



## Apple (lat. *Malus domestica* )

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

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

## Beneficial features

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

Main substances (g / 100 g):	Fresh Apple Golden : <sup>[6]</sup>
Water	85.81
Carbohydrates	13.6
Alimentary fiber	
Squirrels	0.28
Fats	0.15
Calories ( kcal )	57
Minerals (mg/100 g):	
Potassium	100
Calcium	6
Phosphorus	ten
Magnesium	5
Sodium	2
Vitamins (mg/100 g):	
Vitamin B4	5.1
Vitamin E	0.18

Vitamin B3	0.094
Vitamin B 5	0.074
Vitamin B 6	0.051

The chemical composition of apples is different for fruits of different varieties, it is determined by the degree of maturity, the conditions in which the apple tree is cultivated, depends on the shelf life and other factors. The amount of water in fruits can vary from 84 to 90%, sugars - from 5 to 15%, fiber - from 0.59 to 1.38%, and tannins - 0.025 to 0.27%. [3]

### Medicinal properties

Medicinal plants include forest apple. Its fruits contain carbohydrates: phytyglycogen , pectins; organic acids: malic, tartaric, citric; carotenoids , vitamin C, chlorogenic acid, tannins, catechins, flavonoids , anthocyanins, leucoanthocyanidins , essential oil, organic compounds of iron and phosphorus. The composition of the leaves includes dihydrochalcones : phloretin , phloridzin ; flavonoids : hyperin , quercetin , quercitrin , isoquercitrin , rutin, naringenin ; catechins, ascorbic acid.

Tea from the fruits of the forest apple tree is prescribed for urolithiasis, gout, rheumatism, cough and hoarseness, gastric catarrh and colitis. Baked apples are recommended for chronic constipation. Fresh apples are indicated for gastritis with low acidity ( hypoacid gastritis), spastic colitis, biliary dyskinesia of the hypokinetic type, and beriberi. Externally , freshly grated apples are used to treat abrasions, burns, frostbite, ulcers that do not heal for a long time, cracks in the nipples in nursing. In dermatology, apple applications are used for inflammatory skin diseases. A decoction of apple leaves is used as a source of vitamin C. [8]

### In medicine

*Extractum* is made from the fruit of the wild apple tree. *ferry pomati* . Malic acid extract is prescribed for hypochromic anemia.

### In folk medicine

With urolithiasis, gout, rheumatism, catarrh of the stomach, colitis, cough and hoarseness, tea from the fruits of the wild apple tree is useful: 10 fruits are crushed and boiled in a liter of water for 10 minutes. Honey or sugar is added to taste.

In case of hypovitaminosis, for the prevention of beriberi, a decoction is prepared from the leaves of the forest apple tree: finely chopped raw materials are poured with water (1 part of the leaves of the apple tree and 4 parts of boiling water) and boiled for a quarter of an hour. Filter and take a dessert spoon three times a day.

With dysentery, vomiting, you need to eat several sour fresh apples during the day.

A recipe is used as a mild laxative: cut two medium apples into slices, pour 200 ml of milk and 100 ml of water. Cook over low heat for at least 5 minutes. Let it brew. Take in the morning on an empty stomach.

Popular in folk medicine are products based on apple cider vinegar. Among them are apple cider vinegar treatment regimens and recipes according to the system of D. Jarvis, B. V. Bolotov .

### Externally:

With increased sweating of the palms, baths with the addition of a few teaspoons of apple cider vinegar are recommended.

Brittle nails are treated with baths of vegetable oil and apple cider vinegar (1:1). The duration of the procedure is 10 minutes.

From cracked heels, the following drug helps: an apple is boiled in milk and ground into a pulp. The resulting mass is spread on the damaged areas, covered with a clean cloth and kept for half an hour.

An ointment of pureed apples and softened butter is used for cracked lips, for healing wounds and scratches.

True warts are rubbed with a fresh cut of an apple for several minutes up to 6 times a day for a month. [5,8]

### **in oriental medicine**

In the ancient "Canon of Medicine" by Avicenna, recommendations for the daily use of apple fruits are preserved: the famous healer highly appreciated the healing potential of apples.

In the medical system of Tibet, the apple is called Kushu . Tibetan healers attribute to the fruit the functions of reducing gas formation in the intestines and point to the absorbent properties of the apple.

