.
- Mask "Madame Pompadour" for dry skin: grate one lemon on a plastic grater, pour 100 ml of alcohol, let stand, then strain and combine with a glass of sour cream or cream, one beaten egg white and a teaspoon of glycerin. Apply to the face for a quarter of an hour, and then gently remove the remnants of the mask with a cotton pad.
- Tonic for any skin type: mix 2 tablespoons of boiled water, a teaspoon of honey and the juice of half a lemon. Wash your face before going to bed.
- Tonic face mask: mix a tablespoon of oatmeal or wheat flour with a little milk (bring to a mushy state) and add the juice of half a lemon. Apply the mixture on the skin of the face and neck and wash off after half an hour with warm water.

Lemon for hair

- For oily skin and increased greasiness of the hair, it is useful to rub a composition of 2 parts of lemon and one part of carrot juice into the scalp before washing. Wrap your head with a towel, keep the composition on your hair for at least an hour. Rinse your hair after washing with water with lemon juice (a tablespoon of juice per 1.5 liters of water).
- For dandruff, rinse your hair after washing with a prepared decoction: boil the peel of 4 lemons for a quarter of an hour in a liter of water.
- Mask for dry and split ends: mix an egg yolk with a little warm water, add a tablespoon of lemon juice and vegetable oil. ^[3]

Combination with other products

The sourness of the lemon favorably sets off the taste of vegetable and fruit salads, in which lemon juice is used as a dressing. Lemon goes well with fish and seafood: mussels, oysters, shrimps.

Beverages

Lemon juice is used to make lemonade, alcoholic and non-alcoholic cocktails, liquors, the traditional limoncello drink . Kissel is boiled from lemon zest and juice; in drinks, lemon juice works great paired with honey, cinnamon, mint, and sweet fruit juices.

How to make lemonade at home? Remove peel and seeds from lemons and squeeze out 600 ml of juice. Pour 300 g of powdered sugar into lemon juice and mix thoroughly until completely dissolved. Fill glasses three-quarters full with crushed ice, pour over sweet lemon juice and garnish with fresh mint leaves.

Other uses

- Lemon is a natural stain remover. With a mixture of lemon juice and salt, rub and wash the stains on white linen before the main wash (after allowing the composition to dry). A slice of

lemon, generously flavored with salt, perfectly cleans copper and makes it shine. Lemon juice cleans hands from dirt and stains left after working in the kitchen.

- From lemons, pieces of copper wire and galvanized nails, you can assemble a lemon battery, the “power” of which is quite enough to run a standard watch. The principle of operation of such a battery is a chemical reaction resulting from the contact of the acid contained in lemon juice, copper and zinc.
- Lemon can be used to quickly and easily clean your microwave. The zest of one lemon is poured into 500 ml of water and left in the microwave for 2 minutes, turning it on at full power. After that, it remains only to thoroughly wipe the microwave from the inside with a damp sponge: lemon essential oil, as it were, “dissolves” even the most inveterate contaminants.
- You can get rid of yellowness on the teeth, which arose as a result of prolonged smoking, using lemon juice. On a damp toothbrush, apply a small amount of baking soda and 3 drops of lemon juice and massage your teeth with this composition.
- A good protection against mosquito bites is the following method: exposed areas of the body should be wiped with lemon juice. This will reduce the irritation from bites and prevent the appearance of new ones.
- Essential oil of lemon is an effective tool in aromatherapy, characterized by tonic, antiseptic and other properties. ^[9]

Dangerous properties of lemon and contraindications

Given the significant amount of citric acid contained in fruits, lemons should be limited or completely excluded from the diet for diseases of the stomach, liver, intestinal tract, gallbladder, biliary tract, pancreas (acute or chronic pancreatitis), with gastroesophageal reflux.

Lemon applications during cosmetic procedures outdoors in direct sunlight can cause a painful burn (to a greater extent this applies to people with fair and sensitive skin). In some cases, after using lemon-based products, an acute allergic reaction may occur. ^[8,14]

It must be remembered that irrational or excessive use of lemons can harm even an absolutely healthy person.

Botanical description

It is the fruit of an evergreen tree plant representing the genus *Citrus* , family *Rutaceae* . Among the whole variety of citrus fruits, lemon is, if not the most popular, then, undoubtedly, one of the most useful and significant fruits in terms of medicinal properties, second only to orange in the vitamin rating.

origin of name

The word " *lemon* " according to one of the existing versions is borrowed from the Italian language (" *limone* "), and the Italian name of the fruit, in turn, is the result of the assimilation of the Persian " *limun* " (meaning any citrus fruit among the Persians).

Story

It is difficult to reliably determine the homeland of lemons. There are suggestions that in ancient times they were grown in northeastern India, northern Burma and China. Studies of the lemon's genetic code indicate that it is a hybrid of earlier citrus fruits from a historical point of view: citron and bitter orange. Lemons first came to Europe (south of modern Italy) as early as the 2nd century AD. (although they became widespread much later) thanks to the external trading activities of Ancient Rome. In

parallel with these events, the lemon was distributed in Persia, Iraq, and Egypt. In a 10th century Arabic treatise on agriculture, there is information about the lemon, which was cultivated not only as a food product, but also as an ornamental plant. In the 9th century, as a result of the conquests and the aggressive policy of the Moors, lemons began to be grown in southern Spain, Sicily. Thus, the lemon conquered the Mediterranean and Arab regions. The production of lemons on a large scale began in Genoa in the middle of the 15th century. Lemon came to America thanks to Columbus, where, centuries later, it took root perfectly due to the optimal climatic conditions in Florida and California.

Lemon arrived in Russia along with Dutch suppliers and merchants: in the second half of the 17th century, seedlings of lemon trees were delivered to the royal court. The citrus crop was recognized as so valuable and rare that even a special position was introduced at the court - the "caretaker of lemons". The second wave of popularity of lemons swept the empire two centuries later, during the delivery of Georgian lemons to Russia. ^[1,2]

Varieties

The varietal variety of lemons is extremely large, the most popular and demanded varieties on the world market are:

- Novogruzinsky is a remontant variety (the tree blooms and bears fruit all year round). A popular variety characterized by high yield, almost complete absence of seeds in the fruit.
- "Pavlovsky" lemon - the variety is perfectly adapted to growing at home. Trees of this variety tolerate shading. The fruits are thin-skinned.
- 'Eureka', also known as 'Four Seasons'. Lemons of this variety grow almost all year round and are champions in the market in terms of popularity and quantity.
- Variety "Meyer" refers to thin-skinned varieties. More frost-resistant than other varieties, but also more demanding on transport conditions. It is not a common variety in a commercial sense. The cultivar was named after Frank Meyer (1908).
- «Yen Ben" and "Bush" are Australian varieties. Variety "Bush" grows wild in the subtropical zone of the mainland. 'Bush' is a thick-skinned variety popular in cooking.
- Sorrento is an Italian variety whose zest is traditionally used to make limoncello.

Other famous varieties: "Lisbon", "Maikop", "Verna".

Lemons are also conditionally divided into **sour varieties** (real), **sweet varieties** (whose pulp is sweet and juicy) and "**ponderose**" lemons (thick-skinned, with a lot of seeds). Lemons with a thick rind are used to make candied fruits.

By type of plant, lemons are divided into **bushy** (bushes up to 4 m high, fruits are formed at the ends of branches) and **tree-like** (trees up to 6 m high, with a dense crown, in the depth of which fruits are formed). ^[1,3]

Growing features

The site for planting lemon seedlings should be a place well lit and protected from the winds. It is recommended to plant trees of standard size with an interval of 3.5 to 7.5 m (dwarf trees are planted with a smaller interval - up to 2 m). The best soil option is loamy soil.

To grow a lemon from a stone, it is necessary to remove all seed-seeds from the fruit, soak them in water overnight, then plant them in moist soil in a pot to a depth of 1.2 cm. Wrap the pot with a plastic bag and leave it in a warm sunny place for seeds to germinate.

A few weeks after planting the seedlings, you can start top dressing with a mixture of citrus fertilizers. Top dressing is carried out further for several years. The watering schedule is systematic and slightly more than moderate. When growing citrus fruits, mulching is not recommended.

How to grow lemon at home? Meyer and Pavlovsky lemons are best suited for this. A lemon tree needs to be provided with enough lighting, heat and good drainage. You should also protect the plant from drafts, moisten the air in the room where the lemon grows, in the summer - put the pot with the tree in fresh air. In the cold season, you need to extend the daylight hours for the plant with the help of additional lighting. In favorable conditions, the lemon tree is able to bloom and bear fruit throughout the year. ^[four]

Selection and storage

Quality fruits are dense, with a smooth skin, there are no dents or dark spots on them. When warmed for a short time in warm hands, a lemon exudes an intense aroma inherent only in this citrus.

Lemons keep well in the refrigerator. Additional storage time is added by wrapping each fruit in clean paper and placing lemons wrapped in a plastic bag in a separate fruit and vegetable compartment.

Long-term storage reduces the acidity of fruits, since a significant amount of citric acid is transformed into sugars over time.

Prolongs the "life" of lemons by immersing them for seconds in moderately hot melted paraffin: this creates a protective layer covering the fruit. Lemons are well stored in boxes with sand, which is pre-calcined for the purpose of disinfection. ^[3]

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[An extended HTML version of the article](#) is available on the edaplus.info website.

Lemon - useful properties, composition and contraindications

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



Garlic

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

Keywords: garlic , useful properties, potentially dangerous effects, side effects, contraindications, diets

Beneficial features

Chemical composition and presence of nutrients

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

100 g of fresh garlic contains [5]:					
Main substances:	G	Minerals:	mg	Vitamins:	mg
Water	58.58	Potassium	401	Vitamin C	31.2
Carbohydrates	33.06	Calcium	181	Vitamin B6	1.235

Sugar	one	Phosphorus	153	Vitamin PP	0.700
Squirrels	6.36	Magnesium	25	Vitamin B1	0.200
Alimentary fiber	2.1	Sodium	17	Vitamin B2	0.110
Fats	0.50	Iron	1.7		
calories	149kcal	Zinc	1.16		

Garlic contains many useful substances and is a fairly high-calorie product. On the one hand, you should not worry about excess weight at all, because due to the pungency this vegetable is usually consumed in small quantities. On the other hand, it is considered a powerful appetite stimulant.

Medicinal properties

In addition to the presence in the composition of garlic of such important substances as potassium, calcium, phosphorus, vitamins B and C, it boasts a high content of selenium, manganese, iodine, sodium and essential oils. It is difficult to overestimate their importance for a person. So, for example, selenium protects the body from cancer and thanks to it, thyroid hormones are produced. Manganese is involved in a huge number of internal processes, and is also indispensable for the incorporation of calcium into bone tissue. Vitamin B6, among other things, affects the functioning of the central nervous system, namely, it contributes to the production of serotonin.

Moreover, garlic has components that make it special - phytoncides. These are volatile substances that help the plant fight against harmful microorganisms and some insects. Due to this, garlic provides bactericidal, anthelmintic and fungicidal effects.

The antiparasitic properties of the vegetable have been recorded by scientists from different parts of the world. That's just the experiments were carried out so far exclusively on mice and guppies. It is assumed that garlic should have a similar effect on the human body, but without consulting a doctor, it is better not to resort to such treatment, because an excess of phytoncides in the body can lead to serious poisoning.

As for colds, the results of the studies are encouraging. Scientists are sure that the volatile oils and essential oils contained in garlic have an antiviral and antibacterial effect. In one recent study, it was found that a group of people who regularly consumed garlic were three times less likely to catch a cold than those who did not consume garlic. Also, when using this vegetable, the duration of the disease turned out to be less.

Among other things, garlic has a positive effect on the cardiovascular system. Its regular use helps to stimulate hematopoiesis, as well as lower cholesterol and blood pressure (by an average of 5 mm Hg). According to research results, garlic increases fibrinolytic (antithrombotic) activity, which decreases with atherosclerosis and myocardial infarction ^[8].

The rate of blood flow to the genitals and pelvic organs of a man also depends on the condition of the arteries and blood vessels. And endurance largely depends on the ability to absorb oxygen transported by the blood. Since garlic actively affects both the processes of hematopoiesis, and the ability to absorb oxygen, and blood viscosity, its effect on sexual function in men should not be underestimated. In addition, this vegetable promotes the production of testosterone, which increases male libido.

Finally, modern biochemical studies have identified the organic compound alliin in the composition of garlic, which is located in the cytoplasm. When biting or cutting a clove of garlic, the integrity of the cells is broken and alliin reacts with the enzyme alliinase, located in the vacuoles, forming a sulfur-containing substance called allicin. It is allicin that gives garlic its sharpness and that notorious smell.

Interestingly, this element is not absorbed in the body, but is excreted by any means - with breathing, urine, sweat.

Despite this hard to get rid of smell, allicin may help prevent the risk of developing lung cancer. According to studies by Chinese scientists, eating a head of garlic twice a week reduces the risk of cancer by 44%, even in those people who are at risk (for example, smokers) ^[9]. Being a strong antioxidant, allicin kills tumor cells and reduces the likelihood of infectious processes in the oral cavity and on the mucous membranes of the respiratory tract.

