



Chemical Quality: Fluoride (F)

What is Fluoride?

- Fluoride is necessary in humans in minute quantities during tooth formation, to harden the tooth enamel.
- Physically it is the most electro-negative element and therefore forms complexes with many metals.

Fluoride in water

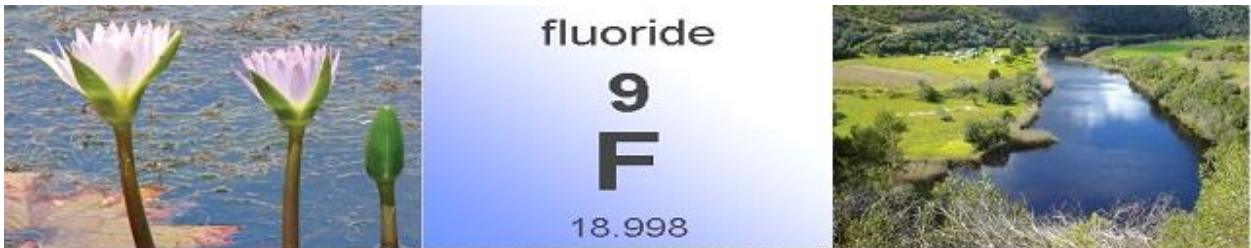
- In unpolluted, natural, fresh water and unpolluted groundwater, fluoride concentrations can vary naturally between 0,1 and 0,3 mg/l. Some groundwater can have a fluoride concentration of as high 12 mg/l.

What problems can Fluoride cause?

- The intake of too high concentrations of fluoride over a long period can harden your skeleton to such an extent that your bones become brittle. This in turn can lead to easy bone fracturing under mild strain and subsequent crippling.
- Ingestion of high concentrations of fluoride can cause acute poisoning, with symptoms such as nausea, vomiting, abdominal pain, diarrhoea and convulsions.
- Too much fluoride during your tooth forming years can cause discoloration of permanent teeth.
- Fluoride in water has no taste, colour or smell and cannot be **aesthetically** detected, even in high concentrations.
- Children under the age of 3 years, HIV positive people, people suffering from malnutrition, especially calcium and zinc deficiencies, people with liver or kidney disease, people who drink a lot of water and patients on renal dialysis, are all very susceptible to fluoride.

How can Fluoride in water be treated?

- It is very difficult to remove low concentrations of fluoride from water.
- Advanced technology is required for effective removal of fluoride from water. Two processes include addition of activated alumina or bone char to absorb the fluoride, as well as desalination by means of ion-exchange resins.
- Both of the above fluoride removal technologies require high levels of skill and maintenance.
- Home treatment with clay or calcium carbonate chips will lower the concentration of fluoride in the water, but usually not even to optimum concentrations.
- Home treatment kits, using ion-exchange processes are expensive and treat only small volumes of water.



Reference: DWAF (1998). Quality of domestic water supplies. Vol. 1: Assessment Guide. WRC No. TT 101/98, pp. 21.