Chinese medicine, which classifies foods according to the degree of Yin and Yang they contain , defines an apple as a product with a predominance of Yang and designates its coefficient as "+2". [9]

### **In scientific research**

**Apple against cancer:** do apples help fight cancer? Yes, the use of apples in cancer therapy is not unreasonable, according to research from the University of Cornwall. For more than 3 weeks in laboratory conditions, it was found that the condition of experimental animals with a breast tumor improved by 17% in the group that received a daily dose of one apple, and by 30% in that part of the study animals that received an apple per day. three times more extract. [ten]

A direct link between the use of apples and the prevention of cancer was also shown by tests conducted on humans. According to the results of a study by Boyer J., Liu R. (2004), the inclusion of one or more apples in the daily diet of patients reduces the risk of developing various types of cancer, as well as the occurrence of cardiovascular diseases. [eleven]

### **Weight regulation**

Apples do not contain saturated fats and cholesterol, and therefore are an excellent food for heart patients and those suffering from obesity. Apple diet can reduce blood cholesterol levels by 30%. Apple varieties (sour), in which a small amount of sugar is useful for patients with diabetes. [5]

### **In cooking**

Apples are a unique product used in desserts, second courses, pastries, salads, sauces. The bird is stuffed with apples; they are baked with meat or fish; stew with vegetables; fried with liver; add to the herring in mincemeat. Apples are delicious in casseroles, pancakes, cheesecakes, cereals and puddings. Apples are pickled, dried, soaked apples are harvested for future use.

Fruit soups made from apples are useful (as a mono-variation or with the addition of other fruits). They are prepared on the basis of applesauce from baked apples, juice or pureed raw fruits. Served with honey, sour cream or cream.

Soft and sweet varieties of apples are suitable for making jams, marshmallows, marmalade. When baking, the culinary specialist prefers hard and green apples with a dense peel. Such fruits do not add excess moisture to the dough and it does not have to be further thickened. <sup>[3]</sup>

### **Apple recipes:**

- Tufakhia

This is a Bosnian dessert (apples stuffed with nuts and raisins).

You will need: 4 medium hard apples, 2 cups sugar, 3 cups water, juice of half a lemon, half a cup of shelled walnuts, a tablespoon of raisins, whipped cream for serving.

Prepare syrup in a deep frying pan or saucepan: bring water to a boil, add sugar and add lemon juice. Peel the apples, make a hole in the place of the stalk and carefully cut out the core. Dip the whole apples into the prepared boiling syrup and cook for 5 to 10 minutes (the finished apple should be easily pierced with a fork, while remaining whole). Remove apples from syrup and let cool. Put the peel of apples into syrup and boil over low heat for about 20 minutes, until the volume of liquid is reduced by half. Drain remaining syrup and refrigerate. Grind nuts and raisins, mix. Stuff apples with walnut-raisin filling, pour over them with cooled syrup and garnish with cream. <sup>[12]</sup>

- apple chutney

Chutney is a traditional Indian sauce, often very hot and spicy, cooked from vegetables or fruits.

You will need products: 30 medium-sized sweet and sour apples, 60 g salt, 300 g cane sugar, 100 g onions, 1 clove of garlic, 80 g ground ginger, 14 g dry chili peppers, 28 g mustard seeds, 100 g raisins, 900 ml of vinegar.

Peel apples, seeds, cut into slices, put in a deep saucepan, add sugar and vinegar, and boil until the apples soften. Soak mustard seeds in vinegar, then dry thoroughly. Crush the raisins. Cut the peeled garlic and onion into slices, mix with chopped chili, ginger and mustard seeds and grind everything in a mortar. When the apples are boiled, combine all the ingredients with the apple mass, mix well and let cool. Divide into jars and store in the refrigerator. Apple chutney is served with fish, poultry, pork, rice, flatbread or homemade bread.

### **In cosmetology**

Cosmetic recipes use apple peel, apple juice or fruit pulp.

- Apple hair mask

Peel and seeds 2 large apples, mash them. Mix applesauce with 2 tablespoons of apple cider vinegar, a teaspoon of lemon juice and a tablespoon of cornmeal, bring to a homogeneous state. Apply the mixture to dry hair and leave the mask on for half an hour. Rinse with warm water and then wash and dry your hair as usual.

- Apple face masks

Apple mask for normal skin: grate the peeled apple on a fine grater. Mix grated apple with a teaspoon of sour cream (or any vegetable oil) and the same amount of starch. Apply a homogeneous mixture on the face and neck for 20 minutes. Wash off with warm water.

