



Turmeric (lat. *Cúrcuma*)

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

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

Turmeric is also called *yellow ginger*, *Curcuma longa*, *turmeric*, *E100* (as its main polyphenols, curcuminoids, are indicated on product labels). Almost everyone has heard about the miraculous benefits of turmeric, but lately, skeptical voices have been heard more and more convincingly, questioning its benefits. What is this fragrant, sharply bitter Indian spice really? Let's figure it out in this article.

Beneficial features

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

Main substances (g / 100 g):	Ground turmeric contains
Water	12.85 g
Carbohydrates	67.14 g
Squirrels	9.68 g
Fats	3.25 g
Calories (kcal)	312 kcal
Minerals	mg/100 g:
Potassium	2080
Phosphorus	299
Magnesium	208
Calcium	168

Iron	55
vitamins	mg/100 g:
Vitamin C	0.7
Vitamin PP	1.35
Vitamin B2	0.15
Vitamin B6	0.107
Vitamin B1	0.058

100 grams of the product contains approximately 80% of the daily requirement of potassium, 50% of the daily requirement of magnesium, 30% of phosphorus, about 17% of calcium, a lot of iron.

However, taking into account the fact that no one uses turmeric in such volumes, and even for medicinal folk remedies, no more than 3-5 grams of turmeric is taken per day, it is impossible to restore the deficiency of minerals with the help of turmeric. And most of the medicinal properties of turmeric are associated not with the vitamin-mineral complex, but with curcumin (diferuloylmethane) - a natural polyphenol contained in the rhizome of the plant.

Curcumin is a bright orange-yellow crystalline compound that is often used as a food coloring. Let's dissolve curcumin in alkalis and in very sour solvents.

In addition to curcumin, there are other components in *Curcuma longa* that are part of the curcuminoids group: demethoxycurcumin, bisdemethoxycurcumin. And although curcumin is still the most abundant of this group (75-77% of the total weight), some researchers believe that the potential therapeutic effect is due to the synergistic action of all curcuminoids. The total mass of all substances in this group is about 5% of the mass of the original product.

Among other components of turmeric, sesquiterpenes (in the composition of essential oil) ^[2], 9 types of terpecurcumins ^[3], more than a dozen glycosides are found. ^[four]

Medicinal properties

For the past half century, laboratories around the world (mainly on cellular material and on experimental animals) have been studying the healing properties of turmeric that people have been using in folk medicine for centuries. Thus, the therapeutic effects of turmeric in relation to diabetes, allergies, arthritis, cardiovascular diseases, Alzheimer's disease, and some forms of cancer were discovered.

However, this therapeutic potential, revealed in the laboratory, is not always able to be used in the treatment of patients. The reason is both the low bioavailability of curcumin (the main therapeutic component of the spice) and the mild therapeutic effect of low doses. Moreover, in some experiments, its potentially dangerous or harmful properties were revealed.

To date, two almost opposing points of view have been presented in views on the potential medicinal properties of turmeric:

1. According to the first, turmeric is a promising product for obtaining drugs for cardiovascular diseases, neurodegenerative disorders, liver diseases, and certain types of cancer.
2. According to the second, the medicinal properties of turmeric and its specific polyphenol curcumin are grossly overrated. So, if we can talk about some kind of therapeutic effect, it is very insignificant.

To understand the health benefits of turmeric, let's take a closer look at both points of view.

Optimistic version: turmeric is a promising basis for drugs

Curcumin is credited with numerous pharmacological properties: antioxidant, antimicrobial, anti-inflammatory. This compound is believed to be able to interact with a variety of molecular targets involved in inflammation. Clinical trials indicate that curcumin may have potential as a therapeutic agent for diseases such as inflammatory bowel disease, pancreatitis, arthritis, and chronic anterior uveitis (inflammation of the choroid), as well as some types of cancer.

Antioxidant, anti-inflammatory activity of compounds of the curcuminoids group was confirmed experimentally. There are scientific works showing the potential ability of curcumin to activate the protective function of macrophages, which destroy foreign microorganisms and toxic particles. Due to these properties, turmeric can be used, for example, as an adjuvant therapy for ulcerative colitis, which is characterized by dysfunction of the immune system.

