

## **ADVANTAGES AND DISADVANTAGES OF REMOVING CHROME 6 BY REVERSE OSMOSIS.**

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**Chromium 6 can be removed from water through reverse osmosis water treatment or distillation. The following is a brief summary of reverse osmosis water treatment.**

Reverse osmosis (RO) is a filtration process that applies high pressure to force water across a semi-permeable membrane and leaves large molecules and ions behind on one side of the membrane and pure water on the other side. It is an effective method for removing contaminants from water.

There are some disadvantages of reverse osmosis:

- RO water has a low pH, making the water more acidic. The acidic water may also cause leaching of some metals from pipes, dependent upon placement of the filtration system in the plumbing.
- Reverse osmosis is a slow process and also wastes a large portion of the water that runs through the system. Household reverse osmosis units in particular use a lot of water because they have low back pressure. RO generally wastes two to three gallons of water for every gallon of purified water it produces. Large-scale industrial/municipal systems have a higher efficiency because they can generate the high pressure needed for more efficient RO filtration
- RO removes minerals and ions that provide taste to the water and electrolytes important for human health. For instance, magnesium, calcium and other nutrients in potable water can help to protect against nutritional deficiency or they need to be supplemented from other sources. Reverse osmosis water is devoid of fluoride which provides protection against dental cavities.
- The Journal of General Internal Medicine <sup>(1)</sup> published a study on the mineral contents of different waters available in the US. The study concluded that "drinking water sources available to North Americans may contain high levels of calcium, magnesium and sodium and may provide clinically important portions of the recommended dietary intake of these minerals".
- Some epidemiological studies have suggested that an inverse relation exists between magnesium levels in drinking water and the occurrence of cardiac disease and that hard drinking water, and particularly high magnesium intake from drinking water, protect against cardiovascular disease <sup>(2, 3)</sup>. Although the major portion of magnesium intake is via food (such as nuts, green leafy vegetables, cereals, and seafood), it is suggested that waterborne magnesium is more efficiently absorbed by the human body and better than magnesium from food <sup>(5)</sup>.

- However, the data supporting this potential relationship is inconsistent. For instance, one later review study reported a statistically significant inverse association between magnesium and cardiovascular mortality (OR 0.75 (95%CI 0.68, 0.82),  $p < 0.001$ ). Evidence for calcium remained unclear<sup>(6)</sup>. Yet another study suggests that neither high water hardness, nor high calcium or magnesium intake appreciably protect against coronary heart disease or cardiovascular disease<sup>(4)</sup>.
- The World Health Organization (WHO) guide<sup>(4, 7, 8)</sup> on pure water list the following possible adverse consequences of low mineral content water consumption:
  - Direct effects on the intestinal mucous membrane, metabolism and mineral homeostasis or other body functions. Increased diuresis and serum sodium concentrations, decreased serum potassium concentration, and increased the elimination of sodium, potassium, chloride, calcium and magnesium ions from the body.
  - Little or no intake of calcium and magnesium from low-mineral water.
  - Low intake of other essential elements and microelements.
  - Loss of calcium, magnesium and other essential elements in prepared food.
  - Possible increased dietary intake of toxic metals.

The guide further states that water with a total dissolved solids (TDS) level of less than 100 mg/L disturbs the water-salt balance in the body and results in the leaching of individual salts such as sodium, potassium and chloride, as well as some calcium from the person who drinks it. Further research does not seem to support some these views and have found the conclusions of the 1980 WHO documents suspect.

#### References:

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