Vitaminizing mask for any type of skin: apply gruel from a grated apple to the face, hold for a quarter of an hour and rinse with cool water (if the skin is dry, apply a little softening cream on the face first).

- Rejuvenating mask

Boil the apple in a small amount of water, puree, mix with a couple of drops of olive oil and a teaspoon of honey. Apply to cleansed face for 15 minutes.

For facial skin care in the cold season: prepare a mask from a tablespoon of oatmeal, the juice of one apple and a small amount of milk. Apply to face and neck for 30 minutes, then rinse with warm water.

- apple mask for dry skin

Mix an apple pounded into gruel with a teaspoon of honey and a tablespoon of chopped oatmeal. Apply to the face, hold the mask for a quarter of an hour, rinse with warm water.

Combine 2 teaspoons of cottage cheese with a teaspoon of apple juice, half the yolk and a teaspoon of camphor oil. Apply to face, hold for 15 minutes. Rinse first with warm, and then with cool water.

- apple mask for oily skin

Mix a tablespoon of baked apple puree with a tablespoon of whipped protein. Keep the mask for at least 15 minutes, then rinse with cold water.

Grind the apple and boil a tablespoon of raw apple for a couple of minutes in 40 ml of milk or cream. Let it brew for half an hour. Add whipped protein to the mass. Apply to face and wash off with cool water after 15 minutes. <sup>[5]</sup>

### **Combination with other products**

In a culinary sense, an apple works well paired with semi-acid and sweet fruits, citrus fruits, carrots, fermented milk products (yogurt, kefir). A good compatibility of an apple with meat and protein products enriched with fats: cheese, full-fat cottage cheese, nuts. But starchy foods in combination with an apple cause fermentation.

### **Beverages**

Tea, kvass, juices, cocktails, punches, fruit drinks are prepared from various varieties of apples (with the addition of other components). Apple juice perfectly quenches thirst, acts as an aperitif. It is drunk neat or mixed with a variety of fruit or vegetable juices (carrot, tomato, pumpkin, parsley or celery juice). Compotes are made from fresh and dried apples. Some varieties of apples boil quickly, so you don't need to boil them, but you should put them in boiling syrup and cool them right away. Apples are used in the basis of both non-alcoholic and alcoholic drinks (calvados, apfelwein).

- Kvass from fresh apples

To prepare kvass, you will need: 15 medium-sized sour apples, 2.5 cups of sugar or honey, half a glass of blackcurrant juice, 2 tablespoons of raisins, 20 g of yeast, a tablespoon of ground cinnamon, zest of one orange and lemon, 5 liters of water.

Peel the apples from the core, chop together with the peel, add water and cook for a quarter of an hour. Then strain and let the broth cool down to 20 °C, add sugar or honey, yeast, cinnamon, citrus zest, currant juice, raisins and leave in a warm place for 2 days. After kvass pour into bottles and store in a cool place. Serve with crushed ice.

- Apple bowl

Ingredients: 1.5 kg of sweet apples, 2 lemons, 2 liters of cold strong tea, 2.5 cups of sugar, a bottle of champagne. Peel the apples, cut into quarters, cut out the seeds, then chop into thin slices, put in an enamel pan, squeeze the juice of 2 lemons and the grated zest of half a lemon, pour in chilled strong, freshly brewed tea, add sugar, mix, cover and leave in cold place for 5 hours. Before serving, transfer the mass to a bowl and pour champagne over it.

- apple cider

Ingredients needed: 10 apples, water,  $\frac{3}{4}$  cup sugar, a tablespoon each of powdered cinnamon and ground allspice.

Cut the apples into quarters, remove the core. Put the prepared apples in a saucepan, pour water so that it covers the apples by about 5 cm. Pour in sugar, cinnamon and allspice. Bring to a boil and cook over medium heat, uncovered, for 60 minutes. Then cover with a lid and boil over low heat for another 2 hours. Let cool and strain. Ready cider to keep in the refrigerator.

- Apples in winemaking

The best varieties for winemaking are apples of autumn and winter varieties: the level of sugar, tannins and acids contained in them is higher than in summer varieties. Excellent wines are obtained from the varieties *Antonovka*, *Parmen winter gold*, *Slavyanka*, *Anis*. Exquisite wine is made from the summer variety *Grushovka Moskva*. Excellent quality wines can be obtained from Chinese and ranetki, but given the high acidity of these apples, the juice of their fruits should be diluted with water or the juice of sweeter apple varieties. The blends use the juice of wild apples.

