



Molybdenum (Mo) - value for the body and health, which contains

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Abstract. The article discusses the main properties of molybdenum (Mo) and its effect on the human body. A systematic review of modern specialized literature and relevant scientific data was carried out. The best natural sources of molybdenum are indicated . The use of the mineral in various types of medicine and the effectiveness of its use in various diseases are considered. The potentially adverse effects of molybdenum on the human body under certain medical conditions and diseases are analyzed separately.

Key words: molybdenum , Mo , molybdenum, useful properties, contraindications, sources

Molybdenum is a useful mineral that you have hardly heard of. It is needed by the body in tiny amounts, but this is enough to participate in many vital processes. Without it, toxins accumulate in the body, amino acids are not absorbed, DNA is not processed. In this article, we break down why it's so important to health and tell you everything you need to know about the little-known trace element.

Molybdenum in the body: role and function

The substance is absorbed into the blood from the gastrointestinal tract (25-80%), and then transferred to the organs. The ability of the body to store it depends on the level of intake, the amount of copper and sulfates in the diet. The body stores a certain amount of the mineral in the form of molybdopterin in the liver, kidneys, adrenal glands, and bones. Its level is difficult to measure, since the presence in the blood and urine does not show the real situation - an excess of the mineral is excreted in the urine.

[one]

The trace element enters plant food from the soil and water with which it is irrigated. It enters the body of animals through plants, so the content of the compound in meat and offal depends on the diet. ^[2]

Experiments have shown that the element is poorly absorbed by humans from soy and other products. But this does not lead to its deficiency, since the micronutrient is present in other foods of plant and animal origin. ^[3, 4]

Molybdenum Foods to Add to Your Diet

There is not enough data on the presence of a microelement in plants, because its concentration depends on the quality of the soil on which they were grown. Although the quantity is variable, the richest sources still include offal, legumes, and grains. There are few minerals in fruits and vegetables.

15 Medium Foods Containing Molybdenum

No.	Product	µg per 100 g ^[5, 6, 7]
one	soy flour	314
2	Pea yellow	250
3	oats	180
four	Green pea	130
5	String beans, asparagus	60
6	Whole grain flour	58.5
7	Rice	29
eight	Bread	21
9	Cheese	eleven
ten	A pineapple	9
eleven	Eggs	9
12	Banana	eight
13	Potato	7
fourteen	Chicken meat	5
fifteen	Garlic	3

The concentration of the mineral in unfiltered water usually does not exceed 10 µg/l, although it can reach 68–200 µg/l in mining sites.

How much molybdenum does the body need - daily rate

The required amount depends on age and is calculated in micrograms.

Average daily recommended doses of molybdenum intake ^[8]

Life period	Age	Men, women (mcg)
babies	0–6 months	2
babies	7–12 months	3

Children	1–3 years	17
Children	4–8 years	22
Children	9–13 years old	34
Teenagers	14–18 years old	43
adults	19+	45

For pregnant and lactating women, the daily requirement increases to 50 micrograms. Most people get this amount of the compound from food. For example, women in the US average 76 mcg/day and men 109 mcg/day. These figures are well above the recommended dietary allowance for adults. ^[9]

Information on the consumption of the mineral in other countries varies, but also usually exceeds the doses recommended by nutritionists. Daily upper limits depend on age. For example, for children 1-3 years of age, the maximum safe daily "serving" is 300 micrograms, for teenagers - 1700 micrograms, and for adults - 2000 micrograms. ^[ten]

5 Health Benefits of Molybdenum for Kids and Adults

1. Acts as a Cofactor for Four Enzymes

The element is necessary for enzymes that are involved in redox reactions, the conversion of sulfites, the breakdown and elimination of toxins. Molybdenum activates enzymes such as sulfite oxidase, aldehyde oxidase, xanthine oxidase, mitochondrial amidoxime (mARC). The role of the mineral in the destruction of sulfites, which come from food products, is especially important. If they accumulate in the body and are not excreted in a timely manner, allergies, skin problems begin to develop, and the digestive tract is disturbed. ^[11, 12, 13]

2. Protects against cancer, sclerosis and other diseases

The trace element removes excess copper from the body. This can play a huge role in the treatment of dangerous chronic diseases. Scientists consider it as a remedy for the treatment of hereditary Westphal-Wilson disease, oncology. ^[14, 15, 16, 17, 18]

3. Protects cells from damage

The body naturally produces free radicals that are harmful to health. They reduce cellular function and lead to the complete destruction of cells. Antioxidants counter this process and prevent the accumulation of cells in aging, cancer, and other chronic diseases. Molybdenum is required to activate the antioxidant functions of some enzymes. ^[19]

4. Eases Metabolic Diseases

The chemical element is responsible for a healthy metabolism - it starts chain reactions to produce energy. Therefore, foods with a mineral must be in the diet of every person.