In a laboratory study by a University of California research team, it was shown that one of the curcumins (bisdemethoxycurcumin) can act as an immunomodulator that stimulates monocytic phagocytosis of beta-amyloid, the accumulation of which is considered the cause of Alzheimer's disease. [5]

There is also an assumption that curcumin increases the level of the hormone, which, in turn, provokes the creation of new nerve cells, and this creates the prerequisites for combating degenerative processes in the brain.

But the therapeutic effect of curcumin is not limited to this, and in the future it can be used to treat a number of other diseases of various organs:

- **Heart and blood vessels.** Several therapeutic effects are associated with the beneficial effect of curcumin on the function of the cells of the inner surface of blood vessels (endothelium), including lowering blood pressure, normalizing blood clotting (destruction of the endothelium leads to poor blood clotting), and lowering cholesterol levels in patients with type 2 diabetes. In particular, the standardized curcuminoids preparation (NCB-02) has shown to be as good at restoring endothelial function as atorvastatin (3rd generation statin drug). [6]
In one clinical trial, the use of curcumin at a dose of 4 g/day resulted in a significant reduction in the risk of myocardial infarction after coronary artery bypass grafting. [7]
- **Antitumor effect.** In a rodent model, curcumin prevents colon cancer. This occurs due to the inhibition of lipid peroxidation and the expression of cyclooxygenase-2 [8], as well as due to the activation of a certain kind of enzymes. [9] But, in addition to this, a number of studies describe the effect of curcumin on various genes and proteins, which prevents the development of tumors at the 2nd and 3rd stages (stimulation and progression) of the disease. [10]
- **Liver.** Curcumin enhances the activity of many antioxidant enzymes, which by reducing lipid peroxidation may ultimately reduce liver damage. [11] But it is also able to increase the activity of detoxifying enzymes in the liver, protecting the organ from carcinogenesis. [12]
- **Joints.** Curcumin supplements are already being tested as a means of reducing pain in joint diseases. In a randomized pilot study evaluating the efficacy and safety of curcumin in patients with active rheumatoid arthritis, the curcumin group had the highest percentage of improvement in overall activity scores, as well as joint tenderness and swelling. Moreover, these indicators turned out to be significantly better than in patients treated with diclofenac sodium, and curcumin treatment itself was considered safe and had no side effects. [13]
- **Respiratory system.** The first evidence suggesting that curcumin works against lung injury appeared in 1996. [14] Since then, several animal studies have demonstrated that curcumin acts against pulmonary fibrosis, mainly by reducing inflammatory mediators. [15] Several cellular and mouse studies have confirmed that curcumin also has potent anti-asthma activity. [16] The

ability of curcumin to reduce synthesis and improve nitric oxide excretion may prevent bronchial inflammation in patients with asthma. ^[17]

Skeptical version: is turmeric useless?

In 2017, a paper ^[18] was published, in which the authors, having studied existing clinical studies, questioned almost all of the above therapeutic effects of turmeric. Curcumin's activity in vitro and animal experiments has led to more than 120 clinical trials of curcuminoids, according to scientists. But no double-blind, placebo-controlled clinical trials of curcumin have been completely successful. The authors explain this by the fact that this compound manifests itself as unstable, reactive, non-bioavailable.

This is not to say that the researchers did not receive positive results at all. For example, in 2019, more than 700 people took part in an experiment evaluating the effects of curcumin on blood pressure. The results showed that with long-term use (at least 12 weeks), there was a noticeable decrease in the "upper" (systolic) pressure. But in general, limiting the therapeutic usefulness of curcumin has indeed proved to be a problem and prompted researchers to begin searching for effective combinations of curcumin with other substances to increase systemic bioavailability.

Thus, a study that assessed the bioavailability of a combination of the alkaloid piperine (present in various types of pepper) and curcumin was quite widely known. ^[19] The experiments were carried out both with animals and with the participation of healthy human volunteers.

- In rats, administration of curcumin at a dose of 2 g/kg resulted in moderate serum concentrations within 4 hours. Simultaneous administration of piperine at a dose of 20 mg/kg increased the concentration of curcumin in the blood serum for a short period (1-2 hours after taking the drug), and the bioavailability of the compound increased by 154%.
- In humans, after receiving curcumin at a dose of 2 g/kg, its serum level was either undetectable or very low. But after adding piperine, the bioavailability of the compound increased by 2 thousand percent.