Apple wines tend to lose flavor and freshness during storage, so they are best consumed in the year they are made. This does not apply to the wine product from ranetki and kitayek: in view of their astringency, these wines should be aged for at least 2 years. During this period, their taste softens.

best to use apples for making semi-sweet or dry wines. <sup>[13]</sup>

## Other uses

- An apple successfully replaces toothpaste with a brush: after eating a fresh hard apple, you can not only have a snack, but also brush your teeth. The fruit used for this purpose should be quite hard, sweet and sour.
- The skin on the hands that has darkened from kitchen chores can be bleached and cleaned with an apple peel.
- The ability of apples to remove radionuclides justifies one of the ways to “cleanse” food: to reduce the radioactivity of a food product, it can be covered with layers of thin apple slices and

left for several hours (from 3 to 6). The readings of the instruments indicate that the radiation background of the product after such a procedure is reduced.

- Many types of apple trees are highly productive honey plants. Apple trees of certain species and varieties have an ornamental value. In turning and carpentry, apple wood has found wide application: the material from it is strong and dense, easy to cut and polish.
- Apples are great craft material. You can create funny animals out of them, make stencils for color printing from apple halves, cut out a recess in the fruit and get original decorative candlesticks for pillar candles. <sup>[1,5]</sup>

### **Dangerous properties of apples and contraindications**

- Sour varieties of apples are forbidden for those who suffer from stomach and duodenal ulcers and hyperacid gastritis (gastritis with high acidity).
- Fresh sweet apples and undiluted apple juice can help raise blood sugar levels. Therefore, they should be used with extreme caution by those diagnosed with diabetes.
- Apple seeds contain cyanide and are poisonous. But the amount of poisonous substance in the seeds per one apple is negligible. A full cup of apple seeds can be considered a lethal dose for a person.
- An apple can cause an allergic reaction in individuals with individual intolerance (allergies in patients can be provoked not only by an apple, but also by other members of the Rose family: apricot, plum, peach, almond, pear).
- Drug Interactions: Apple juice reduces the body's absorption of the antihistamine fexofenadine, reducing its effectiveness. <sup>[fifteen]</sup>

### **Botanical description**

In a botanical aspect, *an apple* is the fruit of an apple tree (tree or shrub), a representative of the tribe *Apple*, subfamily *Plum*, family *Pink (Rosaceae)*. The name of the genus Apple tree in Latin - "**Mālus**" - according to one version, goes back to borrowing from Greek (gr. "**mēlon**", denoting both "*apple*" in particular, and any fruit).

### **origin of name**

The word "apple" in Russian, according to a group of linguists, originates from the Indo-European "*albho*" - ("*white*"). A less popular version connects the etymology of the word "apple" with the ancient city of Abella (Campania region in modern Italy), famous for its apple harvests.

Within the genus, there are 62 species of apple trees. Among them, the following species are the most common and significant in terms of the degree of use in various industries or are the ancestors of modern varieties: domestic (cultivated), forest (wild), low, pubescent, Caucasian (eastern), Alma -Ata (Siversa), plum -leaved (Chinese), Siberian berry. <sup>[1,2]</sup>

### **Story**

The apple tree has been a companion of mankind since time immemorial. The homeland of the wild apple tree is considered to be the Tien Shan mountains in the south of Kazakhstan.

It is believed that the apple tree appeared on the territory of Europe thanks to the Greeks, who developed intensive trade and business relations with the most distant peoples. Over time, a wild-growing apple tree was cultivated by man: the best samples were selected, growing conditions were improved.

In the 4th century BC. Theophrastus describes apple varieties bred by gardeners and the most popular in Hellas. Later, the Romans Cato , Varro , Callumella , Pliny and Virgil already named 36 apple varieties in their writings, indicating the techniques for grafting cultivated fruit plants.

The apple culture migrated to the population of the Western European region from Ancient Greece and Rome. By the beginning of the 16th century, the development of this branch of horticulture accelerated. Less than a hundred years later, in Europe, a detailed description of already 60 varieties of apple trees was given, among them those that are cultivated in our time: Stettin red, Calvil white, Short-legged red, Star-shaped.