5. Prevents tooth decay

The trace element is found in tooth enamel, so scientists decided to test its benefits on animals. Enamel treated with molybdenum fluoride showed accelerated cavity healing due to rapid mineral regeneration. [20, 21]

Interaction with vitamins and trace elements

Molybdenum supplements at a dosage of 500 mcg / day can provoke a deficiency of certain metals - the component displaces copper from body tissues. It also contains the enzyme xanthine oxidase, which promotes the mobilization of iron from reserves in the liver. [22]

Molybdenum in medicine

Food supplements contain molybdenum alone or together with other minerals. However, there is currently little evidence to support Mo. Such complexes may be needed for rare diseases and at certain stages of life (pregnancy, recovery from injuries, etc.). If you think you are not getting enough of a mineral from food, discuss this with your doctor or nutritionist, rather than taking supplements on your own.

It should be noted that the decay product of Mo-99, Tc-99m, is recognized as a working isotope in nuclear medicine for diagnostic imaging. It is used to detect diseases and to study the structure and function of organs. [23, 24]

Molybdenum in scientific research

- Scientists have found that esophageal cancer is associated with nutrition - the highest incidence has been recorded in countries and areas where there is a shortage of food. This primarily concerns China, Africa, the Middle East. In these regions, in addition to malnutrition, there is a lack of molybdenum and other substances in the soil. This contributes to the accumulation of nitrates and nitrites in plants, which convert them into nitrosamines - known carcinogens of the esophagus. [25]
- Previous studies have estimated the average daily dietary intake of molybdenum at about 300–400 mcg/day. To do this, the average food baskets of Americans were collected, their content was analyzed. However, new evidence suggests that the average intake is much lower - ranging from 120 to 240 mcg / day - and depends on age, gender, income. [26]
- Molybdenum deficiency due to long-term intravenous nutrition can provoke amino acid intolerance. During one study, a patient experienced hypersensitivity to L-methionine. Symptoms disappeared when the L-amino acid solutions were discontinued. The abnormalities indicated that a metabolic defect developed during the conversion of sulfite to sulfate. Supplementation with 300mcg/day of ammonium molybdate normalized uric acid production and solved the problem. [27]

Contraindications and risks associated with taking molybdenum

Molybdenum supplements are not approved by the FDA for medical use, although the potential for toxicity is low. The rules for admission are set by the manufacturers themselves, but this does not guarantee the safety or effectiveness of dietary supplements.

Molybdenum deficiency - deficiency symptoms

Deficiency of the element is rare, since it is found in many foods and is needed by the body in scanty amounts. People usually do not take it in the form of dietary supplements. The reason for this can only be diseases that do not allow the body to use the compound. Molybdenum deficiency leads to seizures,

cancer of the esophagus, brain damage, death within a few days of birth, and developmental delay. [28, 29, 30]

Excess molybdenum: symptoms, toxicity

Molybdenum from food and drink does not cause any harm. But taking it in large quantities does not give any advantages. Little is known about toxic effects in humans as research is limited. However, in animals, very high levels have been associated with diarrhea, kidney failure, growth retardation, and infertility.

People exposed to high concentrations of the substance (consumption 10–15 mg/day, industrial exposure) develop side effects:

- decreased bone mineral density; [31, 32, 33]
- accumulation of uric acid, development of gout;
- reproductive problems - a decrease in testosterone, sperm quality, fertility. [34, 35, 36]

Joint pain can also develop due to high levels of uric acid. [37, 38]

Interactions with drugs: when should you pay special attention to the intake of molybdenum?

The mineral does not interact with any drugs, does not interfere with their absorption. But when it comes to its consumption in the form of a supplement in large doses, you should definitely inform your doctor about this when prescribing any medication.

Expert comment

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Molybdenum is a little-known but important trace element that can be obtained from legumes, grains, and offal. You don't need to supplement it as long as you follow a healthy diet. Studies show that even with a healthy diet, the average daily intake often exceeds the needs. Therefore, you should not worry about molybdenum, but about getting other vitamins and minerals.

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