This multiple increase in bioavailability during popularization has formed the opinion that it is enough to eat turmeric with pepper to get the expected therapeutic effect.

However, in this study, the alkaloid piperine was used to increase bioavailability, rather than herbal components containing it. The alkaloid itself is indeed found in many varieties of pepper crops. But in long pepper its content does not exceed 2%, and in white and black pepper - 9%.

Therefore, although mixing turmeric with black pepper probably does increase the bioavailability of curcumin, with such a "homemade" combination in food, it is not entirely correct to talk about an increase in bioavailability by thousands of percent. Accordingly, it is also not necessary to expect a pronounced therapeutic effect from adding spices to food, despite the full therapeutic potential of curcumin.

In medicine

Given the emerging controversy, the future of turmeric in mainstream medicine remains uncertain. Although some practitioners already today declare turmeric a therapeutically significant part of the healing diet.

In particular, oncologist Ivan Karasev, on his Instagram page, not only praised the organic spice for its anti-inflammatory properties, the ability to stimulate the death of cancer cells and enhance the

effectiveness of chemotherapy, but also described in detail how to drink turmeric to get maximum protection against cancer.

According to the doctor, the optimal daily dose of turmeric is 5 grams (about 1 tsp). But for better absorption, it is better to mix it with linseed oil and black pepper. And to prepare 250 ml of a healthy and invigorating drink, in addition to warm water, you will need to mix turmeric (1 tsp), chopped ginger root (about 1 cm in length), half a lemon, honey (1 tsp) and black pepper (on the tip of a knife). If the taste seems too sour, spicy, bitter, etc., then the proportion of ingredients can be slightly changed to suit your taste.

Since the information from the post was reprinted by large media with an audience of millions, this point of view in the mass consciousness has acquired the status of “doctors' recommendation” and is often broadcast as factually proven. Although in evidence-based medicine, the effectiveness of the spice (and not the active components isolated from it) is still a controversial issue.

In folk medicine

Golden turmeric has been used in folk medicine for centuries to improve the functioning of the digestive system. This application is based on the potential ability of the biologically active components of turmeric to activate the secretion of the glands of the gastrointestinal tract, as well as bile formation, which ultimately improves metabolism and digestion.

In home treatment, turmeric is used for chronic cholecystitis, because, in addition to the ability to activate the formation and secretion of bile, the spice can exhibit an anti-inflammatory effect.

In large doses, turmeric acts as a laxative and diuretic.

The antioxidant potential allows the use of turmeric in folk medicine for the treatment of the liver. It is believed that the substances contained in the rhizomes protect this organ from the effects of long-term use of drugs, exposure to fatty foods and alcohol. In combination with turmeric, all of these products cause less harm. Therefore, the presence of dishes with spices during feasts in folk medicine is welcome. But other pathologies of the gastrointestinal tract, caused by a decrease in liver function, become the basis for including turmeric in the diet.

Old recipes contained a recommendation to eat 3.5 grams of the root of the plant to eliminate "blockage of the liver." But the same dose, combined with anise (3.5 g) mixed with white wine, could, according to ancient healers, improve vision. For the same purpose, the eyes were sprinkled with grated turmeric powder and the condensed juice of the plant was instilled into them.

Increase the amount of turmeric in food and for the prevention of atherosclerosis. Regular addition of seasoning in this case should reduce cholesterol, slow down the formation of deposits in the vessels and generally improve well-being.

Turmeric is used externally as a pain reliever. For example, to get rid of a toothache, the root is roasted and chewed while it is still warm. A warm grated spice is applied to wounds and ulcers, not only to eliminate pain, but also to stop bleeding and heal faster.

An effective antibiotic in folk medicine is turmeric with honey. Mixed in the proportion of 1 tbsp. l. powder per 100 g of honey, turmeric helps to heal wounds and recover faster after dislocations. However, the same mixture of 1 tsp. per hour can be taken for colds.

To increase the healing properties of turmeric during the preparatory period, the washed root of the plant is boiled or scalded. It is believed that after such extreme exposure, curcumin begins to be evenly distributed throughout the root, penetrating into all layers. Also, raw materials can be dried in the sun. After a week of drying, the root will significantly decrease in size, but the concentration of curcumin in it will be higher.

in oriental medicine

Turmeric has been traditionally used in Asian countries as a remedy for a number of pathologies due to its antioxidant, anti-inflammatory, antimutagenic, antimicrobial, and anticancer properties. The spice has a reputation as a reliable healing, laxative, anthelmintic, tonic. The rhizome is an important ingredient in such herbal preparations as Jātyādi tailam, Nalpāmarādi tailam, Nārāyaṇa guḷa.