The apple tree came to the eastern and southern Slavs in the 10th century through another intermediary - Byzantium. The cultivation of apple trees was given increased attention in the Kiev principality, the apple orchard founded by Anthony of the Caves (1051) was widely known. In the 12th century, Yuri Dolgoruky initiated the laying of apple orchards in the Moscow region. Apple culture entered a new round of development under Peter I. The 18th century was marked by the discovery of the science of pomology and the activities of its founder A.T. Bolotov , a detailed study of the varieties of apples and pears known at that time. Years later, the works of Michurin I.V. were devoted to the breeding of new varieties.

## **Varieties**

There are more than 10 thousand varieties of apple trees. All their diversity is divided into summer, autumn, winter and late winter varieties.

Summer varieties include: Grushovka Moscow, Melba , Papirovka .

Velvet, Bessemyanka Michurinskaya, Borovinka, Cinnamon striped, Shtreifling , Kitaika form a group of autumn apple varieties.

Winter varieties of apples: Antonovka, Minskoe, Slavyanka, Welsey , Delicious , Jonathan.

Varieties Aurora Crimean, Babushkino, Bananovoe, Golden Delicious , Saltanat , Boyken are considered late winter varieties. <sup>[3]</sup>

## **Growing features**

For planting apple seedlings choose a sunny area. Light requirements come down to a simple rule: trees should receive a portion of direct sunlight for at least 6 hours a day. The distance between individual planted trees is from 4.5 to 5.5 m. Before planting, it is necessary to make sure that the seedlings do not fall into the so-called "frost pocket" - a low-lying fragment of the site in which cold air usually settles.

You should also clear the soil: remove weeds and grass. If the roots of the seedling have dried up, on the eve of planting they need to be fed with water. Young apple seedlings are planted in autumn (second half of October) or early spring. The planting hole is dug up to 0.6 m deep, the width is calculated as follows: the approximate diameter of the root system of the seedling is doubled. Top dressing with fertilizers during planting is possible, but without the use of nitrogen fertilizers and lime, as they cause burns to the root system. After planting and backfilling the planting pit, the stem of the seedling is fixed at the peg support. Form a hole and water abundantly. Then mulch. Pruning of young apple trees is carried out annually in the spring (on the first, second, third, fourth and fifth year after planting). Watering seedlings is rare, but plentiful. According to the schemes for the years of planting, top dressing and preventive spraying are carried out. <sup>[four]</sup>



## picking apples

There are two degrees of fruit maturity: removable (botanical) and consumer (edible). The removable maturity of the fruit coincides with the completion of growth processes and the accumulation of nutrients in the pulp of apples. The fruit no longer grows in size and is easily removed from the branch. The consumer maturity of the fruit is determined by the moment of manifestation in the apple of the aroma, taste and color inherent in this particular variety. These two degrees of maturity occur simultaneously in summer varieties. In autumn and winter varieties, removable maturity is ahead of consumer maturity by a month or more. The harvest of summer varieties is timed to the stage of consumer maturity of the fruit. Eating apples of autumn and winter varieties must be strictly timed: too early harvesting does not leave time for the sour fruits to “ripen”, and untimely belated harvesting leads to the fact that apples become unsuitable for long-term storage. It is wrong to pick apples by shaking or knocking them off the tree. The apple must be carefully removed into the branches, without damaging the stalk. <sup>[3]</sup>

## Selection and storage

A ripe apple, in the process of growing which was done without the use of nitrates, has a pronounced aroma. The color of the fruit also matters: the apple should not be “colored” uniformly. If the surface of the apple (peel) feels slippery, sticky, or feels wet, this is a sign that the fruit has been treated with chemicals. When buying, you also need to sort out apples with small brown spots. A soft skin that easily leaves dents or a partially wrinkled skin indicates that the fruit is beginning to wither and lose its juiciness: the taste characteristics of such fruits have already deteriorated significantly.

Fresh apples are stored in the refrigerator. At room temperature, the fruits can also last long enough if you put them in a plastic bag and periodically (once every 7 days) sprinkle with water. Summer varieties, under the most optimal storage conditions, remain fresh for about 3 weeks. The shelf life of autumn and winter varieties is from 60 days to six months.

The pulp of an apple is a comfortable environment for the reproduction of microorganisms, the only barrier for which is a whole and intact peel. If the fruit is spoiled and begins to rot, it must be immediately transferred to a separate container, since rotting can spread to healthy fruits. <sup>[3,5]</sup>

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**Apple - useful properties, composition and contraindications**

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*Received 11/25/18*

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