In medicine

To date, the pharmaceutical market offers several herbal medicines based on garlic. First, it is a **natural dry powder of garlic bulbs in capsules**. It is indicated to drink it for hypertension, atherosclerosis, colds, dysbacteriosis, impotence, and also as a prevention of myocardial infarction. This drug is sometimes also taken as part of a comprehensive treatment for oncopathologies. The course of admission usually lasts 2-3 months.

Despite the fact that the drug is natural, it is necessary to consult a doctor before use.

Another common remedy is **garlic tincture**. It is usually taken for acute infectious and inflammatory diseases of the respiratory system (bronchitis, rhinitis, tonsillitis, sinusitis, pneumonia), atonic constipation, atherosclerosis, enterobiasis. In addition, the tincture is used externally for dermatitis, pyoderma or purulent wounds. It also helps to relieve itching, contributes to the fight against calluses and corns, has a depigmenting effect on the skin. The method and frequency of application of the tincture must be regulated by the doctor.

In folk medicine

Since ancient times, garlic has been known as a powerful healing agent, and the ancient Egyptians did not even eat it for some time, but used it exclusively to treat various diseases. Until now, in many countries of the world, garlic is one of the main components in traditional medicine recipes. For example, in India, asthma is treated with this vegetable, the French escape it from the flu, the Germans from tuberculosis. In Italy and Spain, traditional healers recommend using garlic to treat intestinal diseases, and Afghans find it useful for mild ailments and fatigue.

In our folk medicine, this vegetable is used in the treatment of a huge number of ailments, but the main thing to remember is that garlic is a spice, and not an independent food, and certainly not a self-sufficient medicine. It can be used for treatment in combination with other drugs and only with the approval of the doctor. Since garlic is a very caustic vegetable, care must be taken not to overdo it, otherwise you can get serious burns of the mucous membranes and skin. You should also remember that you need to be very careful when giving garlic to children. Even in the absence of allergies, a large amount of this vegetable can cause severe pain in the gastrointestinal tract.

The most popular among the people are prescriptions for cold medicines. So, traditional healers advise drinking garlic broth for coughs and sore throats. To prepare it, you need to bring 1 cup of water to a boil, add a quarter of a spoon of chopped garlic and boil for 5 minutes over low heat. Allow the broth to cool, strain it through cheesecloth and drink half a cup once a day.

With a cold, it is recommended to breathe infusion of garlic. To carry out such an inhalation, you need to crush a few cloves, pour a glass of water and keep on low heat for 20 minutes, inhaling the vapors.

Note that garlic beads, beloved by many grandmothers, from viruses, alas, do not save or cure. The only benefit from them is that they slightly, but still reduce the concentration of viral particles around a person in the first few hours of wearing the “decoration”.

According to traditional medicine recipes, garlic is also excellent for the treatment of poisoning. It is necessary to boil three cloves of garlic and a few small pieces of ginger in one liter of water for 10 minutes. It is necessary to prepare and drink the drug after the onset of the first bouts of nausea. However, it is strongly not recommended to get involved in such a drink.

In case of bites of wasps, bees or mosquitoes, traditional medicine has in store a recipe for garlic compresses. To do this, you need to grind a few cloves, mix them with a small amount of warm water and rinse the bite or wound with this mixture, and then make a compress from this liquid. You can also briefly apply cut teeth to the affected area, but this method can lead to skin burns.

To improve erectile function, men are advised to use garlic tincture. It is made at the rate of 1 kg of vegetable per 0.5 liter of vodka. Garlic must be crushed and poured with alcohol. Then tightly close and let it brew in a dark place for a week. After that, the mixture must be filtered through cheesecloth and taken 1 tablespoon three times a day.

You can also bring to a boil 200 ml of white wine with the addition of 3-4 crushed garlic cloves. After cooling, the liquid is poured into a glass bottle, closed and left in a dark place. Men need to take this medicine half an hour before meals, 1 teaspoon three times a day. Usually the course of treatment is three days, after which it is necessary to take a 10-day break and then repeat the procedure again for another three days.

in oriental medicine

In the traditional oriental classification of food, garlic belongs to the group of warm foods that improve metabolism and stimulate the digestive process. In China, this vegetable is used to treat diseases associated with the respiratory and gastrointestinal tract. He is also considered a good helper in the fight against rheumatism and beriberi. Moreover, garlic is used as a prevention of baldness.

In search of a remedy to prevent complications after severe burns, the Chinese physician Shu Rongish turned to ancient Chinese and ancient Greek herbalists, who helped him create a recipe for a raw burn ointment. The main task of this balm is to disinfect and restore the nutrition of damaged skin. The doctor does not reveal the secret of his recipe, but it is known that one of the main components of his remedy is garlic. In addition to it, there is also honey, salt and sesame seeds.

It is also interesting to note that in 1971, during research in Tibet, ancient clay tablets were found in a Buddhist temple. Having deciphered them, scientists discovered a recipe for rejuvenating the body, the main ingredient of which was garlic ^[6].

In scientific research

A recent medical study at Johns Hopkins University (USA) has revealed the effectiveness of garlic essential oil in the fight against Lyme disease. Despite the fact that conventional antibiotics can also cope with this disease, in 10-20% of cases, patients report the onset of symptoms (joint pain, fatigue, etc.) even after undergoing treatment. Scientists agree that dormant bacteria remain in the human body, which can be activated, for example, against the background of stressful situations. During the experiments, garlic essential oil killed pathogenic microorganisms within 7 days ^[10].

The beneficial effect of garlic on the functioning of the cardiovascular system was noted in studies in 2007 ^[11]. Then it was found that the interaction of the components of garlic with red blood cells leads to vasodilation, as well as a decrease in blood pressure. Continuing to study the mechanisms of garlic's effects on the body, scientists from the University of Los Angeles recently found that garlic extract successfully destroys soft plaque in the arteries in patients with metabolic syndrome, which causes arterial hypertension. In addition, the drug helps prevent heart attacks, as it slows down the formation of new plaques ^[12].

American scientists from Washington came to the conclusion that one of the components of garlic (diallyl sulfide) is many times more effective than antibiotics in the fight against the *Campylobacter* bacterium, which lives on the top layer of poultry meat and causes gastroenterological problems. Unlike antibiotics, diallyl sulfide easily penetrates the protective membrane of pathogenic bacteria and kills it. Scientists plan to develop a new drug for food poisoning, using this component as the main ^[13].

Also, researchers have long discovered the anti-cancer properties of some components of garlic ^[14]. Moreover, they concluded that heating in a microwave or heat treatment of a vegetable leads to a decrease in its anti-cancer activity. Scientists suggested cutting the cloves and leaving them for 10 minutes before cooking. Due to the violation of the integrity of the cells, during this time, a chemical reaction has time to occur in the garlic, which forms a substance that can have a destructive effect on cancer cells ^[15]. Interestingly, researchers have recently found benefits even from sprouted garlic. Its antioxidant capacity is superior to that of fresh heads ^[16].

Finally, at the University of California, Loma Linda, experiments were carried out with gamma irradiation of human leukocytes. Basically, the cells died from a large dose of radiation, but white blood cells cultivated in garlic extract retained their viability. As a result, the doctors who conducted the experiment came to the conclusion that garlic preparations are a good prevention for people interacting with equipment that emits ionizing radiation.

In cooking

Thanks to its spicy taste and characteristic smell, garlic is loved by cooks in many countries of the world. In Italian cuisine, for example, cooking almost any dish begins with a little olive oil dripped into a frying pan, a few cloves of garlic are put on it, they are fried for a short time so that they give off flavor, and then the main ingredients are added. Interestingly, in addition to the heads themselves, when preparing various dishes, it is quite possible to use the leaves and arrows of the plant.

One cannot ignore the fashionable culinary trend of recent years - black garlic. To the surprise of many, it turns out that this is not a special variety at all, but simply an unusual way of cooking. Garlic heads are exposed to high temperatures (about 40°C) for a long time (2-3 weeks). As a result, after a series of chemical reactions, the garlic bulbs begin to darken and become black. At the same time, they have a sweetish aftertaste, and they lose their characteristic garlic smell, while retaining almost all the properties of a fresh vegetable.

Note to fans of exotic dishes: in the town of Gilroy (USA) they sell garlic jam. This, of course, is not a dessert, but rather a sweet-spicy-spicy sauce that goes well with meat. You can also find unusual garlic ice cream here. They also sell roasted garlic in Gilroy. When exposed to high temperatures, the vegetable loses its sharpness and becomes very soft. Here it is served with meat or simply spread on bread.

As for the combination with other products, it is advised to combine garlic with whole grain cereals (oatmeal, buckwheat, wheat, etc.), which contain a lot of zinc and iron. Garlic contributes to a better

assimilation of these elements. Also, this vegetable is in harmony with parsley, cilantro, black pepper and watercress.

Finally, a few words about the unloved garlic smell, which is so difficult to get rid of after eating. As mentioned earlier, simply “chewing” this aroma with chewing gum will not work, since it leaves the body not only with breathing, but also with other secretions. However, scientists still came to the conclusion that animal fats can help to quickly drive away the obsessive odor from the body. For example, you can eat garlic with cheese or drink it with milk. Lemon, apple, and mint leaves may also help. In addition, garlic loses its smell during heat treatment.

In cosmetology

In professional cosmetology, garlic extracts and extracts are most often found in the composition of scalp care products and as a component responsible for the prevention of hair loss. Reviews of these funds are controversial, not giving a clear idea of their effectiveness. In home cosmetology, garlic is also actively used in the fight against acne (blackheads) and warts, sometimes it is part of moisturizing masks.

The expectations of professional and home cosmetologists are mainly related to the antibacterial effect of garlic, which, in this case, is justified, since one of the main causes of inflammatory acne skin disease is the vital activity of the *Propionibacterium bacterium. acnes*. Pathological changes that occur with the sebaceous glands and hair follicles create prerequisites for reducing the bactericidal action of sebum. Artificial disruption of clogged accumulations of pus under the epidermis leads to the spread of bacteria. In these cases, garlic comes to the rescue, presumably reducing the activity of microorganisms.

In home cosmetology, there are many recipes for acne based on garlic. One of them, for example, came from the traditional Bulgarian herbal practice. To prepare an alcohol extract, take one juicy garlic clove, grind it into gruel and pour vodka (alcohol) for 3-4 hours. The resulting lotion is filtered and applied pointwise 2-3 times a day to the places where acne foci appear.

The destruction of garlic cells (grinding into gruel) plays, in this case, a key role, since alliin, located in the cytoplasm, and the enzyme alliinase, located in the vacuoles, are combined in this process. Their interaction results in the organic compound allicin, which is associated with the bactericidal as well as fungicidal (antifungal) action of the product.

The ability of garlic to resist microorganisms gives rise to hopes for the effectiveness of this component in the composition of warts, which are most often benign formations, usually of viral etiology. The effectiveness of folk cosmetology here is regularly challenged by medicine, but this does not reduce the number of recipes for preparing a medical and cosmetic mixture. The essence of the recommendations is to regularly apply garlic juice to the wart 3-4 times a day until it disappears completely.

The cosmetic effect of garlic, judging by the number of recipes, should be especially noticeable in the fight against corns. Here are just a few recipes for preparing a mixture that must then be applied to corns:

- 3-4 slices are peeled, rubbed on a fine grater and added to the crushed plantain leaves. Then, to dilute, a few tablespoons of boiled milk and aloe juice are added.
- The garlic clove is boiled in milk and pounded in a mortar to a mushy state.
- A clove of garlic is baked in the oven, after which it is peeled and mixed with butter in a mashed form.

Regarding those recipes that involve heat treatment of garlic (baking, boiling in milk), it should be noted that the above-mentioned allicin has low thermal stability and quickly collapses when heated. In addition, it easily decomposes when mixed with alkalis.

Alternative uses

In the last decade, aquarium fish enthusiasts have begun to regularly discuss the use of garlic in the aquarium trade ^[19]. In particular, it was about the treatment of fish from little-known diseases that were caused by the mass importation of those inhabitants of aquariums that were kept in Asian farms and little was known about the conditions of transportation and treatment of which. The acquisition of parasite resistance to conventional drugs has created a need to find a new affordable means of prevention. The choice fell on garlic.

Since there has not been a systematic laboratory analysis of the effectiveness of garlic, amateur aquarists themselves have tested different dosages of garlic powder and juice of fresh bulbs at home. The result of almost all experiments was encouraging and, as a rule, was comparable with the effect of classical preparations on parasitic organisms. However, scattered experiments did not give clear ideas about the optimal dosage of the product and the choice of the form of supplementation (in the form of a whole head or garlic extract). Aquarists had to act at their own peril and risk, since exceeding the concentration could cause a violation of the biological balance and an increase in the oxidizability of the water.

Preliminary results indicated that garlic was more effective when added to food and limited effectiveness when infused with oil extracts, which "spots" remained on the surface and were more slowly destroyed when they reacted with active substances in the aquarium water.

