Topic

Awareness About Physico-Chemical Parameters of Drinking Water

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GENERAL INFORMATION

- Blue Gold, Abundant, Precious compound.
- Earth Surface contain 74% water.
- 97.5% salt water & only 2.5% drinking.
- Human body contain 74% water
- 135 lit/day

PARAMETER

- **Physical parameters** – pH,TDS,Turbidity, Temperature, Color,Odour, Taste,

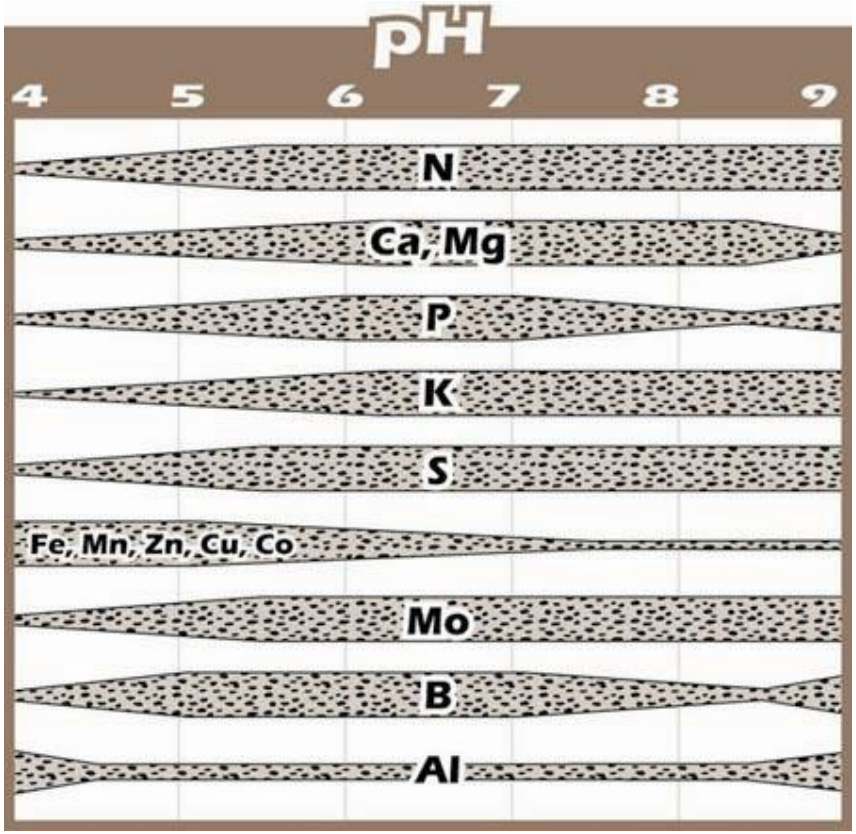
- **Chemical parameters** – Major ions, Minor ions, Trace element.

What is pH?

- pH is a Unit of Measurement
  - pH = Power of Hydrogen (H^+)
  - Defined as the Negative Logarithm of Hydrogen Ion Concentration
    - pH = - log (H^+) in case acid
    - pOH = - log (OH^-) in case base
- Used for Determining the Acidity and Alkalinity of an aqueous Solution.

Solution H^+ concentration compared to distilled water	pH	Solutions at this pH
1×10^{7}	0	Strong hydrofluoric acid
1×10^{6}	1	Battery acid
1×10^{5}	2	Lemon juice, gastric juice
1×10^{4}	3	Vinegar, orange juice, soda
1×10^{3}	4	Tomato juice
1×10^{2}	5	Black coffee Rainwater
10	6	Urine Saliva
1	7	"Pure" water
0.1	8	Seawater
1×10^{-2}	9	Baking soda
1×10^{-3}	10	Milk of magnesia
1×10^{-4}	11	Household ammonia
1×10^{-5}	12	Soapy water
1×10^{-6}	13	Bleach Oven cleaner
1×10^{-7}	14	Liquid drain cleaner

Solubility of Specific ions based on water pH



Metals

Metals

Toxic metals less available in water at pH 6.5 to 8.5

DESIRABLE LIMIT

- According to WHO (World Health Organization) Desirable limit of pH for drinking water is
- 6.5 to 8.5

