



Dates (*Phoenix dactylifera*)

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

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

Beneficial features

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

| Main substances (g / 100 g): | Dates [1] |
|------------------------------|-----------|
| Water | 20.53 |
| Carbohydrates | 75.03 |
| Sugar | 63.35 |
| Alimentary fiber | eight |
| Squirrels | 2.45 |
| Fats | 0.39 |
| Calories (kcal) | 282 |
| Minerals (mg/100 g): | |
| Potassium | 656 |
| Phosphorus | 62 |
| Magnesium | 43 |
| Calcium | 39 |
| Sodium | 2 |
| Iron | 1.02 |

| | |
|-----------------------------|-------|
| Zinc | 0.29 |
| Copper | 0.206 |
| Vitamins (mg/100 g): | |
| Vitamin PP | 1.274 |
| Vitamin B6 | 0.165 |
| Vitamin C | 0.4 |
| Vitamin B2 | 0.066 |
| Vitamin B1 | 0.052 |
| Vitamin E | 0.05 |

In popular literature, dates are often called "bread of the desert", noting its balanced composition, which includes a complex of most vitamins and minerals necessary for a person to live. Oriental legends tell how people ate only dates and water for years without much harm to health. Such an assessment of the date is largely mythologized, but in general, the fruits of the date palm really combine a number of micro- and macroelements, among which copper stands out in a relatively high concentration - approximately 25-30% of a person's daily need, potassium - 20-25%, magnesium - 10-15%.

Still, there are not so many other minerals in dates to eat only these fruits without experiencing a deficiency: zinc - about 2% of the daily requirement, calcium - about 4%, phosphorus 5-6%, iron - 7-10%.

It cannot be said that dates completely cover the needs of a person in terms of vitamins. Vitamins B6 and B3 (PP) in 100 g of the product (without a stone) contains 8-15% and 7-8% of the daily requirement, respectively (the rest is less). Although it should be noted that during the day a hungry person can still eat quite a lot of dates - much more than 100 grams, since one pitted fruit weighs from 5 to 15 grams. However, excessive use is also fraught with consequences.

Date is a very sugary product with 60-65% sugar per unit weight. In fresh fruits, this proportion is slightly less, but solely due to the increase in water. This "sugar content" is often associated with a high glycemic index of the product, but in the case of dates, this is not entirely true.

The Harvard Medical School website ^[2] provides a table of glycemic indices for various fruits, where the date (fresh) value is 42 ± 4 . This is about the same as that of an orange, peach and apple juice, but 20% less than banana, mango and orange juice, 40% less than pineapple, 80% less than watermelon. At first glance, this index may still seem quite high, but when compared with other foods, raw dates are similar in this indicator to boiled carrots and vegetable soup. In general, the glycemic index of dates is considered medium (closer to low) according to this table, due to the high proportion of low glycemic fructose among other sugars. But a large amount of fructose (as well as other sugars) in food can significantly harm health, which is the reason for a significant part of the contraindications when including dates in the daily diet.

The composition of the date is supplemented with useful fiber. But here, too, it must be taken into account that the indicators of the amount of fiber, vitamin C, β -carotene, tannins and the ten most nutritionally important minerals are highest in the early stages of fruit development and decrease during ripening.

In addition to the listed components, amino acids (23 species), flavonoid glycosides luteolin, quercetin, apigenin in various forms ^[3], diosmetin glycosides, which are considered as a possible component of a diabetes drug, have been identified in date palm fruits.

