



## **Spirulina - benefits for the body , contraindications and instructions for use**

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**Abstract.** The article discusses the main properties of spirulina and its impact 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 spirulina is considered in various types of medicine and the effectiveness of its use in various diseases. Potentially adverse effects of spirulina analyzed separately on the human body under certain medical conditions and diseases.

*Key words:* spirulina, benefits, harms, beneficial properties, contraindications

Spirulina is a healthy, environmentally friendly blue-green algae and the most promising product of the future. The powder stimulates the immune system, removes toxins, contains nine essential amino acids, which is rare for a vegetarian food source. Although spirulina has been around for over 2.4 billion years, we only started to consider its benefits 40 years ago, after NASA used the algae as a supplement for astronauts on space missions.

The calorie content of spirulina is low - in 100 g of dry powder there are only 290 cal. But it won the title of superfood for other reasons: the same serving contains 57 g of protein, 24 g of easily digestible carbohydrates and approximately 14 g of fats represented by omega-6 and omega-3. Vitamins A, E, B1, B2, B3, B12, copper, magnesium, potassium, iron, manganese, iodine are concentrated in cyanobacteria . That's why it's so effective at protecting cells and tissues from damage, boosting the immune system, and supporting the heart and bone strength.

## **Top 10 Health Benefits of Spirulina**

### **1. Fights Anemia**

There are several types of anemia, but the most common is iron deficiency. It is characterized by a decrease in hemoglobin levels, leading to a constant feeling of fatigue and weakness. Scientists already have the first evidence that algae increase the amount of hemoglobin in red blood cells in older people. The effect was predictable - in 1 tbsp. l. as much iron powder as 700 g of young spinach. <sup>[one]</sup>

### **2. Reduces total and bad cholesterol**

Bad LDL cholesterol is the culprit of atherosclerosis. Plaque formation in the coronary arteries can start at an early age and become a serious health threat over time, increasing the risk of heart attack and stroke. Just 1g of spirulina per day reduces LDL by 10.1% and triglycerides by 16.3%.

supplement improves blood circulation , reduces the risk of blood clots. A high concentration of omega-3s helps maintain normal cholesterol levels in those who follow a plant-based diet and avoid seafood. <sup>[2]</sup>

### **3. Has anti-cancer properties**

The effect of microalgae on oral cancer has been well studied. Studies show that as little as 1g per day can completely eliminate precancerous lesions in the mouth and reduce symptoms better than drugs. As for other types of cancer, the supplement reduces the risks of their development and the size of tumors. <sup>[3, 4, 5]</sup>

### **4. Reduces high blood pressure**

Too high blood pressure puts additional strain on the blood vessels, heart, brain, kidneys, and eyes. As a result, the risk of heart attacks, aortic aneurysms, vascular dementia, and kidney disease increases. To prevent them and reduce pressure, it is necessary to consume at least 4.5 g of spirulina per day . The supplement increases the production of nitric oxide. The latter makes the vessels softer and wider - improves blood flow, slows down the aging process. <sup>[6]</sup>

### **5. Reduces Allergy Symptoms**

Allergic rhinitis triggered by pollen, animal dander or other allergens is similar to the common cold. Its symptoms cause sleep problems and interfere with daily life. There is evidence that 2 g of spirulina per day improves the quality of life in seasonal allergic rhinitis - relieves sneezing, itching, nasal congestion, runny nose. <sup>[7]</sup>

### **6. Shows Powerful Antioxidant Properties**

Spirulina is an excellent source of antioxidants. It stimulates the brain, acts as an analgesic and anti-inflammatory agent, blocks free radicals - protects cells from oxidative damage. Most of the functions are performed by the plant protein phycocyanin , which fights any chronic inflammation. <sup>[eight]</sup>

### **7. Stimulates endurance and accelerates muscle recovery after exercise**

Spirulina helps athletes recover faster, improve their performance in the gym. It minimizes the damage caused to the body during intense exercise, increases endurance and strength. Legends say that envoys of the Aztec emperors used it to maintain health during marathon races. <sup>[9]</sup>

### **8. Helps Vegans and Vegetarians Eat Protein**

Microalgae is rich in complete plant-based protein, essential for building muscle and maintaining shape - protein levels comparable to eggs. It also contains a lot of pseudo-vitamin B12. If you follow a vegan or vegetarian diet, you know how difficult it can be to find plant-based sources of vitamin B12. <sup>[ten]</sup>

### **9. Detoxifies**

Spirulina has proven to be effective in removing pesticides, arsenic, cadmium and other heavy metals from the body from food. Detoxification can be expected at 20–30 g/day and in combination with zinc, which requires medical supervision. Experts note that dietary supplements are not only effective, but also relieve some of the side effects that occur during detoxification . <sup>[eleven]</sup>

## 10. Reduces Candida Overgrowth

The antimicrobial properties of the components are so great that they successfully fight Candida colonies, stop the reproduction of yeast-like fungi. Superfood also promotes the growth of beneficial bacteria in the intestines, helps to restore the mucosa. [12]

### Contraindications and potential harm - who should not take spirulina

Algae is contraindicated in children, adults with a severe hereditary disease phenylketonuria and in violation of blood clotting. Doctors advise buying spirulina only from trusted brands with 10-20 years of experience, testing products in third-party organizations (USP, ConsumerLab, NSF International). Also, you can not combine taking the supplement with drugs for diabetes, to increase blood clotting and other drugs. Before you start taking it, you must always consult with your doctor.

### How to take spirulina correctly ?

You can stir a small scoop of the powder into a glass of water, juice, smoothie, or add it to soup, pesto, or healthy dried fruit and nut candies. It is worth considering that the superfood turns food dark green or black, and its savory earthy taste is best compensated by sweet fruits such as banana, pineapple, mango.

### Dosage and safety of spirulina : instructions for use

The standard daily dose is 1-3 g, but this can be increased up to 10 g per day. The daily portion should be divided into 2-3 doses and gradually introduced into the diet. Do not exceed the dosage recommended by the manufacturer - instead of additional benefits, you will get indigestion.

### Expert comment

#### Tatyana Eliseeva, nutritionist, nutritionist

Nutritionists often recommend taking chlorella because of its richer composition: the only thing that spirulina has more is copper, the deficiency of which is rare. But the price of quality chlorella is higher and it is produced mainly in powder form. Whichever seaweed you choose, it's better than nothing. Dietary supplements are so rich in nutrients that they can protect against a variety of diseases and infections.

### Literature

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