

Water Quality and Health Effects

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Introduction

- ▶ Water quality is assessed in terms of
- ▶ Physical parameters - Turbidity, colour, odour, temperature
- ▶ Chemical parameters - pH, Alkalinity, hardness, dissolved solids, Cations, Anions, Toxic heavy metals, persistent organic pollutants, organic matter, micropollutants, namely Pharmaceutical compounds, Daily care products and disinfection by products
- ▶ Bacteriological parameters - Total Coliforms, Fecal Coliforms, MPN

Objectives and Outcomes

▶ Objective

To assess water quality that is suitable for drinking and other purposes.

▶ Outcome

To ascertain the suitability of water for drinking and other purposes and accordingly propose the type of treatment required.

Safe drinking water

- ▶ **Free from pathogenic organisms**
- ▶ **Clear**
- ▶ **Not saline**
- ▶ **Free from offensive taste or smell**
- ▶ **Free from compounds that may have adverse effect on human health**
- ▶ **Free from chemicals that cause corrosion of water supply systems**

FLUORIDE

- ▶ Occurs naturally
- ▶ Long term consumption above permissible level can cause -
dental flurosis (mottling of teeth)
- ▶ Skeletal flurosis
- ▶ Acceptable limit - 1 mg / l
- ▶ Maximum permissible limit - 1.5 mg / l
- ▶ Remedy - Defluoridation
- ▶ Using different techniques



Heavy Metals

- ▶ Present as minerals in soil, rocks of earth and in industrial wastewaters
- ▶ Chromium, Lead, Nickel, Copper, Zinc, Mercury, Cadmium, Arsenic, etc.
- ▶ Most of the heavy metal are Carcinogenic
- ▶ **Arsenic**
- ▶ Occur in ground water from arseniferous belt
- ▶ Industrial waste, agricultural insecticide
- ▶ High arsenic causes muscular weakness, paralysis of lower limbs, skin and lung cancer
- ▶ Acceptable limit - 0.01 mg / l

Persistent Organic Pollutants

- ▶ Toxic.
- ▶ Persistent.
- ▶ Bioaccumulative in human fat and animal tissues.
- ▶ Insoluble in water.
- ▶ Lipophilic.
- ▶ Semi-volatile.
- ▶ Long half life.

Hazards

- ▶ Damage of the nervous system,
- ▶ Diseases of the immune system,
- ▶ Reproduction and the developmental disorders,
- ▶ Cancer.
- ▶ Most of them are Endocrine Disruptors

Micropollutants

- ▶ Pharmaceutical Compounds
- ▶ Personal Care Products
- ▶ Disinfection byproducts

Common Water Borne Diseases

- ▶ Bacterial: Cholera, Typhoid, Bacterial Dysentery
- ▶ Viral: Hepatitis A (jaundice), Polio
- ▶ Protozoa: Amoebic Dysentery, etc.

▶ Global Facts

- ▶ The World Health Organization reports that contaminated water contributes to 80% of all sickness and disease worldwide.
- ▶ In the last decade, the number of children killed by diarrhea exceeded the number of people killed in all armed conflicts since the Second World War.
- ▶ Every eight seconds, a child dies from drinking dirty water

Thanks

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