Medicinal properties

Date finger in the Arab countries has long been part of the main diet. The literature describes many pharmacological properties of the plant. According to these data, date fruits, pits, leaves, bark and pollen have anticancer, antioxidant, hepatoprotective, antidiabetic, hypotensive, antiulcer, anti-inflammatory, antiproliferative, antimutagenic, antidiarrheal, antibacterial, antifungal properties. In addition, dates can increase the levels of estrogen, testosterone, red blood cells, hemoglobin, reticulocytes, and platelet count. These fruits can eliminate lead-induced hemotoxicity, methylprednisolone side effects, male and female infertility. They also have cerebroprotective, neuroprotective and hematopoietic effects. ^[four]

- Digestive organs

Both fresh and dried date palm fruits are known for their ability to relieve constipation and improve the functioning of the digestive tract. This is accompanied by an activation of the defecation process (both frequency and quantity increase) with a parallel decrease in the concentration of ammonia in the stool ^[5]. Since genotoxic substances have mutagenic and carcinogenic potential, damaging cellular genetic material, a reduction in genotoxicity leads to a decrease in the risk of colon cancer.

In animal experiments, this was confirmed and it was shown that palm juice and especially date pulp water extract (depending on the dose) have a stimulating effect on the activity of the gastrointestinal tract ^[6]. At the same time, some studies show that dates do not always have an exclusively stimulating effect on the digestive organs. Gastrointestinal transit can either increase or decrease depending on the method of fruit extraction ^[7].

Several laboratory experiments have shown that water and ethanol extracts of date fruits and, to a lesser extent, date seeds, were effective in alleviating the severity of gastric ulcers and attenuating the ethanol-induced increase in histamine and gastrin concentrations, as well as in reducing the level of mucin in the stomach ^[8].

- Vessels and heart

Date extract, by inhibiting oxidative, inflammatory and apoptotic molecules, alleviates primary diseases of the heart muscle ^[9]. The result was obtained in an animal experiment, but the researchers believe that date extract has a great potential in terms of human myocardial damage.

An international team of scientists, combining various herbal ingredients well established in traditional medicine, came to the conclusion that the consumption of dates and date seeds along with pomegranate has the most beneficial anti-atherogenic effect on the serum and macrophages of mice ^[10]. The special effect of preventing the development of cardiovascular diseases is associated with the unique and diverse structure of the components, due to which the oxidative stress of macrophages - cells that absorb harmful and foreign substances, has sharply decreased, the content of serum cholesterol and lipid peroxide has decreased.

Fractions of phenolic acids and flavonols of dates fruits (*Phoenix dactylifera* L.) were studied in vitro ("in vitro"), studying their antioxidant properties and the ability of these fractions to protect the heart and blood vessels, prevent the formation of cholesterol and atherosclerotic plaques (antiatherogenic properties) ^[11]. Fractions of flavonols, in contrast to fractions of phenolic acids, demonstrated a pronounced ability to restore the antioxidant effect of iron, the ability to scavenge free radicals and suppress the oxidation of low-density lipoproteins ("bad" cholesterol).

The date is distinguished by a sufficiently high content of potassium with a low sodium content, which makes it an excellent food for hypertensive patients. In addition, magnesium in the composition can enhance the effect of drugs against hypertension.

- Brain and nervous system

Since oxidative stress may play a key role in the neuropathology of Alzheimer's disease, scientists have tried to influence this factor by long-term dietary supplementation from date palm fruits. Unfortunately, in this case, too, all the results have been obtained so far only in animal models. But under given conditions, however, date supplements helped restore the activity of antioxidants and membrane-bound enzymes and reduce oxidative stress^[12]. Also, fruit extracts were able to protect the nervous system from complications arising from diabetes^[13].

Various varieties of dates (but especially the Ajwa variety) have demonstrated the ability to reduce the feeling of pain, restore the efficiency of nerve cells in disorders of the central nervous system. The observed neuropharmacological and analgesic activity is partly due to the presence of three important plant polyphenols (catechin, epicatechin and transferulic acid), which are known for their neuroprotective activity and the ability to exert antioxidant effects on brain cells^[14].

However, judging by experiments on laboratory mice, not all pain can be effectively relieved with the help of date preparations. Thus, the results of a study by Iranian scientists using water-alcohol extracts of the date palm showed that the date remedy is able to reveal a significant analgesic effect in chronic pain, but it practically did not demonstrate an analgesic effect in acute pain^[15].

