



## Antioxidants - description, benefits, effects on the body and the best sources

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**Abstract.** The article discusses the main properties of antioxidants and their effects on the human body. A systematic review of modern specialized literature and current scientific data was carried out. The best natural sources of antioxidants are indicated. Signs of shortage and excess are considered antioxidants and their interaction with other essential elements .

**Key words:** antioxidants , benefits, harm, norm, beneficial properties, sources

For many centuries, people have been looking for the answer to the secret of preserving eternal youth, health and beauty for many years. And at the beginning of the third millennium, science took a confident step towards revealing the mystery, based on knowledge about free radicals and antioxidants.

Antioxidants are protectors of our body from the harmful effects of toxic substances that have a detrimental effect on human health. With the correct use of these substances, the rate of aging of the body is reduced, and the development of cardiovascular, endocrine and oncological diseases is prevented.

### Antioxidant Rich Foods

1. Berries (blueberries, raspberries, strawberries) ; [ 1,2,3 ]

2. Fruits (pomegranate, apples, cherries) ; [ 4,5,6 ]
3. Nuts (walnuts [7], almonds, pistachios);
4. Green tea ;
5. Dark chocolate (high cocoa content);
6. Garlic [8];
7. Cabbage (broccoli [9] , cauliflower) ;
8. Red pepper [10];
9. Spinach [11];
10. Artichokes ;

### **General characteristics of antioxidants**

About 30 years ago, the term *antioxidants* was used exclusively to refer to antioxidant substances that prevent corrosion of iron, spoilage of food and other organic substances present in canned food, cosmetics, and creams.

And now, several decades later, a revolutionary free radical theory appears in medicine, which overturned all established ideas about antioxidants.

It turns out that in our body there are aggressive compounds called free radicals. They destruct the body's cells by oxidizing their molecular structures.

Antioxidants fight excess of such substances in the body. Antioxidants include vitamins A, E, C, P, K, bioflavonoids, some sulfur-containing amino acids, zinc, copper, selenium, iron and alcohol in small quantities.

### **Daily requirement for antioxidants**

Depending on the type of antioxidant, its daily requirement for the body is determined. Thus, the body needs vitamin A in the amount of 2 mg, E - 25 mg, C - 60 mg, K - 0.25 mg [12] and so on.

Microelements are required in volumes ranging from 0.5 mg (selenium) and reaching amounts of 15 mg (for example, zinc and iron [13]).

### **The need for antioxidants increases:**

- With age, when the body's ability to independently produce useful substances decreases, the number of free radicals increases.
- Under unfavorable environmental conditions (work in hazardous industries).
- In a state of increased stress.
- Under high mental and physical stress.
- In active smokers, when the absorption of nutrients by the body decreases.

### **The need for antioxidants is reduced:**

In case of individual intolerance to certain groups of antioxidants.

### **Antioxidant Absorption**

Most vitamins and microelements are well absorbed by the body with food. Therefore, it is usually recommended to take vitamin-mineral complexes after meals.

### **Beneficial properties of antioxidants, their effect on the body:**

Vitamin A and its predecessor beta-carotene normalize the condition of the mucous membranes, improve the condition of the skin and hair, prevent the development of cancer, and are necessary for strengthening the eyes. [ 14 ]

Vitamin C is responsible for the body's immunity, strengthens the cardiovascular system, and actively fights mutations at the gene level. [ 15 ]

Vitamin E is essential for the nervous system and protects cell membranes from destruction. [ 16 ]

Selenium slows down the processes of fat oxidation and blocks the toxic effects of heavy metals. [ 17]

Zinc is essential for the immune system and is essential for cell growth and repair. Zinc has a positive effect on the body's endocrine system. [18]

### **Interaction with Essential Elements**

Antioxidants actively interact with each other. For example, vitamins E and C mutually enhance each other's effects on the body . Vitamin E is highly soluble in fat, as is beta carotene. Vitamin C is highly soluble in water.

### **Signs of a lack of antioxidants in the body**

- weakness;
- increased irritability;
- pale skin;
- apathy;
- frequent infectious diseases;

### **Signs of excess antioxidants in the body**

Antioxidants that enter the body from food, in case of excess, are easily eliminated from the body on their own. If there is an excess of artificially produced antioxidants (vitamin-mineral complexes) in the body, a condition described in the medical literature as hypervitaminosis may occur, accompanied in each specific case by certain disorders and symptoms.

### **Factors influencing the content of antioxidants in the body**

The level of antioxidants in the body is influenced by the general health of a person, his age and diet.

It is difficult to overestimate the positive effect that antioxidants have on our body. They protect our body from the destructive effects of free radicals, strengthen the immune system and slow down the aging process!

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