Dangerous properties of garlic and contraindications

There is no doubt that garlic brings many benefits to the human body. However, do not forget about the other side of the medal. This vegetable has potent substances, an overabundance of which can lead to undesirable consequences and only aggravate the situation. When eating and especially treating garlic, you must be extremely careful and not abuse it. You should also limit the use of this vegetable in the following cases:

- on empty stomach;
- a week before the upcoming operation, as it affects blood clotting;
- with pancreatitis, cholelithiasis, liver diseases, since it strongly stimulates the digestive system and can lead to spasm and heartburn;
- with obesity, as it causes appetite;
- with epilepsy, as it can provoke an attack.

Botanical description

This is a perennial herbaceous plant, recently belonging to the Amaryllis family. Prior to the latest phylogenetic studies, it, along with other onions, constituted an independent family with the same name ^[1].

origin of name

In science, this vegetable is called the Latin phrase *allium. sativum* (lat. Garlic seed). However, the same word "allium" (lat. garlic) is used in science in a broader sense, covering the entire genus Onion, to which, in addition to garlic itself, wild garlic, onion, leeks, etc. belong. Scientists cannot

accurately determine the etymology of this word, but, according to one version, it came from " ala " (lat. wing) and implied the resemblance of a bird's wing to a clove of garlic.

Linguists-etymologists believe that the Russian name "garlic" is borrowed from the Proto-Slavic language and has a common root with the verb " česati " (Pra -Slav . *scratch, split, tear*). Most likely, the name implied the ability to split the head of garlic into cloves ^[2] .

Story

Researchers agree that the progenitor of garlic was a long-pointed onion, and its native home was the territory of Central Asia (mountainous regions of Uzbekistan, Tajikistan, Turkmenistan, northern Iran, Pakistan and Afghanistan) ^[3] . The exact time of cultivation of garlic is unknown, but it is considered one of the oldest vegetable crops in the world. Around 2600 BC The Sumerians on clay tablets compiled a list of dietary products, which included garlic.

Scientists believe that initially the interest of ancient civilizations in this vegetable was caused by its almost “magical” abilities to save neighboring crops from diseases and pests. For these properties, he was deified and worshiped. For example, in Egypt they believed that garlic is indispensable for maintaining the physical strength of a person. So, according to legend, the pharaoh ordered to provide each slave involved in the construction of the pyramids daily with a portion of this vegetable. Garlic is also mentioned many times in the famous ancient Egyptian medical treatise known as the Ebers Papyrus .

The ancient Greeks also appreciated it. Hippocrates used garlic with honey to treat lung disease. In addition, it was believed that this vegetable is a good means for increasing courage, as the famous playwright Aristophanes mentions in his comedies. In ancient Rome, garlic became famous for its ability to fight parasites in the intestines, and later legionaries began to wear it on their chests as a talisman. This vegetable, most likely, was brought to Russia in the 9th century from Byzantium.

In the Middle Ages, garlic occupied an unshakable position in the cuisine of the East and became an indispensable ingredient in the preparation of many local traditional dishes. It was also considered a good antibacterial agent and was recommended to seize muddy water with it. At the same time in Europe, garlic was considered a medicinal plant, and its healing properties became the basis for the emergence of many mysterious legends about the fight against evil spirits. Many doctors of those times considered the vegetable an effective remedy against the plague.

In the middle of the 19th century, the famous French chemist Louis Pasteur gave a powerful impetus to scientific research by first describing the antiseptic properties of garlic ^[7] . Leaving the cloves on a plate of bacteria, he soon discovered that there were no living microbes around the lobules. In this regard, garlic or garlic solution (which was called "Russian penicillin") was actively used in the fight against infections during the First World War.

Varieties

Unlike many other vegetables, garlic does not have a wide variety of varieties. Basically, in our area you can find heads consisting of white cloves, covered with light (sometimes with purple stripes) husks. Without being an avid gardener, many varieties are almost impossible to distinguish in appearance or taste characteristics. However, there are several varieties that stand out from the rest.

Firstly, we are talking about **french pink garlic** , which is also called **creole** . It is distinguished by a rich bright purple color of the head ^[4] . Secondly, **elephant garlic** can also be classified as an unusual variety . In fact, this is one of the forms of *onion Grape* , but in smell and characteristic division into

cloves, it is similar to garlic. He was nicknamed elephant because for the most part the bulbs of this vegetable reach very large sizes (one clove can weigh 50-80 g, and the whole head can weigh up to 450 g). A characteristic difference of elephant garlic is not too sharp aroma and relatively mild taste.

Selection and storage

The choice of garlic is a simple matter. The main thing is that the heads are dry, dense and without external damage. It is also important that the vegetable does not have a green tuft, because after germination it gradually loses a number of its useful properties. When choosing, you can also pay attention to the size of the garlic: it is popularly believed that larger cloves are usually more caustic and sharp, although this fact has not been scientifically proven.

As for storage, it is quite possible to put garlic in the refrigerator for a period of no longer than a month. However, if you plan to stock up on a large amount of vegetables for a long time, then the option with a refrigerator is no longer suitable. The humidity there will cause the garlic to gradually begin to turn black and moldy. Also, the vegetable does not like direct sunlight, in which it dries quickly.

Optimal storage conditions are a dry, dark place with a temperature range of 5 to 18°C. Of the containers, a box or box with holes for ventilation is perfect. If after use you have a few brushed cloves left, you can put them in the refrigerator. To avoid the spread of a strong smell, it is better to store them in a sealed container.

Growing features

Garlic is an unpretentious plant that can be planted both in autumn (winter varieties) and in spring (spring varieties). It should be borne in mind that the plant requires abundant watering in the first few weeks after planting and, conversely, prefers dryness during the ripening of the bulbs.

As for the appearance of garlic, its leaves are narrow, pointed towards the top, reach a height of 30-100 cm. They grow one from the other in a spiral, thus forming a false stem. Winter varieties produce an arrow-peduncle, which can reach 150 cm in length. Before flowering, its edge, crowned with an umbrella inflorescence, twists in a spiral. If you do not plan to collect aerial bulbs (bulbs) for planting material, then the arrows should be removed when they reach about 20 cm above the level of the stem. This procedure increases the yield.

Spring varieties, in turn, do not shoot and multiply due to cloves. The absence of a peduncle explains why garlic of spring varieties does not have a stem in the center, and the cloves are arranged in several rows. Such garlic is usually stored longer, but at the same time brings a smaller yield.

It should be noted that the soil prepared for garlic should be rich in phosphorus, potassium and nitrogen. To ensure the normal development of the root system, it needs to be loosened. Planting depth usually varies from 6 to 12 cm depending on the size of the cloves (the larger they are, the deeper they need to be planted). To avoid the formation of a crust, the earth can be mulched with humus. Harvested, as a rule, in early August (winter varieties) and early September (spring varieties).

Diseases and pests

The diseases that garlic is susceptible to may differ depending on the climatic conditions where it grows. The most common attack is bacterial rot, which can affect both the plant itself during the growing season and the harvested crop during storage. With such a disease, brown ulcers appear on the teeth, and a putrid odor may appear. Gradually, there is a feeling that the slices were frozen.

In the southern regions, where the winter is not too severe, the fungal disease fusarium is a danger. It provokes yellowing of the leaves and leads to the appearance of a pinkish coating of spores. Due to the infection of the bulb, the roots die off. If there are diseased heads in the harvested crop, then they are covered with pink mycelium for a short time and rot.

Among insects, various types of onion flies cause great harm to garlic. Their larvae feed on the fruit, damaging it, which starts the process of head rotting and leads to the drying of the leaves. Parasites such as onion stem nematodes, thrips, as well as four-legged garlic and root mites are also dangerous for garlic.

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Garlic - useful properties, composition and contraindications

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



Ginger

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

Keywords: ginger , useful properties, potentially dangerous effects, side effects, contraindications, diets

Beneficial features

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

100 g of fresh ginger root contains [3]:					
Main substances:	G	Minerals:	mg	Vitamins:	mg
Water	78.89	Potassium	415	Vitamin C	5

Carbohydrates	17.77	Magnesium	43	Vitamin PP	0.750
Alimentary fiber	2	Phosphorus	34	Vitamin B6	0.160
Squirrels	1.82	Calcium	16	Vitamin B2	0.034
Sugar	1.7	Sodium	13	Vitamin B1	0.025
Fats	0.75	Iron	0.6		
calories	80kcal	Zinc	0.34		

Fresh ginger contains a large amount of useful minerals, vitamins, essential oils, essential amino acids. Almost all of them are preserved in ginger powder. But the pickled root crop cannot boast of the same usefulness. Moreover, in its composition, the level of sodium rises sharply, whose excess in the body can lead to increased pressure and edema. In addition, artificial sweeteners are often added to ginger marinade.

Medicinal properties

Of all the minerals, ginger has the most potassium, which will be useful for women taking diuretics to relieve tension in the premenstrual period. At this time, along with the liquid, the body loses a lot of potassium, and ginger helps to restore its level. Also, in tandem with phosphorus, potassium contributes to the supply of oxygen to the brain, and together with calcium, it controls neuromuscular activity. In combination with iodine and alkaline bases, which are rich in ginger, potassium has a positive effect on the body in diseases of the cardiovascular system and thyroid gland.

In addition to potassium, ginger is rich in magnesium. The lack of this element is observed in most people. At particular risk are patients with poisoning, accompanied by vomiting and diarrhea, pregnant women and the elderly. This substance is indispensable for the functioning of the nervous system, as well as for the synthesis of proteins and the removal of toxic elements from the body. Moreover, magnesium has a beneficial effect on the condition of a person after a heart attack and reduces the symptoms of premenstrual syndrome in women.

The high calcium content of ginger makes it especially beneficial for adult women (post-menopause) and the elderly. This element helps to maintain normal blood pressure, ensures blood clotting, and regulates the work of various enzymes. Its sufficient presence in the body helps prevent arrhythmia and muscle cramps.

Due to the presence of fiber and pectin in its composition, ginger helps the digestive system. The root crop stimulates the secretion of the digestive glands of the stomach, has a beneficial effect on the microflora and intestinal motility. When using ginger, there is a decrease in gas formation and neutralization of toxins. In general, it activates the digestive system and speeds up metabolism.

This spicy root also combats common problems such as cholesterol buildup and high blood sugar ^[9]. It strengthens blood vessels and prevents thrombosis. By the way, the effect on the vessels and the improvement of blood circulation have a positive effect on the fight against sexual dysfunction in men.

Ginger root contains a lot of vitamin C and B vitamins (B1, B2, B6, B9), which support the body's immune system, so ginger is recommended to eat in the initial stages of colds. In addition, ginger contains the alkaloid gingerol, which, together with essential oils, gives the root crop its specific smell and taste. This compound is credited with a lot of useful properties, the main of which ^[9]:

- suppression of nausea of any nature (caused by motion sickness, poisoning, toxicosis, etc.);
- antibacterial effect;
- relaxation of spasmodic muscle tissue;

- antioxidant activity (promotes renewal processes in the body);
- increased thermogenesis - the production of heat in the body (has a warming effect).

In medicine

In medicine, ginger is used to make tinctures and powders. They are recommended for use in motion sickness and motion sickness, to improve digestion, as well as cholesterol and fat metabolism. As part of a comprehensive treatment, ginger-based preparations are prescribed for joint diseases (arthrosis, arthritis) and atherosclerosis.

In addition, ginger essential oil can be found on the pharmaceutical market. It is actively used as aromatherapy in the treatment of various psycho-emotional disorders. Also, the oil is effective in the treatment of SARS. On its basis, inhalations are made, hot baths are taken with it and it is used for rubbing.

Work is also underway to create a new drug based on gingerol . Its action will be aimed at combating bronchial asthma. Conducting research on fragments of the respiratory tract, scientists at Columbia University in the USA found that gingerol-6 helps to eliminate spasms, relax muscle tissue and, as a result, expand the bronchi ^[5] .

It is worth noting that simply eating ginger will not help people with asthma, because we are talking, firstly, about the effect of the substance gingerol-6 in its pure form, and, secondly, in the experiments, the effect was directly on the smooth muscles of the respiratory organs.

It is important to note that the use of ginger is incompatible with the use of certain medications. For example, blood-thinning drugs combined with regular consumption of ginger, which also helps to reduce blood viscosity, can cause bleeding. It is not recommended to use ginger while taking drugs that lower sugar.

In folk medicine

In folk medicine, ginger root has a wide range of applications: infusions, powder, decoctions, tea are prepared from it, it is used for compresses. People who do not tolerate long journeys are advised to take gingerbread or a piece of root vegetable with them on the road - this helps to get rid of nausea. Also, half an hour before the intended trip, you can drink half a glass of water with one teaspoon of ginger powder.

It is believed that this powder has a beneficial effect on the condition of the liver and is sometimes even recommended for use as an additional therapeutic agent in the drug therapy of viral hepatitis and fatty liver. Ginger contributes to the restoration of cells and tissues and contributes to the normal functioning of the body.