- reproductive function

The effect of experimental palm preparations on spermatozoa and spermatogonial stem cells preceding them was studied in several studies at once. Among them, special attention is drawn to those studies that were conducted with the participation of human volunteers.

In particular, in an experiment that studied the effect of palm pollen on sperm parameters of infertile men, scientists came to the conclusion that pollen powder in the amount of 120 mg / kg, taken in capsules for 2 months, increased the quantity and quality of spermatozoa - their mobility and morphology. Scientists have even suggested that male infertility can be cured in this way. Although the number of volunteers who took part in the experiment was relatively small - only 40 people^[16].

It is hypothesized that spermatozoa can be protected from damage caused by oxidative stress by saturating them with the antioxidants present in palm pollen. Pollen phenolic compounds, thanks to polyphenols, affect several factors at once, eliminating hydroxyl free radicals and protecting spermatozoa from damage^[17].

In addition, steroidal saponins (21 pcs.) were found in the 80% methanol fraction of male date palm flowers. These complex glycoside compounds showed a significant improvement in the number, motility and viability of spermatozoa in male rats. Scientists associated these effects with an increase in the level of sex hormones^[18].

In a number of laboratory experiments, it was shown that date pollen extract also increases sperm motility, and is also able to protect the testicular apparatus from the damaging effects of nicotine and thyroid hormones.

In addition to the above, various date extracts can potentially be used in other areas of therapeutic practice.

- **Protecting the liver from damage.** Date palm fruits have been shown to be effective in preventing hepatotoxicity caused by oxidative stress in animals ^[19]: water extracts - in protection against the negative effects of trichloroacetic acid (formed during the chlorination of drinking water) ^[20], and seed extracts - from the action of carbon tetrachloride ^[21].
- **Immunostimulating effect.** The corresponding effects of dates have been documented when testing a number of plants for immunostimulatory activity using the macrophage migration index as a parameter of macrophage activation and cell-mediated immunity and some other parameters ^[22].
- **Antifungal properties.** Date extracts of not all varieties of palm are equally capable of suppressing fungi, but in some varieties (for example, "Bent-Cherk") this ability was pronounced in the experiment ^[23].
- **Antiallergic activity.** Mice treated with a hot water extract of ripe date palm fruits sneezed and suffered from a mucosal reaction to an allergen much less frequently than mice from the control group ^[24].

In medicine

In modern European medicine, the components of the date palm are not used as a medicine. In the medicine of the Arab countries, fruits can become part of a restorative diet prescribed after childbirth, past illnesses, and injuries. In addition, the appointment of representatives of official medicine and traditional folk recipes is practiced.

However, some plant palm components that have proven themselves as healing agents can be bought today in our country.

- **Palm pollen.** Manufacturers recommend pollen (extract) of male palm trees in the form of a white powder or capsules for the treatment of impotence, male and female infertility, various kinds of mental disorders, depression, and gastrointestinal disorders.
- **Fruit extract.** It is sold, as a rule, in the form of a packaged dark brown powder. Manufacturers note its immunomodulatory and anti-inflammatory effect, recommending the use of the extract in cosmetics to restore skin elasticity and firmness.
- **complex preparations.** Palm fruit extracts are sometimes combined with other medicinal herbal ingredients: pumpkin seed oil, fenugreek extract, garlic, yarrow, broccoli, etc. The medicinal properties of such collections are usually described as the sum of the properties of individual components.

In folk medicine

Since the natural habitat of the date palm is the territory of the countries of the Middle East, North Africa, Pakistan, India, it was in these regions that the principles and options for using different parts of the plant in folk medicine were formed.

A large-scale ethnopharmacological analysis of the date palm healing traditions on the continent showed that this was a very common practice in 35 African countries. Moreover, more than 20 different parts of the plant were used, although, basically, all the same, fruits, oil, roots, seeds and leaves. Researchers have counted more than 700 medicinal uses of the plant in 25 traditional medicines, but most of them dealt with the most common infections and disorders of the digestive system. Moreover, in contrast to the European practice of using medicinal preparations, parts of the date palm were rarely mixed with other plants, and if mixtures were sometimes prepared, then more often with products of animal origin ^[25]. In Arab countries, however, herbal preparations were often used.

