

THE ROLE OF BORON FOR HUMAN BODY

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Introduction. Boron is a little known trace element from the metalloids class that is supposed to be essential for the human body. The main source of boron for humans is drinking water. To date, there is evidence that boron can be beneficial for bone and joint health, brain activity, hormonal health and can help the body to metabolize minerals like calcium, copper, and magnesium. The purpose of this study was to research the literature data to determine the role of boron for the human body.

Material and methods. A study analysis of 150 bibliographic sources was carried out that highlighted the boron functions and its role for the human body.

Results. Boron can be easily found in the form of compounds as borax, boric acid and boron oxide in the environment, particularly in sea water, drinking water, rocks and soil. Its concentration in water can vary from 0.001 to 150 mg/L depending on geographic location. Along with the consumed food and the region of provenience drinking water can provide a dose of 0.75-1.35 mg of boron per day. Following available researches that extrapolate results from animal experiments, for optimal health effects of boron a minimum dose of 0, 5 mg per day is needed. World Health Organization suggests that an acceptable safe range for population means 1-13 mg of boron per day for adults. This indicates that usual intakes of boron above 1 mg day may promote human health. Most ingested boron is converted into boric acid in the gastrointestinal tract, then rapidly absorbed in the proportion of 85-90%, used in the body processes and excreted in that form mostly in the urine. That means that boron is not toxic, and its deficiency is more dangerous than the excess. Available human studies suggest that boron is beneficial for bone maintenance and can reduce the risk for osteoporosis. More than that, daily boron supplementation with 6-12 mg of calcium fructoborate can decrease joint rigidity and increase mobility, the symptoms being associated with osteoarthritis and rheumatoid arthritis. Boron has positive effects on vitamin D metabolism or utilization, circulating homocysteine levels, and S-adenosylmethionine, compounds which affect brain function, thus, it seems reasonable to suggest that nutritional intakes of boron have a positive effect on the central nervous system. Some biochemical findings suggest that boron might be beneficial for reducing the risk of the metabolic syndrome and diabetes through facilitation of the action or releasing of insulin. Both animal and human findings indicate that nutritional intakes of boron can reduce chronic inflammation determined by high serum C-reactive protein, which is a risk factor for heart diseases. Following this findings, boron is supposed to alleviate this risk factor and have a positive effect on heart health.

Conclusions. Substantial evidence indicates that boron is a trace mineral that can be easily found in drinking water and has health effects that may prevent or reduce the risk for bone diseases such as osteoporosis, osteoarthritis and rheumatoid arthritis, brain impairment, cardiovascular diseases and metabolic syndrome.