In addition, to increase the body's resistance to various viruses and infections (especially in the autumn-winter period), a vitamin mixture is prepared, consisting of 400 g of ginger root, 250 g of honey, 3-4 lemons and nuts. All ingredients must be ground with a blender or passed through a meat grinder, then transferred to a glass dish and stored in the refrigerator. Take the mixture one tablespoon per day.

- Decoction

With frequent breakdowns of the digestive system, flatulence, indigestion, lack of appetite, folk healers advise taking ginger broth. You can prepare it by pouring one teaspoon of ginger powder with

a glass of boiling water. Then leave the resulting mixture for 30 minutes on a steam bath and strain after cooling. It is necessary to take a decoction of a quarter cup 3 times a day half an hour before meals. You can also add yarrow and chamomile flowers to the decoction.

- Tea

For colds accompanied by fever, folk healers recommend mixing two tablespoons of raspberry jam, one tablespoon of ginger honey and half a cup of strong tea. It is especially useful to drink this drink at night.

If you are worried about a sore throat, then 25-50 g of ginger should be poured with hot water, adding honey and lemon, and drinking instead of tea. With a strong cough, you should take the juice of 1 ripe lemon, 2 tablespoons of purified glycerin and 1 tablespoon of ginger honey. The mixture should be stored in a cool place and taken one teaspoon at bedtime or, if necessary, 3-4 times during the day.

- infusions

With the help of an infusion of herbs with ginger honey, it is recommended to eliminate irritability, sleep disturbances, headaches and pain in the heart area that occur in women during menopause or premenstrual syndrome. To prepare the infusion, you need to take 15 g of chamomile flowers and motherwort herb, 10 g of sage herb, St. John's wort, yarrow, rose hips, hawthorn flowers and calendula. Two tablespoons of this collection should be poured into 0.5 liters of hot ginger water and let the mixture brew for an hour. Then strain, add ginger honey and drink half a cup warm.

Ginger can also be useful in case of male potency problems. It is believed that a tincture of 50 g of ginger powder, 10 g of clove and vanilla powder, 5 g of cinnamon powder and 1 kg of powdered sugar helps restore a normal erection. All this mixture must be poured over 2 liters of dry white wine, mixed and allowed to brew in a cool dark place for a day, and then filtered through cheesecloth. Take this remedy should be 20-30 minutes before sexual intercourse.

Ginger tincture, according to traditional healers, helps to fight another male disease - prostatitis. To prepare it, you need to take 100 g of a root crop and 1 liter of vodka. Infuse for two weeks in a dark place, strain, and then take 15 drops three times a day 20 minutes before meals.

- Outdoor use

Ginger compresses are used for colds, bruises, sprains and sciatica. Their action is aimed at reducing pain. To prepare a compress, you should take 2 teaspoons of ground ginger, 1 teaspoon of turmeric and half a teaspoon of chili pepper, filling it all with warm water. Then you need to leave the mixture to infuse in a dark place for about two weeks. Before use, warm the liquid, then apply it on a cotton cloth and attach it to the sore spot, securing it with cling film.

With arthrosis and arthritis, rubbing the joints with ginger oil helps. A few tablespoons of freshly grated ginger are recommended to be poured with vegetable oil (preferably sesame) and let it brew in a dark place for 21 days. Then rub this oil on the affected areas.

in oriental medicine

In traditional Tibetan medicine, ginger is classified as a product that generates heat and cures diseases of mucus (problems with the digestive system, liver and kidneys) and wind (various infectious diseases).

In the traditional system of Indian folk medicine, ginger is revered as the best spice and universal remedy for many ailments. It helps to get rid of nausea and vomiting, reduces the accumulation of gases in the intestines and stomach, relieves cramps in the abdominal cavity, relieves pain from inflammation of the joints.

In China, the root vegetable is considered a means of expelling "full cold". It is used to improve blood circulation, normalize pressure, improve the functioning of the stomach and kidneys. This is one of the remedies used to quickly bring a person to his senses in fainting and shock. Ginger is also used in the practice of cauterization of biologically active points.

Chinese doctors suggest that regular use of ginger can improve memory and maintain sobriety of mind until old age. The Chinese also refer to the root crop as an adaptogen of natural origin - products that help to cope with stress and, in general, with the adverse effects of the environment.

In addition, according to the Chinese and Japanese, this is a very effective remedy in the fight against runny nose and sore throat. So, in the Celestial Empire, ginger broth is considered a traditional recipe. A few thinly sliced pieces of the root are placed in 1 liter of chicken broth, a few cloves of garlic and a couple of green onions are added. This drink is drunk throughout the day. In addition, the Chinese boil Coca-Cola, add ginger and lemon to it, and drink this "potion" warm.

Ginger is also used for food poisoning. Two teaspoons of finely chopped root are boiled in 0.5 liters of water, then filtered and drunk a quarter cup warm during the day. The Chinese claim that ginger also helps with a hangover. In order to recover faster, it is recommended to drink a tincture of root vegetables, tangerine, and brown sugar in the morning.

In scientific research

Naturopaths from the University of Michigan conducted a study, the results of which revealed that ginger can be considered as a potential remedy for colorectal cancer. A group of people who were given 2 g of ginger per day for a month showed fewer markers of colonic inflammation than those who took a placebo at the same time ^[10].

Moreover, scientists have been able to prove the usefulness of ginger root for cancer patients who are undergoing chemotherapy. In most cases, patients complain of persistent nausea and vomiting, which doctors recommend to eliminate with the help of special antiemetic drugs. However, many patients complain that drugs relieve directly from the gag reflex, but not from the remaining feeling of nausea. In this case, ginger can come to the rescue. 1 g of the root vegetable daily three days before and three days after "chemo" helps to overcome nausea ^[11].

Interesting experiments on the appearance of cancer have recently been carried out in the USA. During experiments on mice with a predisposition to lung cancer, scientists were able to find out that the alkaloid capsaicin, similar to gingerol, (found in red pepper and makes it pungent) provokes the development of tumors in 100% of cases. Gingerol-6, in turn, caused the development of cancer in half of the experimental subjects, but the combination of capsaicin and gingerol led to the appearance of the disease in only 20% of the rodents. Researchers are now trying to determine the potential benefit of alkaloid interactions ^[12].

After a series of studies, scientists from the University of Georgia came to the conclusion that ginger reduces pain in the muscles after intense physical exertion. They conducted an experiment in which 74 people took part. They were divided into two groups, for 11 days the representatives of one of them received 2 g of ginger daily, and the representatives of the other received a placebo. All participants performed a specific set of exercises with heavy weights to put a strain on the muscles of the hands

and provoke a slight inflammation. As a result, participants in the ginger group had a less pronounced inflammatory process. ^[13].

It has also been found that the alkaloids gingerol-6, gingerol-8 can be used to combat asthma. Usually, people suffering from this disease use bronchodilators (beta-agonists), which relieve spasms from the bronchi and allow normal breathing.

Scientists conducted an experiment in which they tried to relieve bronchospasm in several different ways: separately with beta-agonists, separately with gingerol-6, and combinations of bronchodilators with gingerol-6 and gingerol-8. The best performance was demonstrated by a pair of beta-agonists + gingerol-6. Now scientists are trying to find out whether the effect of the alkaloid is preserved not with direct exposure to the respiratory organs, but with the use of an aerosol ^[14].

Finally, recent studies by German scientists have demonstrated the relationship of gingerol-6 with fresh breath. It turned out that this alkaloid provokes the production of saliva enzymes that destroy sulfur-containing components. The latter often cause bad breath. Thus, gingerol-6 can become the basis of new oral hygiene products ^[15].

Weight regulation

According to popular belief, ginger is a miracle cure for weight loss. It is believed that the dropping of extra pounds occurs mainly due to the alkaloid gingerol-6. However, experts are not in a hurry with unambiguous conclusions.

Conducted studies have indeed demonstrated the ability of the alkaloid to enhance thermogenesis and accelerate metabolic processes. Gingerol has also been noted to inhibit the accumulation of lipids by adipocytes (the cells that make up adipose tissue). However, all these experiments were carried out on isolated cells outside a living organism.

Thus, experts agree that ginger is useful for overweight people, since it has a positive effect on metabolism. It can also be one of the factors affecting the change in weight, but the root crop itself does not have the magical ability to “burn” those extra pounds. The result can be achieved only by using ginger on the background of a healthy balanced diet and regular physical activity.

In cooking

Ginger is combined with almost any product, so it is used in cooking in a variety of ways: added to first and second courses, included in salads and desserts, sauces and many drinks are made based on it. In China, jam is made from the root crop, and ginger flour is produced in India. In Japan, the pickled root is used between different types of sushi to “zero out” the taste buds.

Interestingly, ginger sweets were a favorite delicacy of Queen Elizabeth I, which made the root vegetable popular in those days in England. In addition to sweets, they even began to make beer on its basis, which was called ginger ale. Until now, in the UK there is a tradition of preparing gingerbread cookies for Christmas. And this year, the royal confectioners even shared their recipe for this delicacy.

To make 10 cookies, mix:

- 150 g flour;
- 1.5 tsp _ baking powder for dough;
- 1/2 tsp . salt;
- 1/2 tsp . ground ginger;

- 1 tsp _ spice mixes (cinnamon, cloves, nutmeg, cardamom, allspice);
- 100 g butter.

Add 45 g of milk to this mixture, knead the dough and leave it for at least 2 hours (preferably overnight), wrapping it in cling film. Next, roll out the dough to 3 mm, cut out figures and bake at 180 ° C until cooked. Cooled pastries are traditionally decorated with icing.

Beverages

Traditionally, grated ginger root is put into tea or prepared on its basis as independent hot drinks with the addition of honey, lemon, cinnamon and other spices. The fresh root vegetable is also often added to smoothies and freshly squeezed juices.

In addition, ginger often becomes an ingredient in refreshing and tonic drinks with cucumber, lemon, mint, etc. Sometimes it is added to kefir or yogurt, and kvass is also made on it.

In cosmetology

Thanks to scientific studies that demonstrate the usefulness and discover new properties of ginger, its powder, extract and extracts are increasingly included in the composition of various cosmetic products. Especially a lot of them appear on the Asian market, but gradually they find their audience in European countries.

Given that gingerol improves blood circulation, ginger extract is often found in hair care products (in shampoos, balms, masks, lotions). It improves the blood supply to the scalp, nourishes the hair follicles and stimulates hair growth. However, you should be careful not to overdo masks and lotions on your hair, as this can lead to dry skin.

You can prepare a mask to strengthen the hair and at home. To do this, mix grated ginger and jojoba oil in equal proportions . The mixture is rubbed into the skin and applied to the hair, leaving for 30 minutes, then rinse thoroughly.

When it comes to skin care, ginger can often be found in facial products for oily skin. This is due to the fact that the root helps to even out the color, normalizes the sebaceous glands and effectively fights inflammation (acne). The tonic effect of ginger is also known, so it is added to anti-aging creams and gels. You should pay attention to the fact that ginger tends to dry out the skin, therefore, you need to control the time the mask stays on the face, and people with dry skin should avoid using them.

Among folk recipes for ginger face masks, one can single out an anti-acne remedy. To prepare it, you need to mix 1 tsp . ground ginger, 1 tsp . honey and some milk. The mixture is applied to the face for 10 minutes and then washed off with water. Also, to give a healthy complexion to the skin of the face, you can prepare a mask of 1 tsp . ground ginger, 1 tsp . honey and 1 tsp . lemon juice. Before applying funds to the face, it is necessary to check whether they cause allergies by testing them on the wrist.

Note that numerous folk recipes for anti-cellulite scrubs and ginger-based masks, as well as lip augmentation products, do not have a scientifically proven effect and, moreover, can be hazardous to health.

Unconventional use

In addition to the root itself, in Asian countries, people actively use other parts of the plant. For example, flowers often become an element of decor. They do not fade for a long time and have a

pleasant unobtrusive aroma. They decorate tables, they are used to create bouquets and garlands. Also beneficial are ginger leaves, in which enterprising market traders wrap products.

As for the root vegetable itself, its unconventional use was seen during the filming of *The Lord of the Rings*. Typically, ginger is used to treat colds and relieve sore throats, but on the set, actor Andy Serkis was specially prepared with a mixture of excessively large doses of ginger, lemon and honey in order to burn his throat. This helped the actor speak in the creaky voice of his Gollum character .

Dangerous properties of ginger and contraindications

Despite the fact that ginger is full of nutrients and, in general, has a beneficial effect on the human body, it should be consumed in moderation. Moreover, it is impossible to replace drug treatment with a root crop. After consulting a doctor, it can be used in combination with medications. However, in some cases, it is better to refuse ginger altogether:

- while taking sugar -lowering drugs and blood thinners;
- with inflammatory bowel diseases (gastritis, enteritis);
- during the period of exacerbation of diseases of the heart, gallbladder, liver;
- with damage to the mucous membranes and bleeding;
- at too high a temperature;
- during pregnancy (second and third trimesters);
- children under 3 years old.