Similar ethnopharmacological studies of plants used in traditional medicine were carried out in other Arab and African countries. The results suggest that dates are used everywhere in several areas of medicine at once, but there are also more pronounced directions for a particular region:

- In Egypt, there are many folk recipes for the use of date components for stomach ulcers in people. Date palm seeds are included in folk remedies for diabetes, liver disease, and gastrointestinal disorders.
- In traditional Persian medicine, date bandage is used as an analgesic.
- In Tunisia, variously prepared fruits are used to treat constipation.
- In Morocco, dates have long been used to treat hypertension and diabetes ^[26]. Moreover, there are relatively few such plants that can be used to treat both of these diseases at once.
- In traditional Indian medicine, the immune-boosting activity of dry fruits and herbs is used for the recovery of mothers after childbirth and the disabled.

But such regional specificity arose only in certain historical periods and disappeared with the expansion of cultural boundaries. Therefore, we can say that almost everywhere where the date palm grew, its fruits were widely used as a medicine for the treatment of gastric and intestinal disorders and pathologies, fever, edema, bronchitis, for healing wounds and skin diseases, restoring reproductive function in men and women, to relieve psychological stress.

The purpose and recipes of folk remedies could vary in different regions. Thus, in some cultures, a combination of dates and fresh milk was used to treat (and still treat) diseases of the respiratory tract, and in others, they restored male potency. In particular, it was believed that if dates were soaked in milk overnight and cinnamon was added to them, then the man who ate them would regain his "male strength". True, there was a danger that such a combination could simultaneously provoke a violation of the digestive tract.

Used in traditional medicine and decoctions of different parts of the plant. A decoction of fruits with fenugreek was supposed to help remove stones from the bladder and kidneys, and with rice - to restore strength, saturate, restore fatness to the body.

A decoction of the seeds was also used to remove stones. But, in addition to the decoction, seeds burnt into ashes were used, with which they rubbed ulcers, wounds and treated eye lesions.

in oriental medicine

In traditional Chinese medicine, the fruits of the date palm, as a medicine, were almost completely replaced by the fruits of another plant, which is also called a date in the common people. "Chinese date" is smaller than the "classic" and redder. It is also very tasty, and also very healthy (to such an extent that in some ratings it is included in the "five" of the most used Chinese medicine plants). However, it has nothing to do with *Phoenix dactylifera* (*Date palmate*). The scientific name of this plant is *real Ziziphus*, or *Chinese Yuyuba*.

However, other types of date palm grow in southwest China and some countries in Southeast Asia - for example, the dwarf Robelin date (*Phoenix roebelenii*), but it is primarily used as an ornamental, not as a medicinal plant.

In scientific research

The bulk of the research that studies the therapeutic potential of the date is carried out in those countries where these fruits have traditionally been used in folk medicine. Based on rich historical

experience, scientists in scientific experiments are looking for evidence of the effectiveness of old medical practices.

It is especially interesting to see if modern research confirms the healing effects of dates described in ancient sacred texts. For example, they indicate that Sayyidina Maryam, the mother of the Prophet Isa (who in a number of theological interpretations is identified with the New Testament Jesus Christ), during labor pains to strengthen her strength and improve the condition of eating dates. And the Prophet Muhammad recommended that pregnant women and nursing mothers eat dates for the development of a healthy child.

Modern scientists undertook to check whether the use of dates during the month before childbirth actually simplifies and facilitates this process. During the year (February 2007 to February 2008) at the Jordan University of Science and Technology, the effect of eating date fruits (*Phoenix dactylifera*) on various indicators of the birth process was studied. The study was conducted on 69 women (Group 1) who were given six dates per day for 4 weeks prior to their due date. Their performance was then compared with that of 45 women (Group 2) who did not eat dates at all. There were no significant differences in gestational age, age, or other biological characteristics between the two groups.