In the Indian medical system of Ayurveda, turmeric is used very widely, prescribing both simply to restore the strength of weakened patients, and to treat such serious diseases as diabetes and anemia, although the full list of diseases and pathologies in which the spice is used is much longer. It includes smallpox, anemia, anorexia, leprosy, bronchitis, dropsy, gonorrhea, liver damage, various diseases of the organs of vision, dizziness, skin diseases, edema, burns, all kinds of ulcers and wounds, boils, sprains, hysterical conditions. According to Ayurveda, turmeric helps with scorpion and leech stings, as well as with scabies, dyspepsia, and ringworm.

As a preventive measure, women in India still lubricate their bodies with turmeric paste, considering it an effective antiseptic.

In traditional Chinese medicine, turmeric is in demand as an analgesic and anti-inflammatory agent. In particular, it is used to eliminate hemorrhoidal pain. Turmeric is also used with benefits for women. It is added to food for prolonged menstrual irregularities.

The root extract of the plant is part of the ancient herbal medicine "Jiawei-Xiaoyaosan" (Jiawei-Xiaoyaosan), which was used for dyspepsia, stress and mental disorders. ^[twenty]

In scientific research

The bioavailability of curcumin can be called the cornerstone of controversy between turmeric drug advocates and skeptics. The latter believe that curcumin is extremely difficult to use in medicine due to its low bioavailability. Therefore, here we will review studies that raise this issue.

The first study of the bioavailability of a substance took place back in 1978. ^[21] Then, in experiments on rats, scientists injected animals with curcumin at a dose of 1 g/kg, fixing a low level of curcumin in blood plasma as a result of the experiment.

More recent studies have shown that when curcumin was administered orally at a dose of 2000 mg/kg, the maximum concentration in the serum of experimental animals was $1.35 \pm 0.23 \mu\text{g/ml}$. But even when administered orally, as shown by Chinese scientists ^[22], the bioavailability of curcumin is about 1%, and therefore very high doses of curcumin (from 3600 to 12000 milligrams) are needed to achieve any beneficial effects.

In clinical studies, curcumin metabolites have been found in plasma when patients have taken at least 3600 mg of curcumin (more specifically, curcumin glucuronide and its sulfate forms). ^[23]

However, along with increasing the dose and, in some experiments, scientists have been able to enhance the therapeutic effect by combining curcumin with other substances and / or foods that increase its bioavailability.

So it was found that if curcumin is administered to rats along with piperine (which induces glucuronyl transferase enzymes), the bioavailability of the substance increases by 154%.

When curcumin was administered to animals at a dose of 2 g/kg, moderate serum concentrations were reached within 4 hours. Simultaneous administration of piperine at a dose of 20 mg/kg increased the concentration of curcumin in the blood serum for a short period (1-2 hours) after taking the drug.

In people participating in the experiment, after a dose of 2 g of curcumin, serum levels were either undetectable or very low. But the simultaneous administration of piperine at a dose of 20 mg caused much higher concentrations from 0.25 to 1 hour after drug administration, and the increase in bioavailability was 2000%. The study showed that, at the dosages used, piperine increased the serum concentration, absorption rate, and bioavailability of curcumin in both rats and humans without side effects.^[19]

In subsequent studies, it was found that the excretion of curcumin metabolites depends not only on the combination of substances, but also on the vehicle used and the forms of administration.^[24] When taken orally, 75% of curcumin metabolites are found only in feces, but not in urine. When administered intraperitoneally, 73% of these metabolites are found in the feces and about 11% in the urine. And given intravenously to mice, one form of curcumin accumulates in the liver, spleen, lungs, and brain.^[25]

In terms of form, liposome encapsulation, polymeric nanoparticles, cyclodextrin encapsulation, lipid complexes, or polymer-curcumin complex synthesis have been investigated. All of them helped to increase the activity and bioavailability of this compound in animal experiments.