Botanical description

Botanically, ginger is a genus of perennial herbaceous plants that belongs to the Ginger family. This genus includes the species pharmaceutical or common ginger (Latin *zīngiber officinale*). It is its rhizomes that are used in cooking and medicine.

origin of name

Scientists believe that the Latin and Greek names of this plant (“ zingiber ” and “ zingiberis ”, respectively) are derived from the Prakrit word “ singabera ”, which, in turn, appeared due to the Sanskrit “ srngaveram ”, which meant “horned root”^[1]. Most likely, the root crop was so named because of its appearance.

As for the Russian word "ginger", which for a long time was pronounced and recorded as " inbir ", then, according to linguists, it was borrowed from the German language, where the root crop is called " ingwer " ^[2] .

Story

Ginger is an ancient plant whose properties have been known to man for more than 5000 years. The homeland of ginger is the region of Southeast Asia. Some researchers even name a more precise place - the Bismarck archipelago in the Pacific Ocean. However, now this plant is no longer found in the wild in nature. India, China, Australia, Indonesia, Barbados, Jamaica and others are engaged in its cultivation.

Scientists claim that the cultivation of ginger was first started in India in the III-IV century BC. e., and from there he came to China. Also, the root crop was brought to Egypt, where he won the favor of many healers, and Alexandria for a long time became the center of its sale. Ginger was also popular in Europe. The ancient Greeks and Romans used it both as a seasoning for various dishes and as a

medicine. For example, it was often eaten during feasts, because it was known that it eliminates the unpleasant consequences of overeating.

The ancient Roman writer Pliny Sr. in his work noted the warming and antidote effects of ginger and described its benefits for digestion. The physician Claudius Galen in his work "On the Parts of the Human Body" called this root crop a cure for sexual impotence.

This root was popular among European sailors. Going on long voyages, they took with them special pots in which they grew ginger, escaping it from scurvy, various infections and seasickness. In addition, the refreshing pleasant smell of the root crop prompted the Romans to create aromatic salt, which was actively used by noble ladies of that time.

Arab merchants who brought ginger to Europe surrounded it with an aura of mystery. They told stories about mythical monsters guarding the lands where the root grows, and about the dangers that lie in wait for hunters of this spice. Naturally, this increased the interest of buyers and at the same time made it possible to inflate prices for the "magic" product. For example, in England, half a kilogram of a root crop cost about the same as a ram or a sheep ^[6].

However, wealthy families did not spare money for overseas curiosity and ginger was widely distributed in England, France, Germany, starting from the 9th-10th centuries. n. e. Especially rare and exquisite delicacy was considered gingerbread, which was served at the tables of many European kings. In the 16th century in Europe, this root crop was recognized as an effective means of preventing cholera, and was also used in the treatment of plague.

This root came to America at the beginning of the 16th century and immediately gained great popularity among the locals. In the same period in Russia, the first written mention of ginger appeared in the collection of instructions on all issues of the organization of life Domostroy. Although he was known and loved here long before that. Even in Kievan Rus, it was considered an essential ingredient in kvass, mash, liqueurs and Easter cakes.

Varieties

Ginger comes to us mainly in the form of a ripened root with a yellowish-brown skin and a light yellow core. However, in Asia there are a large number of different types of root crops. There are mainly two types:

- **black ginger**, which is not subjected to any pre-treatment (it is more pungent in taste and has a more pronounced smell);
- **white ginger** - peeled from a dense surface layer.

In addition, depending on the variety, the roots of white ginger can have a different shape: rounded, elongated, flattened. Sometimes they differ in flavors or have colored streaks. At the same time, regardless of the variety, the root crop becomes more piquant when ripe.

In Asian countries, where ginger has long been included in the daily diet of local residents, it is often eaten young. For example, Thais prefer roots harvested in March. By this time, the roots do not yet have time to become hard and too hot. With such ginger, you can not even remove the skin. Usually it is simply washed and eaten ^[8].

By the way, on the shelves of our stores you can often see pink or red pickled ginger. Many mistakenly believe that this is a special variety of root. In fact, manufacturers simply use safe food coloring to

make the product more attractive. In nature, ginger only has a pinkish tint if it is harvested before it is fully ripe.

Growing features

Ginger practically does not produce seeds, so it is grown by dividing the rhizome, from which the ground part of the plant develops - spirally pointed leaves and flowers of yellow-orange and purple, collected in spike-shaped inflorescences. This plant thrives best in warm, humid climates. Harvested usually 6-10 months after planting, when the leaves begin to turn yellow. Dug up root crops must be washed and dried in the sun.

Our climatic conditions are not suitable for planting ginger in the garden, but it is quite possible to grow it in an apartment. By the way, ginger looks very nice as a flower and has a pleasant lemon aroma. Usually they plant a root crop with live buds (if the buds are dry, put the root in warm water for several hours) in a shallow and wide pot in early spring. It is best to use the soil for vegetables (you can add fertilizer for root crops).

Growing ginger is impossible without good drainage. Despite the fact that the plant loves moisture, stagnant water usually leads to root rot. Ginger is also photophilous, but reacts badly to direct sunlight^[7]. In the warm season, it can be taken out to the balcony, terrace or garden.

Selection and storage

Choosing ginger is a simple matter. It is important that it be free of external damage, blackening and stains. The root crop should be dense and not too dry. It is believed that the darker the skin and core, the more mature and therefore more vigorous the product.

It is advised to store ginger in the refrigerator, because at room temperature it usually does not lie for more than 10 days - it dries out. If you have a piece of peeled or chopped / grated ginger left, it should be put in a closed glass dish and refrigerate. It is also recommended to pour the peeled root crop with white wine - this helps to preserve all its active substances.

In addition, ginger can be dried. To do this, it is cut into thin slices and placed in an oven with air convection. The root is dried, as a rule, at a temperature of 45-60 ° C. In this form, the root crop loses 20-30% of gingerol, but most of the useful elements are still preserved in full. Ginger remains useful both when powdered and pickled, but does not tolerate freezing very well. When exposed to low temperatures, the root crop does not lose its taste, but loses many useful elements.

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Ginger - useful properties, composition and contraindications

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



Buckwheat

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

Keywords: buckwheat , useful properties, potentially dangerous effects, side effects, contraindications, diets

Beneficial features

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

Main substances (g / 100 g):	Buckwheat contains ^[5]
Water	8.41
Carbohydrates	74.95
Alimentary fiber	10.3
Squirrels	11.73
Fats	2.71
Calories (kcal)	346
Minerals (mg/100 g):	
Potassium	320
Calcium	17
Phosphorus	319
Magnesium	221
Sodium	eleven
Iron	2.47
Zinc	2.42
Vitamins (mg/100 g):	
Niacin	5.135
Vitamin B-6	0.353
Riboflavin	0.271
Thiamine	0.224
folate	0.042

Buckwheat contains up to 20% protein (with amino acids such as lysine and tryptophan), up to 80% starch, sugar - 0.3-0.5%, organic acids (malic, citric, oxalic, maleic), vitamins B1 (thiamine), B2 (riboflavin), P (rutin), PP (nicotinic acid), anthocyanins, salts of iron, calcium, phosphorus and trace elements - copper, zinc, boron, iodine, nickel, cobalt. The aerial part of the plant during the flowering period contains a flavone glycoside (vitamin) - rutin (1.9-2.5%). ^[2]

Use in medicine

For therapeutic purposes, seeds and grass of buckwheat (flowers together with apical leaves) are used. Grass (as a pharmaceutical raw material) is cut at the stage of buckwheat flowering, when the level of

rutin in the plant reaches its maximum amount. The flowers are harvested for the production of herbal preparations. The raw material is not available in the pharmacy assortment.

Buckwheat is a product whose dietary value is difficult to overestimate. Especially useful is the use of dishes from buckwheat for diseases of the stomach and intestines, for anemia, disorders of the nervous system, and kidney diseases. Rutin is produced from buckwheat grass, which is used for the prevention and treatment of hypo- and vitamin P deficiency; in the treatment of diseases that are accompanied by impaired vascular permeability (hemorrhagic diathesis, capillary toxicosis, retinal hemorrhage, hypertension and radiation sickness, glomerulonephritis, rheumatism, septic endocarditis). A number of drugs are produced on the basis of rutin: *urutin*, *rutamine*, *ascorutin*, etc. In folk medicine, buckwheat flower infusion is drunk when coughing. Thoroughly crushed and sifted buckwheat leaves are used as a natural powder for diaper rash in children.

Application in official medicine

For the purpose of prevention (and in the treatment of hypo- and avitaminosis of vitamin P), Rutin is prescribed (Rutinum). It is used 2 tablets 2 to 3 times a day. The duration of the course is 5-6 weeks.

Use in traditional medicine

- As **an expectorant**, an infusion of buckwheat flowers is used (40 g of flower raw materials per liter of boiling water): drink 200 ml up to 5 times a day.
- With a **dry cough**, a mixture is prepared from the flowers of buckwheat (50 g), forest mallow (60 g), wild poppy, common white and herb lungwort officinalis (10 g each). Pour a liter of boiling water over the herbs and let it brew overnight. Take a glass up to 5 times a day.
- With bronchitis, which is accompanied by a dry, debilitating cough, an infusion is useful: flowers of buckwheat (40 g), common white, black elderberry, heart-shaped linden (20 g each), wild poppy flowers, scepter-shaped mullein, forest mallow and medicinal lungwort grass (30 each). d) steamed in a liter of boiling water, kept overnight, then filtered and drink 50 ml of the drug every hour. ^[eight]
- For arthritis, polyarthritis, various sclerotic lesions, convulsive conditions, an infusion is taken: 4-6 tablespoons of dried leaves, herbs and flowers of buckwheat are steamed in a liter of boiling water. Drink chilled, up to 4 glasses per day.
- With **neurasthenia**, **low blood pressure** with a feeling of weakness, they drink the infusion described above, 100 ml up to 4 times a day.
- Dry raw materials of buckwheat grass (crushed tops or leaves and flowers) are included in the composition of medicinal infusions from herbal mixtures and are taken for sore throat, laryngitis, neuritis, pain with sciatica, hepatitis, and obesity.

Externally:

- Fresh, washed buckwheat leaves are applied as compresses to unopened purulent wounds, abscesses.
- From a concentrated infusion (2 tablespoons of buckwheat herb per 200 ml of boiling water), lotions, compresses for abscesses, panaritiums, phlegmons, ulcers are made. They wipe the scalp with infusion for baldness, treat burns with sterile cotton wool, prepare an infusion for washing the eyes (for cataracts). ^[2]

Use in oriental medicine

Eastern recipe recommends buckwheat in combination with pomegranate sauce for anemia. Hard grains of buckwheat are used in Indian and Chinese medicine in therapeutic massage sessions.

In scientific research

Due to its prevalence, useful properties and specifics of cultivation, buckwheat has become an object of study in both agronomic and medical research.

In the "Collection of Economic Rules" (1670), F. Udolov said the following about buckwheat: "It will not be unprofitable if other bread is canceled, and buckwheat is sown instead."

In the "Instruction on speculative and record-keeping agriculture" (1786), the first Russian manual on agronomy, scientist M.G. Livanov wrote about buckwheat: "this grain is very useful and beneficial for various needs in housebuilding. It spreads so strongly that no grain of bread can compare with it."

The founder of scientific agronomy in Russia I.M. Komov in his treatise "On Agriculture" (1788) emphasized that "Greeks are sown more, and are better used, and known in Russia than in all of Europe. For there only birds and cattle are fed with it, and in our country the most nutritious food for humans is prepared from it. Komov also mentioned the ability of buckwheat to "drown out" wild, weedy herbs, forcing them out of the land."

A century later, the famous Russian agronomist A.N. Engelhardt extolled buckwheat in his Letters from the Village, where it was said that "buckwheat porridge never gets boring, and it is eaten willingly every day."

In the 20th century, the historian and researcher of culinary traditions V. Pokhlebkina devoted an extensive article to the "buckwheat" issue. ("The hard fate of Russian buckwheat").^[3]

The medicinal properties of buckwheat, its potential as part of medical diets and standard diets for weight loss, the impact of bioactive substances on health were studied at one time by O. Sitar, M. Breshtik, M. Zivtsak; H.A. Jimenez-Bastida, H. Zelinsky.^[9,10]

For weight loss

Buckwheat porridge is an integral part of both therapeutic diets on medical advice (dietary tables) and the classic mono-diet for weight loss (with or without kefir).