As a result, the following differences between the groups were recorded:

1. Mean cervical dilatation was significantly higher in Group 1: 3.52 cm vs. 2.02 cm. Date eaters also had a higher proportion of intact membranes: 83% vs. 60%.
2. Independent childbirth occurred in 96% of those who used dates, and in 79% of women from the second group.
3. Prostin (a hormone that softens the cervix) and oxytocin (a hormone that increases uterine tone) were used less frequently in Group 1 (28%), compared to 47% in Group 2.
4. The mean latent phase of the first stage of the labor process was also shorter in women who consumed date fruits (510 minutes versus 906 minutes).

According to these data, the scientists concluded that the consumption of dates in the last 4 weeks before childbirth significantly reduced the need for medical intervention and control of the birth process ²⁷¹.

Weight regulation

Using sweet dates in weight loss is a controversial practice, but it finds its supporters.

100 g of dates contains 280-300 kcal. With an average weight of the pulp of one fruit of about 10 g, it can be easily calculated that about 30 kcal comes with just one eaten fruit. Such an amount seems dietary, but, firstly, as a rule, no one is limited to one date, and secondly, the bulk of these calories are provided by sugars.

Over 60% of the mass of even a fresh date is sugar, and in most varieties, fructose is considered the predominant sugar (in some varieties, a high percentage of glucose was found and comparable). In conditions of limited energy intake, fructose-containing foods can be life-saving. However, with a daily nutritious diet, the use of fructose in the composition of dates is likely to lead to the rapid appearance and accumulation of fat in the abdominal cavity. Fructose will simply be transported to the liver and processed there into fat. It will be consumed only if there is no other food.

Thus, in a diet aimed at getting rid of “fat” kilograms, it is better to eat dates separately from the main meal or, in extreme cases, in combination with healthy fats and proteins: nuts, avocados, sour-milk

products, unsweetened vegetables. A date eaten as a snack can give energy and distract from hunger. But even in this case, it is better to limit the amount of these fruits to two or three pieces per day.

In cooking

At first, the combination of dates with other food products, traditional for the Arab world, may seem strange to a European. In northern countries, sweet fruits are more often perceived as a component of dessert dishes, pies, cakes, muffins, cookies, sweets, etc. But in the East, dates are eaten with meat, fish, milk, bread, butter and cheese. Often the dates are stuffed. Very tasty, for example, is a date stuffed with cheese, garlic and herbs.

The fruit of the date palm has been used to make wine since ancient Egypt. But from the leaves of the Indian species of this plant, palm wine, which is called "tari", has long been prepared. Such date alcoholic beverages are often compared to young grape wines or champagne. At the same time, alcohol is not always present in carbonated date drinks.

In some regions, an analogue of a coffee drink is prepared from roasted and ground date seeds. It also tastes like coffee, so it is not surprising that it is offered in the general menu in some cafes. In particular, in the network of coffee houses "Cafenetto" (Israel), date EspressoDate is served.

In cosmetology

Since ancient Egypt, date fruits have been used as a remedy for healing skin lesions and relieving inflammation. Modern research confirms the anti-inflammatory properties of fruit juice, which, according to scientists, accelerates cell proliferation and promotes faster tissue healing. Chemical analysis showed the high total antioxidant capacity of the juice and its free radical scavenging activity [28].

Cosmetologists use the anti-inflammatory properties of date seed juice and oil to prepare various cosmetic products [29]. Creams, serums, lotions, shampoos and conditioners with date fruit extracts are easy to find on sale today, and this ingredient is used by many manufacturers of both affordable and elite cosmetics.

Such attractiveness of dates is explained by the presence of biologically active substances in the composition of the "five" extract that protect the skin, tighten it, make it more elastic, elastic and "alive": phytosterols, isoflavones, ursolic acid, beta-carotene, forms of vitamin E (tocopherol, tocotrienol).

