# Sodium Borate

## What is Boron?

Boron is a vital trace mineral, a required component of the normal physiology of the body. It is not produced in the body and therefore needs to be acquired through diet to maintain normal functionality of body systems. Boron is essential for all the cells in the body since it is required for maintenance of cell membrane's integrity. Its highest concentration is found in the parathyroid glands. The parathyroid gland is responsible for maintenance of bones by preserving a delicate balance between two different types of cells that either breakdown the bones or create new bone tissues. Additionally, when sodium borate combines with stomach acid it produces boric acid which has strong antiviral and antifungal properties. It is used as therapy for resistant fungal (Candida) infections due to its ability to destroy 'bio-films'. These bio-films are protective shields created by various pathogens to protect themselves against traditional antimicrobials.

## Sources of Boron

Boron is commonly found in the environment but its deposits and content in foods can vary in concentration based on geography (depleted soil can have low levels of boron). It is also abundant in fruits and vegetables such as kiwi, plums, avocados, grapes etc, however, most of the Boron is lost in washing and cooking or during processing when fruits and vegetables are canned.

## OTC products

Boron is available in several different formulations and also included in minute quantities in select over the counter multivitamins supplements. Sodium borate has the highest available elemental boron compared to citrate/aspartate formulations.

## Reported Uses

- Boron can prevent arthritis by modulating activity of parathyroid glands which are responsible for absorption and metabolism of calcium, magnesium and phosphorus.
- Boron can reduce severity of Rheumatoid Arthritis, Juvenile Arthritis and Lupus with positive effects in improving pain, swelling and stiffness.
- It can prevent post-menopausal Osteoporosis by increasing the level of estrogen in menopausal women and also promoting conversion of vitamin D to its active form and promoting deposition of calcium in bones rather than calcifying soft tissue.
- Boron has a role in increasing estrogen production by increasing both testosterone levels in men and estrogen levels in menopausal women.
- The antifungal, antiseptic and antiviral properties are especially useful in treating infections caused by Candida overgrowth. One interesting effect is destruction of bio-film which is a protective layer that various pathogens (bad bugs) can develop to protect themselves from our immune system. These bio-films protect these bad bugs and allow them to produce toxins that are responsible for damaging intestinal wall causing inflammatory diseases and Leaky-Gut Syndrome.
- It can have a protective effect against cancer since it has been postulated that cancer can be caused by the deterioration of cell membranes which can be linked to boron deficiency.
- Other important reported benefits range from improvements in cognitive performance and brain function, inhibition of harmful enzymes, as well as preventing blood clot formation possibly benefiting patients with congestive heart failure.

## Causes of Boron deficiency

One of the many culprits of boron deficiency is clearly a poor diet. The modern diet consists mostly of processed foods that lack essential vitamins and minerals that are damaged by cooking and commercial processing. To add to this problem, overuse of fertilizers also inhibits the uptake of boron from the soil and thus emphasizes the importance of eating nutrient rich foods that are organically grown. It is important to note that gluten sensitivity and Candida overgrowth can also affect the absorption of minerals and can lead to people unknowingly being unable to absorb necessary nutrients including boron. This means that taking a multivitamin can be very important for some patients.

## Symptoms of Boron deficiency

When the body is deficient in boron, the parathyroid glands become overactive causing the blood level of calcium to increase at the cost of displacing it from bones and teeth. Predictably, this leads to osteoarthritis, osteoporosis and tooth decay. Unfortunately, the increased calcium level in the blood can lead to calcification of soft tissues (endocrine glands, pineal gland, kidneys and ovaries) which can lead to dysfunction or even failure of those organs.

## Symptoms of Boron toxicity

By comparison with other pharmaceutical products, the side effect profile of boron is fairly gentle if recommended doses are used. A common manifestation associated with boron use is Herxheimer reaction as a response to rapid elimination of Candida pathogens causing discomfort in the digestive tract. Accidental large dose ingestion of boron can causes severe cramping, pain, as well as problems with blood circulation, nerve transmission which may present as numbness and skin sensitivity.

## Boron Supplementation

Boron supplementation in the form of sodium borate (26.3 mg = 3 mg elemental boron) with 3 mg – 9 mg (elemental boron) per day for adults provides most of the benefits listed above. Boron is a component of certain multi-vitamins in minute quantities (150-200 mcg). Boron aspartate/citrate is also commercially available as 2 mg capsules; however, this formulation has a low bioavailability of Boron (~11% elemental Boron vs. sodium borate ~55% elemental Boron) and may not be beneficial in bio-film destruction and osteoporosis. The recommended daily allowance has not been established for boron. Further research is needed to establish maximum allowance per day. Just as any chemical Boron can be hazardous if ingested in large quantities. The minimal toxic dose of ingested boron is reported to be 2–3 g in infants, 5–6 g in children, and 15–20 g in adults.

## References


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