Use in cooking

- From buckwheat, you can cook both crumbly porridge and "slurry porridge". Soups and buckwheat hominy are cooked with buckwheat. Pancakes and pancakes are baked from buckwheat flour, flour is used as a basis for sauces. Buckwheat flour is also used in the confectionery industry: for the manufacture of chocolate and chocolates. Whole buckwheat is used to make granola, homemade bread.
- The legendary V. Pokhlebkina in "Secrets of Good Cuisine" wrote the following about buckwheat porridge: "buckwheat porridge is the simplest in terms of cooking, which has a good natural protective coating of each grain and does not emit mucus (starch) during cooking. It is difficult to spoil buckwheat porridge, and yet it is often prepared clumsily, tasteless. The secrets of properly cooked buckwheat porridge, according to Pokhlebkina, are as follows: a) cereals and water for cooking should be taken at the rate of 1: 2; b) porridge should be cooked in a metal pan or cauldron with a thickened convex bottom, the lid should fit snugly; c) cook over high heat until the water boils, then maintain a moderate boil, at the final stage of cooking, you need to increase the fire as much as possible so that the water completely boils away and evaporates not only from the surface of the porridge, but also from the bottom of the saucepan or pot. It is not recommended to stir the porridge, slightly open the lid. The peculiarity of

boiled buckwheat is that porridge is cooked rather with the help of steam. Delicious crumbly porridge is obtained if steam is not lost and intervention in the cooking process is minimized. [eleven]

- Buckwheat noodles (made from buckwheat flour) were made centuries ago in Tibet and northern China because wheat flour was not common in those regions. Later, the recipe for noodles made from buckwheat flour migrated to Japanese and Korean cuisines. In Japan, buckwheat noodles are referred to as "soba". In some areas of Italy, a pasta is made from buckwheat flour, which is called "pasta di grano saraceno".
- Hindus in northern India eat buckwheat flour during fasting days, as grains (such as rice or wheat) are forbidden foods during fasting. Buckwheat flour pancakes are called "kuttu" in India ki puri", and potato slices rolled in buckwheat flour and fried in oil - "kuttu pakoras".
- Pork sausage (or sausage) wrapped in a buckwheat pancake is a type of fast food street food in some regions of France.
- "Steep" is a dish popular in certain provinces of Holland, which is served as follows: a portion of buckwheat porridge is made into a recess, where they put fried bacon flavored with gravy.
- In vegetarian cuisine, buckwheat grains are germinated and then eaten raw or after heat treatment. [12]
- Buckwheat groats, based on the degree of grinding, are divided into types: *prodel* (crushed, chopped buckwheat grains obtained by hulling), *Smolensk buckwheat groats* (maximum crushed and polished buckwheat grains) and *core* (whole buckwheat grains, hulled from the shell). Another variety is "veligorka" - a very small whole grain, the grains of which are rolled to a rounded shape. The most useful is the core, in which the whole complex of trace elements and vitamins is preserved. [3]

Homemade whole grain buckwheat bread (no flour)

Ingredients: 3 cups whole buckwheat kernels, 1 teaspoon salt, 1 cup water, vegetable oil for greasing the pan, sesame or poppy seeds for sprinkling. Pour buckwheat with water and leave overnight. In the morning, drain the water, let the grits drain. Combine buckwheat with salt, a cup of water and puree in a blender until smooth (grind the ingredients for at least 2-3 minutes). Pour the "dough" into a clean glass container, cover with a towel and leave to ferment in a warm place for a day. The next day, preheat the oven to 200 degrees. Grease a baking dish with vegetable oil, and generously sprinkle the bottom and sides of the form with sesame or poppy seeds. Pour the "dough" into a mold and bake at 180 degrees for an hour. Ready bread cut already completely cooled. For the preparation of such buckwheat bread, green buckwheat (not heat-treated) is also perfect. If desired, crushed olives, pumpkin seeds, raisins can be added to the dough. [13]

The combination of buckwheat with other products

In dishes, buckwheat goes well with greens and vegetables with a moderate or reduced starch content. It is better to avoid adding cheese, nuts or seeds to the buckwheat product. Also, nutritionists strongly do not recommend mixing buckwheat with animal proteins, sweet fruits and sugar. If desired, you can sweeten the porridge with honey.

Beverages

Buckwheat is a plant that is an alternative to barley in brewing. Buckwheat beer is thus a gluten-free beer, as opposed to regular, "cereal" beer. Buckwheat does not contain gluten and belongs to pseudocereals. Buckwheat beer was invented not so long ago, but it can be said that it is a product with a future in the global market.

Buckwheat whiskey is an alcoholic drink produced in Brittany (France) and the USA. Buckwheat must be the basis of production.

Buckwheat shochu is a strong alcoholic drink that has been produced in Japan since the 16th century. Its taste is milder compared to traditional barley-based shochu .

memil ") is prepared from roasted buckwheat groats . cha " and " soba cha ").^[12]

Use in cosmetology

Buckwheat flour is used as a natural ingredient in homemade cosmetics. In masks, peels and scrubs, buckwheat perfectly shows its cleansing, softening and nourishing properties.

- Scrub with buckwheat flour for dry skin

Mix one egg yolk, a teaspoon each of granulated sugar and olive oil and half a tablespoon of buckwheat flour. Bring to a homogeneous state and apply to cleansed face skin in a circular motion. Massage lightly. Do not rinse off face for 5 minutes. Then gently remove the scrub with a tissue and wash with cold water. After moisturizing the skin with cream.

- Pumpkin peeling with buckwheat flour for dry skin

Prepare a homogeneous composition of egg yolk, a tablespoon of grated pumpkin pulp, half a tablespoon of buckwheat flour and olive oil with granulated sugar ($\frac{1}{2}$ teaspoon each). Prepare your face (steam with a steam bath or a warm, damp towel). Then rub the pumpkin -buckwheat mixture into the skin for 2 minutes. Wash off the peeling with warm water.

- scrub with pepper and buckwheat flour

To prepare the scrub you will need: 100 g of ground coffee, 30 ml of hot pepper tincture, a teaspoon of ginger flour (powder) and a tablespoon of buckwheat flour. Mix everything thoroughly and keep the mixture in a dark place for 7 days. Scrub the pre-steamed skin of the body until redness. Then rinse with warm water and apply moisturizer.

Face masks based on buckwheat flour

- **Nourishing mask (for dry skin)**

Mix buckwheat flour (5 g) with cocoa powder and cosmetic coconut oil (10 g each). Apply to a cleansed face and hold for a quarter of an hour. Remove the mask with a damp soft towel or napkin.

- **Moisturizing mask**

Prepare a mixture of buckwheat flour (5 g), banana puree (take one medium-sized fruit) and 10 ml of heavy cream. Apply the mask on a washed face and hold for about half an hour. Remove the rest with a soft cloth.

- **Purifying mask**

Mix 10 g of buckwheat flour and liquid honey, add 2 drops of lemon essential oil to the mixture. Apply to the face with massaging movements. Wash off after 4-5 minutes with warm water.

- **Toning scrub mask**

Dilute 10 g of buckwheat flour in a small amount of warm water until the consistency of sour cream. Add to the mass 5 g of finely ground coffee and 5 ml of grape seed oil. Apply with gentle movements on the face, rubbing lightly. Wash off with warm water after 10 minutes.

- **Strengthening hair mask with buckwheat flour**

Required ingredients: 0.5 cups of milk, 2 tablespoons of buckwheat flour and one egg. Mix warm milk and flour and bring to a homogeneous state. Introduce the egg into the mixture. Apply evenly to hair. Leave the composition for half an hour, then rinse your hair well and wash with shampoo. ^[fourteen]

Other uses

- Buckwheat is a valuable honey plant, the flowers of which produce an impressive amount of pollen and nectar. Under conditions of sufficient moisture on one hectare of buckwheat, you can "collect" from 80 to 100 kg of honey. Buckwheat honey is useful, has a characteristic smell and pleasant taste.
- Buckwheat grain is an excellent animal feed for poultry. The inclusion of buckwheat grain in the diet of birds increases their egg production and improves the quality of meat.
- Buckwheat straw contains a lot of potassium, which makes it possible to obtain potassium carbonate (potash) from straw raw materials.
- Buckwheat husk is used in the production of plastics, in the microbiological industry in the production of fodder yeast; used as stuffing material for pillows and mattresses.
- Grinded buckwheat husk or ash from it is an excellent natural fertilizer for the land.
- The leaves and flowers of buckwheat are widely used in modern pharmacology for the synthesis of vitamin P. ^[3]

Dangerous properties of buckwheat and contraindications

Individual intolerance to buckwheat and buckwheat products can provoke significant allergic reactions.

The use of vitamin P is contraindicated in case of increased blood clotting.

Despite the undeniable dietary value, it should be borne in mind that steep buckwheat porridge contributes to the formation of constipation.

Buckwheat contains fluorescent phototoxic fagopyrins. Of course, buckwheat products are safe when consumed in moderation. But those on a diet based on buckwheat sprouts can develop fagopyrism (with excessive consumption of buckwheat sprouts, flowers, or extracts rich in fagopyrin). Symptoms of fagopyrism include inflammation of the skin in areas exposed to direct sunlight, sensitivity to cold, and tingling or numbness in the hands. ^[8,12]

Selection and storage

High-quality buckwheat is fresh, without the smell of mold or dampness. Buckwheat should be stored in a tightly closed jar in a cool place. If the conditions are violated or the shelf life is exceeded, the taste of cereals deteriorates. Not only the taste deteriorates, a musty and slightly rancid smell appears.

Story

The homeland of buckwheat is considered to be the highlands of India and Nepal, where it is believed that the plant was cultivated about 4000 years ago. Here, buckwheat grew in areas flooded in summer, abundantly flavored with sunlight, moisture and heat, which probably could not but affect the nature of its accelerated physiological development. From India, buckwheat entered China, Korea and Japan. In China, the first written sources mentioning the plant date back to the 5th century AD. From Central Asia and Tibet, buckwheat spreads to the Middle East and Europe, and then to North America. Among European peoples, the first written mention of buckwheat was recorded in the 16th century.

The first documented information about the cultivation of buckwheat in Russia dates back to the beginning of the 15th century. French traveler Guilbert Lannoa visits in 1414 and 1421. a number of Russian cities and in their reports mentions acquaintance with Russian cuisine and treats of buckwheat porridge. Documents from the 15th and 16th centuries testify to the wide distribution of this cereal crop in Russia (inventories of the Russian peasant household, act materials, monastic letters with instructions on the cultivation of buckwheat). In the 16th century, a separate trading row operated in Pskov, where only buckwheat was sold. Buckwheat grain was also supplied for sale in European countries. Buckwheat in the trade books of seaports is not inferior in terms of quantity to exported wheat. Smolensk buckwheat, brought from Russia, was appreciated at its true worth at the London International Exhibition and won prestigious awards.

According to most scientists, the theory of bringing buckwheat to Russia during the Mongol-Tatar invasions in the 13th century is considered unfounded. The conquering tribes did not grow grain or other crops, which was predetermined by their nomadic traditions. Italian diplomat Carpini Giovanni da Plano, who traveled through Mongolia in 1245-47. emphasized that the Mongols have neither bread nor its substitute culture. Two centuries later, the Venetian diplomat Contarini Ambrogio notes that the Mongols do not eat bread, eating meat and milk. A vessel with buckwheat seeds found in 1939 in a Sarmatian burial (in the Rostov region) also refutes the version of the "Mongolian trace", since the product belongs to the 2nd century BC. AD Subsequent similar finds dating back to the 10th and 12th centuries testify in favor of the fact that buckwheat was grown on Russian soil long before the Mongol-Tatar conquests. ^[3]

Varieties

The main task of breeders is to obtain varieties whose fruits would ripen more or less evenly and would be more firmly held on the plant. This is due to the peculiarities of buckwheat vegetation: it is characterized by non-simultaneous ripening of fruits. Branching, bud formation and flowering on each particular plant continues, while the fruits formed in the place of the first flowers have already ripened and begin to gradually crumble.

The most common varieties of buckwheat:

- Buckwheat "Zelenotsvetkovaya" ("Malikovskaya"). In the process of selection, a thickened and strong peduncle was obtained - a property that allows ripened buckwheat fruits not to crumble for a long time.
- Buckwheat "Bashkir Krasnostebel'naya". The variety was bred by breeders based on several buckwheat hybrids. A variety has been created as a source of raw materials for the production of the Rutin medical preparation. ^[one]

Growing features

Buckwheat is better than other crops adapted to infertile soils. It grows well on soils, the acidity of which has pH = 5-7. The most favorable for growing buckwheat are loamy and sandy soils.

The features of buckwheat cultivation include: conditional and floating sowing dates; a short vegetation period (from 75 to 80 days), which is a guarantee of its ripening as a so-called insurance crop.

Buckwheat is moisture-loving. The plant absorbs water masses twice as much as wheat and three times more than millet. The yield indicators of buckwheat directly depend on precipitation, which falls at the stages of the beginning of plant growth, the period of flowering and the formation of the ovary: at this time, the need for watering in buckwheat is the highest. The soil for sowing buckwheat should be well-drained. After sowing, the soil is rolled and leveled. Exceeding the level of applied nitrogen fertilizers can reduce yields. Yield indicators directly depend on the number of pollinating bees.

Pest control should be of a preventive nature (treatment of seeds with fungicides, etc.): buckwheat seedlings can be affected by the fungus, the roots are eaten by the cockchafer, and the leaves and stems by the caterpillar of the wheat scoop.^[four]

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Buckwheat - useful properties, composition and contraindications

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



Vitamin B12 - description, benefits, effects on the body and the best sources

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Abstract. The article discusses the main properties of the vitamin B12 and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The best natural sources of vitamin B12 are indicated. The use of the vitamin in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of vitamin B12 on the human body under certain medical conditions and diseases are analyzed separately.

