Chemical Quality: Manganese (Mn)

What is Manganese?

- Manganese is a metal that occurs in soils that are often associated with water, giving the water it a tea-like colour.
- Tea-coloured water in the Western and South Cape regions are due to the presence of organic matter and manganese.
- Manganese occurs naturally in tea.
- Manganese is essential in the human body, where it plays an important role in cartilage integrity.

Manganese in water

- Unpolluted, fresh water has a manganese concentration of as much as 3 mg/l.
- As soon as the manganese of a water source exceeds 5 mg/l, it can be assumed that either the water is polluted or manganese was circulated to the surface from the bottom of the water source.

What problems can Manganese cause?

- Ingestion of less than 2 mg manganese per day is normal and will have no adverse effects on the human health.
- When the human being is exposed to high levels of manganese over a long period, it may cause **brain damage**, resulting in a Parkinson-like disease.
- Manganese concentrations in water rarely cause any health effects.
- Children under the age of 3 years, kidney patients and people that drink large volumes of water are most sensitive to manganese.

How can Manganese in water be treated?

- Generally magnesium concentrations can be reduced in water by **lime softening**, Processes for the removal of manganese are **aeration**, **chemical oxidation** (strong oxidants are required) and **lime treatment**, followed by **flocculation** and **filtration**.
- **Aeration** or **alkalinisation** is only effective when the water is free of organic matter and the manganese uncomplexed (which is seldom).
- Treatment with **domestic bleach** will improve the water quality, but will fail to remove manganese.
  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.