Weight regulation

Turmeric for weight loss is widely used, but not always justified. The smell of spice and even its color increase the attractiveness of the dish and stimulate appetite. Actually, this is the main task of both this and any other spice. Therefore, food with turmeric at dinner can be eaten much more, and this does not contribute to weight loss.

However, on the other hand, adding turmeric to your diet can improve digestion and metabolism, allowing your body to use what you eat more efficiently and effectively.

At the same time, for a noticeable effect, large dosages are likely to be needed, which can provoke a laxative effect. But in the recipes published on the Internet, in most cases, just large dosages are indicated.

For example, a recipe for weight loss is popular, in which 2 teaspoons of turmeric (which is about 10 grams of spice) are recommended to be poured into a glass of hot milk and, after the drink has cooled to a warm state, add a spoonful of honey to it.

Since there is no objective experimental data on the results of the effect of such a drink from turmeric on body weight and waist size, one has to focus on the subjective impressions of people who have experienced it for themselves. And these impressions are very contradictory. Therefore, we draw attention to the fact that even Indian naturopathic healers (usually using turmeric quite freely and widely) do not recommend exceeding a single dosage of 7 grams for any spice intake.

In cooking

In cooking, turmeric is considered as an auxiliary ingredient that improves the taste, smell and appearance of the dish. The beautiful and varied yellow-orange hues of the seasoning make puddings, omelettes, pasta and rice dishes, lamb, beef, chicken, fish, as well as broths and soups more appetizing. And to add flavor and color to this spice, you don't need much at all: a quarter of a teaspoon per serving of 4 dishes. For example, when cooking pilaf, you will need about a quarter of a teaspoon per kilogram of rice.

In the food industry, orange turmeric is used to color cheeses, butter, and margarine. The technological process simplifies the fact that this spice is relatively easily soluble in fats. By the way, the fact that water hardly interacts with turmeric helps to distinguish the more expensive ground stigmas of saffron from the relatively inexpensive turmeric powder: when saffron powder is immersed in water, unlike turmeric, it will tint it.

Without this experiment, it is more difficult to distinguish one ingredient from another, since color saturation can also be ensured by adding ground red pepper to the powder.

However, even without mixing, turmeric can acquire an intense color. To do this, the rhizomes are dug up, washed, and, in a purified form, are dipped in boiling water for a short time, and only then dried and polished. After this treatment, the roots become brighter, harder and shiny at the broken points.

The further culinary fate of the rhizomes largely depends on the type of plant:

- **Turmeric long** (*C. longa*) is used in the form of a powder for spices, including - in a mixture with other spices. For example, in the composition of the famous curry mixture, the proportion of turmeric can reach 15-20%.
- **Aromatic turmeric** (*C. aromatica*) is more in demand in confectionery shops.
- **Turmeric zedoaria** (*C. zedoaria*) is used in the production of alcoholic beverages (liqueurs) and, as a rule, is not ground into powder, but cut into small pieces.

Turmeric is included in many recipes in Asian cuisine, but one of the most beautiful, simple and healthy is the golden milk recipe.

Turmeric milk is a health drink that can still be drunk on an almost regular basis. To prepare it, you will need low-fat milk (200 ml), water (50 ml), 1 teaspoon each of turmeric, honey and coconut (or linseed) oil.

1. Turmeric powder is boiled in boiling water for 5 minutes (from the moment of boiling).
2. Milk and butter are poured into the mixture, after which all this is heated to 50-60 ° C.
3. After cooling to a warm state, honey dissolves in the drink.

In cosmetology

The cosmetic benefit of turmeric for the face is that curcumin improves blood circulation, activates the process of renewal and regeneration of the skin, prevents acne, heals acne marks and small wounds, activates collagen synthesis, brightens the skin.

This ingredient (often referred to as Turmeric on stickers) is widely used by skincare manufacturers. Examples include:

- Kiehl's Energizing Radiance Mask, which tightens pores and renews the stratum corneum,

- Hello Fab First Aid Beauty vitaminized mask in the form of jelly, which cools and soothes the skin, evens out wrinkles,
- Kora Organics Turmeric Brightening & Exfoliating Mask with alpha hydroxy acid, which evens out the texture of tissues and eliminates pigmentation, etc.

In home cosmetology, in the manufacture of masks, to facilitate the application of spice powder and to enhance the effect, turmeric is usually mixed with honey, milk, egg yolk and other ingredients.