Key words: vitamin B12 , vitamin B12 , benefits, harms, beneficial properties, contraindications, sources

Chemical formula:

$C_{63}H_{88}CoN_{14}O_{14}P$

Also known as: *cobalamin, cyanocobalamin , hydroxocobalamin , methylcobalamil , cobamamide , Castle extrinsic factor .*

Discovery history

In the 1850s, an English physician described a deadly form of anemia, attributing it to an abnormal gastric mucosa and a lack of stomach acid. Patients exhibited symptoms of anemia, inflammation of the tongue, numbness of the skin, and abnormal gait. There was no cure for the disease, and it was invariably fatal. The patients were malnourished, hospitalized and had no hope of treatment.

George Richard Minot , M.D. at Harvard, had the idea that substances in food could help patients. Minot teamed up with William Parry in 1923. Murphy , basing his research on previous work by George Whipple . In this study, dogs were brought to a state of anemia, and then they tried to determine which foods restore red blood cells. Vegetables, red meat, and especially liver were effective.

In 1926, at a convention in Atlantic City, Minot and Murphy reported the sensational discovery that 45 patients with pernicious anemia were cured by taking large amounts of raw liver. Clinical improvement was evident and usually occurred within 2 weeks. For this, Minot, Murphy, and Whipple received the Nobel Prize in Medicine in 1934. Three years later, William Castle, also a Harvard scientist, discovered that the disease was due to some factor in the stomach. People with their stomach removed often died of pernicious anemia, and eating the liver did not help. This factor, present in the gastric mucosa, was called "intrinsic" and was necessary for the normal absorption of "extrinsic factor" from food. "Intrinsic factor" was absent in patients with pernicious anemia. In 1948, "extrinsic factor" was isolated in crystalline form from the liver and published by Carl Folkers and co-workers. They called it vitamin B12.

In 1956, British chemist Dorothy Hodgkin described the structure of the vitamin B12 molecule, for which she received the Nobel Prize in Chemistry in 1964. In 1971, organic chemist Robert Woodward announced the successful synthesis of the vitamin after ten years of trying.

The fatal disease could now be easily treated with injections of pure vitamin B12 and without side effects. Patients recovered completely ^[2].

Products with the maximum content of vitamin B12 [11]:

Product	Content (µg/100 g)
Beef liver, fried	83.13
Beef liver, stewed	70.58
Beef liver, raw	59.3
Chicken liver, raw	16.58
Mussels, raw	12
shellfish	11.28
Tuna, raw	9.43
Sardines, canned in oil	8.94
Atlantic mackerel, raw	8.71
Rabbit	7.16
wild salmon	3.18
Swiss cheese	3.06
Mutton	2.39
Beef	1.97
Feta	1.69
Shrimp, raw	1.11
Chicken egg, raw	0.89
Whole cow's milk	0.45
Cottage cheese	0.43
Yogurt	0.37
Chicken breast	0.34

See also [Top 100 Natural Sources of Vitamin B 12](#).

Daily requirement for vitamin B12

The recommended intake for vitamin B12 is determined by the nutritional committees in each country and ranges from 1 to 3 micrograms per day. For example, the norm set by the US Food and Nutrition Board in 1998 is as follows ^[3]:

Age	Men: (mcg/day)	Women: (mcg/day)
babies 0–6 months	0.4 µg	0.4 µg
babies 7–12 months	0.5 mcg	0.5 mcg
Children 1–3 years	0.9 mcg	0.9 mcg
Children 4–8 years	1.2 mcg	1.2 mcg
Children 9–13 years old	1.8 mcg	1.8 mcg
Teenagers 14–18 years old	2.4 mcg	2.4 mcg
adults 19-50 years old	2.4 mcg	2.4 mcg
adults 51 years and older	2.4 mcg	2.4 mcg
pregnant any age	-	2.6 mcg
lactating any age	-	2.8 mcg

In 1993, the European Committee on Nutrition established the daily intake of vitamin B12:

Age	Men: (mcg/day)	Women: (mcg/day)
6–12 months	0.5 mcg	0.5 mcg
1–3 years	0.7 mcg	0.7 mcg
4–6 years	0.9 mcg	0.9 mcg
7–10 years	1.0 mcg	1.0 mcg
11–14 years old	1.3 mcg	1.3 mcg
15–17 years old	1.4 mcg	1.4 mcg
18 years and older	1.4 mcg	1.4 mcg
pregnant	-	1.6 mcg

lactating	-	1.9 mcg
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Comparative table of the recommended amount of vitamin B12 per day, according to data in different countries and organizations ^[4] :

European Union (including Greece)	1.4 mcg/day
Belgium	1.4 mcg/day
France	2.4 mcg/day
Germany, Austria, Switzerland	3.0 mcg/day
Ireland	1.4 mcg/day
Italy	2 mcg/day
Netherlands	2.8 mcg/day
Nordic countries	2.0 mcg/day
Portugal	3.0 mcg/day
Spain	2.0 mcg/day
Great Britain	1.5 mcg/day
USA	2.4 mcg/day
World Health Organization, Food and Agriculture Organization of the United Nations	2.4 mcg/day

The need for vitamin B12 increases in such cases:

- older people often have decreased gastric secretion of hydrochloric acid (resulting in reduced absorption of vitamin B12) and an increased number of bacteria in the gut, which can reduce the level of the vitamin available to the body;
- with atrophic gastritis, the body's ability to absorb natural vitamin B12 from food decreases;
- with malignant (pernicious) anemia, there is no substance in the body that helps absorb B12 from the alimentary tract;
- during gastrointestinal operations (for example, truncation of the stomach or its removal), the body loses cells that secrete hydrochloric acid and contain an internal factor that promotes the absorption of B12;
- in people on a diet that does not contain animal products; and also in infants whose breastfeeding mothers are vegetarian or vegan .

In all of the above cases, vitamin B12 deficiency can occur in the body, which can lead to very serious consequences. To prevent and treat these conditions, physicians prescribe a synthetic vitamin either orally or by injection ^[5] .

Physico-chemical properties of vitamin B12

In fact, vitamin B12 is a whole group of substances containing cobalt. It includes cyanocobalamin , hydroxocobalamin , methylcobalamin and cobamamide . In the human body, it is cyanocobalamin that is most active . This vitamin is considered the most complex in its structure, in comparison with other vitamins.

Cyanocobalamin has a dark red color, occurs in the form of crystals or powder. Has no smell or color. Soluble in water, resistant to air, but destroyed by ultraviolet rays. Vitamin B12 is very stable at high temperatures (the melting point of cyanocobalamin is from 300°C), but loses its activity in a very acidic environment. Also soluble in ethanol and methanol. Since vitamin B12 is water-soluble, the

body needs to get enough of it at all times. Unlike fat-soluble vitamins, which are stored in fatty tissues and gradually used by our organs, water-soluble vitamins are excreted from the body as soon as a dose above the daily requirement has been received ^[6,7].

Scheme of getting B12 into the blood:

Vitamin B12 is involved in the formation of genes, protects the nerves and helps in metabolism. However, for this water-soluble vitamin to function properly, it must be adequately consumed and absorbed. Various factors contribute to this.

In food, vitamin B12 is associated with a certain protein, which, under the influence of gastric juice and pepsin, dissolves in the human stomach. When B12 is released, a binding protein attaches to it and protects it while it is transported to the small intestine. Once the vitamin is in the gut, a substance called "intrinsic factor B12" separates the vitamin from the protein. This allows vitamin B12 to enter the bloodstream and perform its functions. In order for B12 to be properly absorbed by the body, the stomach, small intestine, and pancreas must be healthy. In addition, a sufficient amount of intrinsic factor must be produced in the gastrointestinal tract. Drinking large amounts of alcohol can also affect the absorption of vitamin B12 by reducing stomach acid production. ^[8,9].

Useful properties and its effect on the body

Interaction with other elements

While numerous diseases and medications can negatively affect the effectiveness of vitamin B12, certain nutrients can support its effect or even make it possible in general:

- **folic acid** : this substance is the direct "partner" of vitamin B12. It is responsible for converting folic acid back into its biologically active form after various reactions - in other words, it reactivates it. Without vitamin B12, the body quickly suffers from a functional deficiency of folic acid, as it remains in our body in an unusable form. On the other hand, vitamin B12 also requires the presence of folic acid: in one of the reactions, folic acid (more specifically, methyltetrahydrofolate) releases a methyl group for vitamin B12. Methylcobalamin then goes into a methyl group to homocysteine , whereby it is converted to methionine.
- **biotin** : The second biologically active form of vitamin B12, adenosylcobalamin , requires biotin (also known as vitamin B7 or vitamin H) and magnesium to perform its essential mitochondrial function. In the case of biotin deficiency, a situation may arise where there is sufficient adenosylcobalamin , but it is useless because its reaction partners cannot be formed. In these cases, symptoms of vitamin B12 deficiency may occur, although blood levels of B12 remain normal. On the other hand, a urinalysis shows a deficiency of vitamin B12, although in fact it is not. Supplementation with vitamin B12 would also not lead to the cessation of the corresponding symptoms, since vitamin B12 simply remains ineffective due to biotin deficiency. Biotin is very sensitive to free radicals, so getting extra biotin becomes necessary in cases of stress, heavy sports and illness.
- **Calcium** : Intestinal absorption of vitamin B12 by intrinsic factor is directly dependent on calcium. In cases of calcium deficiency, this method of absorption becomes extremely limited, which can lead to a slight vitamin B12 deficiency. An example of this is taking metoprolol , a diabetes drug that lowers intestinal calcium levels to the point where many patients develop a B12 deficiency. However, studies have shown that this can be compensated by the simultaneous administration of vitamin B12 and calcium. As a result of an unhealthy diet, many people suffer from high acidity. This means that most of the calcium consumed is used to neutralize the acid. Thus, excessive acidity in the intestines can lead to B12 absorption

problems. Vitamin D deficiency can also lead to calcium deficiency. In this case, it is advised to take vitamin B12 with calcium to optimize the rate of absorption of intrinsic factor.

- **vitamins B2 and B3** : they help convert vitamin B12 after it has been converted to its bioactive coenzyme form ^[10].

Absorption of vitamin B12 with other foods

Foods high in vitamin B12 are good to eat with black pepper. Piperine, a substance found in peppers, helps the body absorb B12. As a rule, we are talking about meat and fish dishes.

Research shows that consuming the right ratio of folic acid and B12 can improve health, strengthen the heart, and reduce the risk of developing Alzheimer's disease; however, if there is too much acid, it can interfere with B12 absorption and vice versa. Thus, maintaining an optimal amount of each is the only way to prevent a deficiency from occurring. Folic acid is found in leafy greens, beans, and broccoli, while B12 is found primarily in animal products such as fish, organic and lean meats, dairy, and eggs. Try to combine them!

Natural B12 or dietary supplements?

Like any other vitamin, B12 is best obtained from natural sources. There are studies that synthetic food additives can harm the body. In addition, only a doctor can determine the exact amount of a substance necessary for health and well-being. However, in some cases, synthetic vitamins are indispensable.

In dietary supplements, vitamin B12 is usually present as cyanocobalamin, a form that the body readily converts to the active forms methylcobalamin and 5-deoxyadenosylcobalamin. Dietary supplements may also contain methylcobalamin and other forms of vitamin B12. Existing evidence does not show any difference between the forms in terms of absorption or bioavailability. However, the body's ability to absorb vitamin B12 from dietary supplements is largely limited by the ability of intrinsic factor. For example, only about 10mcg of a 500mcg oral supplement is actually absorbed by healthy individuals ^[5].

Vegetarians and vegans should especially think about the additional intake of vitamin B12. B12 deficiency among vegetarians depends mainly on the type of diet they follow. Vegans are most at risk. Some B12-fortified cereal products are a good source of the vitamin and often contain more than 3 micrograms of B12 for every 100 grams. In addition, some brands of nutritional yeast and flakes are fortified with vitamin B12. A variety of soy products, including soy milk, tofu, and meat substitutes, also contain synthetic B12. It is important to look at the composition of the product, since not all of them are fortified with B12, and the amount of the vitamin can vary.

Various infant formulas, including those based on soy, are fortified with vitamin B12. Formula-fed newborns have higher vitamin B12 levels than breastfed babies. While exclusive breastfeeding is recommended during the first 6 months of a baby's life, adding a fortified formula with vitamin B12 during the second half of infancy can be quite beneficial.

A few recommendations for those who adhere to vegetarianism and veganism :

- Make sure you have a reliable source of vitamin B12 in your diet, such as fortified foods or dietary supplements. As a rule, it is not enough to consume only eggs and dairy products.
- Ask your healthcare provider to check your B12 levels once a year.
- Make sure your vitamin B12 levels are normal before and during pregnancy and if you are breastfeeding.
- Older vegetarians, especially vegans, may need higher doses of B12 due to age-related issues.