At home, dates are used to make multi-component moisturizing face masks that make the skin silky. There are many recipes for date masks, but the following can be cited as an example: the pulp of 6 dates with the pit removed is ground into porridge and mixed with 20-25 ml of olive oil until smooth, after which the mass is applied to the face for 15-20 minutes.

Dangerous properties of dates and contraindications

Representatives of ancient Arabic medicine believed that the fruits of dates can harm people living in areas where date palms do not grow. That is, all Europeans were at risk. It was believed that due to eating unfamiliar fruits, such people could pathologically increase the amount of black bile, clog the hepatic canals, develop fever, headache and toothache.

Modern medicine does not share such concerns, but welcomes the restrictions on the use of date fruits (up to 8-10 pieces per day for a healthy person), linking this to a high content of sugars (mainly

fructose) in the fruit. The abuse of dates, which supplement a full-fledged diet, can potentially threaten the appearance of fatty hepatosis, diabetes, atherosclerosis, hypertension, dementia and other diseases. In the short term, excess fructose can cause bloating and abdominal pain.

Allergy can also occur on dates (although this phenomenon is considered quite rare). At risk are those people who develop an allergic reaction to histamine, which is present in a number of dried fruits and dairy products.

Another potential source of danger can be sulfites, which extend the shelf life of fruits. Dates owe these substances to the characteristic sheen on the skin of the fruit. But these same substances can also provoke a disorder in the functions of the digestive tract.

Selection and storage

Ideally, when choosing dates, it is better to buy those that have ripened and dried right on the tree. But since dates are an imported product in our country, there are no ideal purchase conditions.

Depending on the characteristics of the collection and preparation of fruits by producers, dates are subjected to various processing methods - from thermal exposure to accelerate ripening, to soaking fruits in sugar syrup. Sometimes, though comparatively rarely in the case of dates, these fruits are treated with sulphurous gas.

To choose dates with a minimum set of "unpleasant" surprises, you should pay attention to their appearance and skin condition:

1. Fruit color should be dark brown. Light fruits are more likely to be underripe, although shades may also depend on the varietal affiliation of the batch.
2. There should be no cracks in the skin. Their presence indicates the possible heat treatment of fruits. This can also be indicated by peeling the skin, the taste of a fried fruit, or too dark a color. The pulp of such oven-dried dates will be sticky and will start to stick in your teeth. In boxes, these fruits can be compacted into a homogeneous array.
3. Fruit with sticky skins should not be selected because they have most likely been coated in glucose syrup. An additional sign of such processing are sugar crystals on the surface.
4. Wrinkled fruits with odors of sweetness or fermentation indicate improper storage and / or underdrying of the dates.
5. Too shiny fruits (especially if they leave an oily mark on the fingers) should also be avoided. Dates are often greased, but sellers may do this not only out of a desire to improve the presentation of a quality product, but also in an attempt to hide defects.

Dates must be washed before use. Dried packaged fruits that have already passed the "washing stage" during the preparation of the product for sale can theoretically be eaten without washing. However, since the buyer, as a rule, does not have reliable data on the methods of processing and storing fruits, in practice it is better to at least rinse dried fruits with cool water and then dry them on a paper napkin. Moreover, sugar syrup, which is often used to process fruits, can eventually become a breeding ground for pathogens.

You can store fresh dates for a long time without worrying about their quality outside the refrigerator, but the safe shelf life will be reduced:

- at room temperature, the fruits can lie up to 1.5-2 months,
- on the "warm" shelves of the refrigerator - twice as long - 3-4 months,
- in the freezer at sub-zero temperatures - at least a year.

The shelf life of dried dates at room temperature doubles, and in a refrigerator it can be increased at least 3 times. At the same time, fruits should be packed either in tightly closed glass jars, or in plastic and plastic bags.

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Dates - useful properties, composition and contraindications

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