Sometimes women tend to use turmeric to solve some problems in which the spice is unlikely to be able to help. For example, on forums you can sometimes read that turmeric eliminates cellulite and increases breast size, which is not true.

However, there are some specific problems that turmeric can actually solve. So, a randomized double-blind study showed that turmeric essential oil slows down hair growth and can lighten the skin in the armpits. ^[26]

In this experiment, for several weeks, women applied 1% and 5% turmeric essential oil in a lotion to the skin in the armpit area. From 5-11 weeks of testing, the oil slowed hair growth by an average of 13% with the 1% lotion and by an average of 16% with the 5% lotion. At the same time, both concentrations of oil were equally effective in brightening the skin for 3 weeks, and the lightening effect persisted for another 2 weeks after the cessation of exposure to the skin.

Dangerous properties of turmeric and contraindications

Both as a dietary supplement and as a drug, curcumin is approved in the United States, where it is considered a safe compound in daily amounts up to 10 g at the recommended dose of 3 mg/kg body weight. Such recommendations are based on previous preclinical and, less commonly, clinical studies. However, the experiments taken as the basis for evaluating the danger/safety of curcumin were conducted no longer than 16 weeks, which introduces certain risks when using curcumin for a longer period and, especially, at high doses.

With the abuse of spice, "response" reactions of the gastrointestinal tract in the form of nausea or diarrhea are quite possible. When trying to "cleanse the body" with shock doses of turmeric, biliary colic and exacerbation of gastritis are possible. People can also experience allergic reactions to turmeric.

Contraindications for the use of turmeric as a dietary supplement are exacerbations of cholelithiasis, cholecystitis and hepatitis. There is a suspicion that turmeric itself is capable of provoking the occurrence of autoimmune hepatitis. This is explained by the fact that curcumin inhibits the liver enzyme, which provides a detoxifying effect, and, therefore, indirectly enhances the toxic effect. However, these suspicions remain unconfirmed for the time being, and the effect requires further study, since the dosage and / or combination of the compound with other substances may affect the degree of its severity. In addition, as mentioned above, at the same time, curcumin is able to increase the activity of detoxifying enzymes in the liver and kidneys, protecting against carcinogenesis processes.

Spice is not recommended for kidney diseases (nephritis, glomerulonephritis), as well as during pregnancy. Some experts suggest that hot spices included in the diet in the last trimester can cause premature contractions. But, besides this, the ability of turmeric to thin the blood can have a negative effect on the fetus. For the same reason, turmeric should not be added to food for people taking aspirin and similar blood thinning medications, since such a dietary supplement does not allow for dosage control.

Because of turmeric's supposed ability to lower blood sugar levels, care should be taken when "mixing" the spice with anti-diabetic medications.

During the period of breastfeeding, nursing mothers often begin to deliberately increase the dose of spices to increase lactation "according to the Indian folk recipe." But this should not be done, since there is no comprehensive data on the effect of curcuminoids on the health of the child and on their entry into the body of an infant with breast milk.

Selection and storage

Turmeric is commercially available in two forms: as a whole root and as a powder. Therefore, below we formulate the selection rules for both forms of spice.

How to choose turmeric powder

The main rule for choosing ground spices is sealed packaging. In the markets, turmeric is sold from open containers, which do not isolate it from the effects of the environment (light, oxygen, etc.), so this spice loses both taste, smell, and useful properties. But when buying in stores, you should pay attention to the expiration date and refuse expired goods. Even in an airtight bag, the powder should remain crumbly and not roll into lumps.

How to choose turmeric root

In general, turmeric retains its beneficial properties better than ground turmeric. The root may have different shades depending on the growing conditions (growth) and variety, therefore, when choosing a bright color, they usually do not focus and pay more attention to the density of the pulp. The root should be elastic and "voiced" when breaking.

In addition to density, the freshness of turmeric can be determined by smell. If you break the root or pick it up a little, then the smell of fresh turmeric will be pronounced and bright.

How to properly store turmeric

To preserve the aroma, prevent the accumulation of moisture and the formation of lumps, and also prevent the damaging effects of ultraviolet radiation, it is better to store turmeric in a hermetically sealed opaque glass jar or in a dry, dark place at room temperature.

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Turmeric - useful properties, composition and contraindications

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