- Higher doses are likely to be needed for people who are already deficient. According to the professional literature, doses ranging from 100 micrograms per day (for children) to 2000 micrograms per day (for adults) are used to treat people with vitamin B12 deficiency ^[12].

The following table contains a list of foods that can be included in a vegetarian and vegan diet and are great for maintaining normal B12 levels in the body ^[13]:

Product	Vegetarianism	Veganism	Comments
Cheese	Yes	Not	Cheese is an excellent source of vitamin B12, but some types contain more than others. Swiss cheese, mozzarella, feta are recommended.
Eggs	Yes	Not	The largest amount of B12 is found in the yolk. The richest in vitamin B12 are duck and goose eggs.
Milk	Yes	Not	
Yogurt	Yes	Not	
Vegetarian Spreads with Nutritional Yeast	Yes	Yes	Most spreads can be consumed by vegans. However, you need to pay attention to the composition of the product, as not all spreads are enriched with vitamin B12.

Application in official medicine

Health Benefits of Vitamin B12:

- Possible preventive effect against cancer: Vitamin deficiency leads to problems with folic acid metabolism. As a result, the DNA cannot replicate properly and gets damaged. Experts believe that damaged DNA can directly contribute to the formation of cancer. Vitamin B12 supplementation along with folic acid is being researched as a way to help prevent and even treat certain types of cancer.
- Promotes Brain Health: Low levels of vitamin B12 have been seen to increase the risk of Alzheimer's in older men and women. B12 helps keep homocysteine levels low, which may play a role in the development of Alzheimer's disease. It is also important for focus and may help reduce ADHD symptoms and poor memory.
- May prevent depression: Numerous studies have shown a correlation between depression and vitamin B12 deficiency. This vitamin is essential for the synthesis of a neurotransmitter associated with mood regulation. One study, published in the American Journal of Psychiatry,

examined 700 women with disabilities over the age of 65. Researchers have found that women with vitamin B12 deficiency are twice as likely to suffer from depression.

- Prevention of anemia and healthy blood formation: Vitamin B12 is essential for the healthy production of red blood cells that are normal in size and maturity. Immature as well as undersized red blood cells can lead to lower blood oxygen levels, general symptoms of weakness and exhaustion.
- Maintain optimal energy levels: As one of the B vitamins, vitamin B12 helps turn proteins, fats and carbohydrates into "fuel" for our body. Without it, people often experience chronic fatigue. Vitamin B12 is also required for neurotransmitter signaling, which helps muscles contract and maintains energy levels throughout the day ^[1].

Vitamin B12 in dosage form can be prescribed in such cases:

- with hereditary vitamin deficiency (Immerslud-Grasbeck disease). It is prescribed as an injection, first for 10 days, and then throughout life once a month. This therapy is effective for people with impaired vitamin absorption;
- with pernicious anemia. Usually in the form of injections, oral or nasal preparations;
- with a deficiency of vitamin B12;
- with cyanide poisoning;
- with high levels of homocysteine in the blood. Taken in combination with folic acid and vitamin B6;
- with an age-related eye disease called age-related macular degeneration;
- with skin lesions shingles. In addition to relieving skin symptoms, vitamin B12 may also relieve pain and itching in this disease;
- with peripheral neuropathy ^[14].

In modern medicine, three synthetic forms of vitamin B12 are most common - cyanocobalamin, hydroxocobalamin, cobalamin. The first is used in the form of intravenous, intramuscular, subcutaneous or intralumbar injections, as well as in the form of tablets. Hydroxocobalamin can only be administered under the skin or into muscles. Cobalamin is given by injection into a vein or muscle, or taken by mouth. It is the fastest of the three types. In addition, these drugs exist in the form of powders or ready-made solutions. And, without a doubt, vitamin B12 is often included in multivitamin preparations.

The use of vitamin B12 in traditional medicine

Traditional medicine, first of all, advises taking foods rich in vitamin B12 for anemia, weakness, and a feeling of chronic fatigue. Such products are meat, dairy products, liver.

There is an opinion that vitamin B12 can have a positive effect on psoriasis and eczema. Therefore, folk doctors advise using ointments and creams, which include B12, externally and in the form of courses of treatment.

Vitamin B12 in the latest scientific research

- Scientists from the Norwegian Institute of Science and Technology have determined that a lack of vitamin B12 during pregnancy is associated with an increased risk of preterm birth. The study involved 11216 pregnant women from 11 countries. Premature births and underweight fetuses are responsible for a third of the nearly 3 million newborn deaths each year. The researchers determined that the results also depended on the country of residence of the mother of the fetus - thus, high B12 levels were associated with a high birth weight ratio in low- and

middle-income countries, but did not differ in countries with a high level of residence.

However, in all cases, vitamin deficiency has been associated with a risk of preterm birth ^[15].

- A study based at the University of Manchester shows that adding high doses of certain vitamins to traditional treatment - especially vitamins B6, B8 and B12 - can significantly reduce the symptoms of schizophrenia. Such doses reduced mental symptoms, while low amounts of vitamins were ineffective. In addition, B vitamins have been noted to be most beneficial in the early stages of the disease ^[16].
- Norwegian scientists have found that low levels of vitamin B12 in infants are associated with a subsequent decline in children's cognitive abilities. The study was conducted among Nepalese children, since vitamin B12 deficiency is very common in South Asian countries. Vitamin levels were first measured in neonates (aged 2 to 12 months) and then in the same children 5 years later. Children who had lower B12 levels performed worse on tests such as putting together a puzzle, recognizing letters, and interpreting the emotions of other children. Vitamin deficiency was most often caused by insufficient consumption of animal products due to the low standard of living in the country ^[17].
- A first-of-its-kind, long-term study from the Center for Cancer Research at Ohio State University shows that long-term supplementation of vitamins B6 and B12 leads to an increased risk of lung cancer in male smokers. The data was collected from more than 77,000 patients who took 55 micrograms of vitamin B12 every day for 10 years. All participants were in the 50 to 76 age group and were enrolled in the study between 2000 and 2002. As a result of observations, it was revealed that in men who smoke, the risk of developing lung cancer was four times higher than in those who did not take B12 ^[18].
- A recent study suggests that taking certain vitamins such as B12, D, coenzyme Q10, niacin, magnesium, riboflavin, or carnitine may have a therapeutic effect on migraine attacks. This neurovascular disease affects 6% of men and 18% of women worldwide and is a very serious condition. Some scientists claim that it may be due to a lack of antioxidants or mitochondrial dysfunction. As a result, these vitamins and microelements, having antioxidant properties, can improve the patient's condition and reduce the symptoms of the disease. ^[19].

The use of vitamin B12 in cosmetology

It is believed that vitamin B12 has a beneficial effect on the condition of the hair. By applying cyanocobalamin topically, you can add beautiful shine and strength to your hair. To do this, it is advised to use pharmacy vitamin B12 in ampoules, adding it to masks - both natural (based on oils and natural products) and purchased. For example, the following masks will benefit the hair:

- mask, which contains vitamins B2, B6, B12 (from ampoules), almond oil and burdock oil (a tablespoon), 1 raw chicken egg. All ingredients are mixed and applied to the hair for 5-10 minutes;
- a mixture of vitamin B12 (1 ampoule) and 2 tablespoons of red pepper. With such a mask, you need to be extremely careful and apply it only to the hair roots. It will strengthen the roots and accelerate hair growth. You need to keep it no longer than 15 minutes;
- mask with vitamin B12 from the ampoule, a teaspoon of castor oil, a teaspoon of liquid honey and 1 raw chicken yolk. This mask can be washed off an hour after application;

The positive effect of vitamin B12 is observed when it is applied to the skin. It is believed that it helps to smooth out the first wrinkles, tone the skin, renew its cells and protect it from the harmful effects of the external environment. Cosmetologists advise using pharmacy vitamin B12 from an ampoule, mixing it with a fatty base - be it oil, sour cream or petroleum jelly. An effective anti-aging mask is a mask of liquid honey, sour cream, chicken egg, lemon essential oil, with the addition of vitamins B12 and B12 and aloe vera juice. This mask is applied to the face for 15 minutes, 3-4 times a week. In

general, vitamin B12 for skin works well with cosmetic oils and vitamin A. However, before using any cosmetic substance, it is worth testing for an allergy or adverse skin reaction.

The use of vitamin B12 in animal husbandry

Like humans, some animals produce intrinsic factor in their bodies, which is necessary for the absorption of the vitamin. Such animals are monkeys, pigs, rats, cows, ferrets, rabbits, hamsters, foxes, lions, tigers and leopards. Intrinsic factor has not been found in guinea pigs, horses, sheep, birds, and some other species. It is known that in dogs only a small amount of the factor is produced in the stomach - most of it is located in the pancreas. Factors affecting the absorption of vitamin B12 in animals - deficiency of protein, iron, vitamin B6, removal of the thyroid gland, hyperacidity. The vitamin is stored mainly in the liver, as well as the kidneys, heart, brain and spleen. As in humans, the vitamin is excreted in the urine, while in ruminants it is mainly excreted in the faeces.

Dogs rarely show signs of vitamin B12 deficiency, however, they need it for normal growth and development. The best sources of B12 are the liver, kidneys, milk, eggs, and fish. In addition, most ready-made feeds are already enriched with essential vitamins and minerals, including B12.

Cats need about 20 micrograms of vitamin B12 per kilogram of body weight to maintain normal growth, pregnancy, lactation, and hemoglobin levels. Studies show that kittens can go without vitamin B12 for 3-4 months without noticeable effects, after which their growth and development slows down significantly to a complete halt.

The main source of vitamin B12 for ruminants, pigs and poultry is cobalt, present in soil and feed. Vitamin deficiency is manifested in growth retardation, poor appetite, weakness, and nervous diseases [20].

The use of vitamin B12 in crop production

For many years, scientists have been trying to find a way to get vitamin B12 from plants, since the main natural source of it is animal products. Some plants are able to absorb the vitamin through their roots and thus enrich themselves with it. For example, barley grains or spinach contained a significant amount of vitamin B12 after fertilizer was added to the soil. Thus, through such research, opportunities are expanding for people who cannot get enough of the vitamin from its natural sources [21].

Myths about vitamin B12

- **Bacteria in the mouth or gastrointestinal tract produce enough vitamin B12 on their own.** If this were true, vitamin deficiency would not be so common. You can only get the vitamin from animal products, artificially fortified foods or nutritional supplements.
- **Sufficient amounts of vitamin B12 can be obtained from fermented soy foods, probiotics, or algae (such as spirulina).** In fact, these products do not contain vitamin B12, and its content in algae is very controversial. Even though present in spirulina, it is not the active form of vitamin B12 required by the human body.
- **It takes 10 to 20 years for vitamin B12 deficiency to develop.** In fact, deficiency can develop quite quickly, especially with a sudden change in diet, for example, when switching to a vegetarian or vegan diet [12].

Contraindications and warnings

Signs of a vitamin B12 deficiency

Clinical cases of vitamin B12 deficiency are extremely rare, and in most cases they are due to serious metabolic disorders, diseases, or a complete rejection of foods containing the vitamin. Only a doctor can determine whether there is a lack of a substance in your body by conducting special studies. However, if the level of B12 in the blood serum approaches the minimum, some symptoms and discomfort may occur. The most difficult thing in this situation is to determine whether your body really lacks vitamin B12, as its deficiency can masquerade as many other diseases. Symptoms of vitamin B12 deficiency may include:

- irritability, suspicion, personality change, aggression;
- apathy, drowsiness, depression;
- dementia, decreased intellectual abilities, memory impairment;
- in children - developmental delay, manifestations of autism;
- unusual sensations in the limbs, tremors, loss of sense of body position;
- weakness;
- vision changes, damage to the optic nerve;
- incontinence;
- problems of the cardiovascular system (ischemic attacks, stroke, myocardial infarction);
- deep vein thrombosis;
- chronic fatigue, frequent colds, loss of appetite.

As you can see, vitamin B12 deficiency can “mask” as many diseases, and all because it plays a very important role in the functioning of the brain, nervous system, immunity, circulatory system and DNA formation. That is why it is necessary to check the level of B12 in the body under medical supervision and consult a specialist about suitable treatments.

Vitamin B12 is considered to have a very low potential for toxicity, so there is no medical evidence of a borderline intake or evidence of excess vitamin intake. It is believed that excess vitamin B12 is excreted from the body on its own.

Interaction with drugs

Some medicines can affect the level of vitamin B12 in the body. These drugs are:

- chloramphenicol (chloromycetin), a bacteriostatic antibiotic that affects vitamin B12 levels in some patients;
- drugs used to treat stomach ulcers and reflux, these can interfere with B12 absorption by slowing the release of stomach acid;
- metformin , which is used to treat diabetes.

If you are taking these or any other medications on a regular basis, you should consult with your healthcare professional about their effects on your vitamin and mineral levels ^[22].

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Vitamin B12 - useful properties, composition and contraindications

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Abstract. The article discusses the main properties of the vitamin B12 and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The best natural sources of vitamin B12 are indicated. The use of the vitamin in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse

effects of vitamin B12 on the human body under certain medical conditions and diseases are analyzed separately.