EFFECT & FACTOR

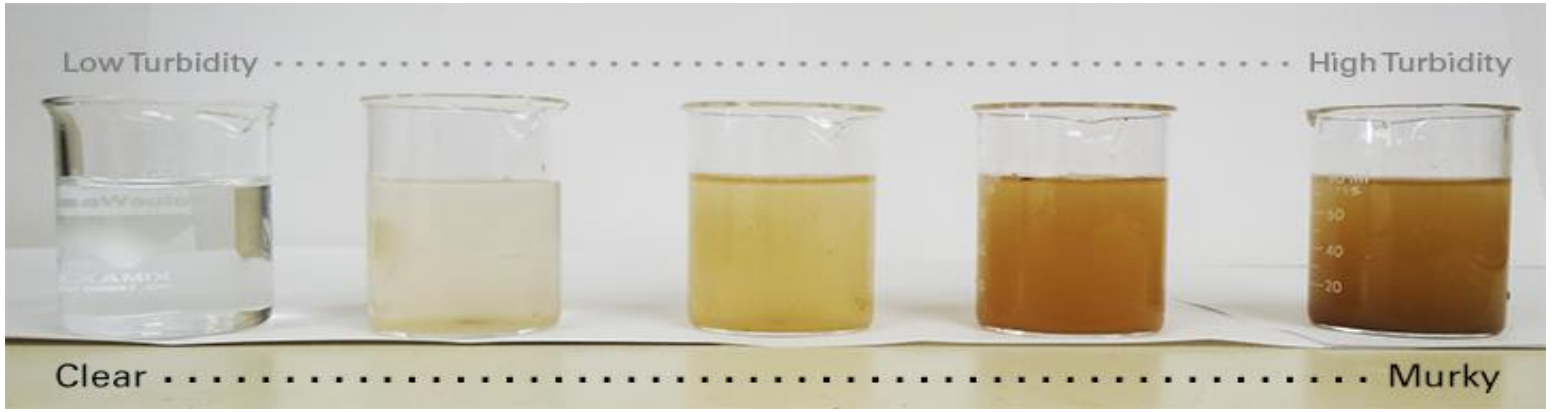
- May causes gastrointestinal issue , skin irritation, Vomiting.
- Metabolic Alkalosis – reduces free calcium in body affect on bone health.
- CO_2 in Water, Acid Rain, Waste water etc.

TURBIDITY

Turbidity is a measure of water clarity how much the material suspended in water decreases the passage of light through the water. Suspended materials include soil particles (clay, silt, and sand), algae, microbes, and other substances.

Turbidity refers to water clarity.

Sediments suspended in the water increase turbidity.


Low Turbidity
High Turbidity
Clear
Murky


ELICO
CL 52D NEPHELOMETER
SET 0
SET 100
RANGE (NTU)

DESIRABLE LIMIT & UNIT

- Unit of Turbidity is NTU.
- According to WHO desirable limit of Turbidity for drinking water is 5 NTU.
- Consumer acceptance decreases.
- Lower the amount of D.O.

TDS

- PRINCIPAL CAUSE- Mineral substances dissolved in water.
- SIGNIFICANCE- Total dissolved solids is a measure of the total amount of minerals dissolved in water.

Level of TDS (milligrams per litre)	**Rating**
Less than 300	Excellent
300- 600	Good
600- 900	Fair
900 - 1,200	Poor
Above 1,200	Unacceptable

Desirable & Permissible Limit

- Desirable level according to WHO is 500 -1000 ppm (mg/liter)

Chemical Parameter
1) Hardness of Water

- **Hardness represents the soap-consuming capacity of water.**
- **Species that form insoluble compounds with soap Ca, Mg, Organic compounds etc.**
- **Total hardness is sum of Ca and Mg and expresses as CaC03 mg/l (ppm).**
- **Volumetric Analysis i.e.EDTA titration.**

TOTAL HARDNESS

- Total Hardness = TH + PH

- Bicarbonate (TH) $Ca(HCO_3)_2 + Mg(HCO_3)_2$
- Removed by boiling and adding lime

- Non-Carbonates (PH)
- $CaSO_4 + MgSO_4$ & $CaCl_2 + MgCl_2$
- Removed by lime-soda, zeolite,demineralization etc.

HARDNESS

Hardness Range (mg/L of $CaCO_3$)	**Water Category**
0-60	Soft
61-120	Moderately Hard
121-180	Hard
More than 180	Very Hard

CAUSES & EFFECT

- Chemical Industry effluents.
- Mining effluents.
- Weathering of limestone.
- Mainly Kidney stone, Dry skin & Hair.
- Cardiovascular Diseases.

FLUORIDE

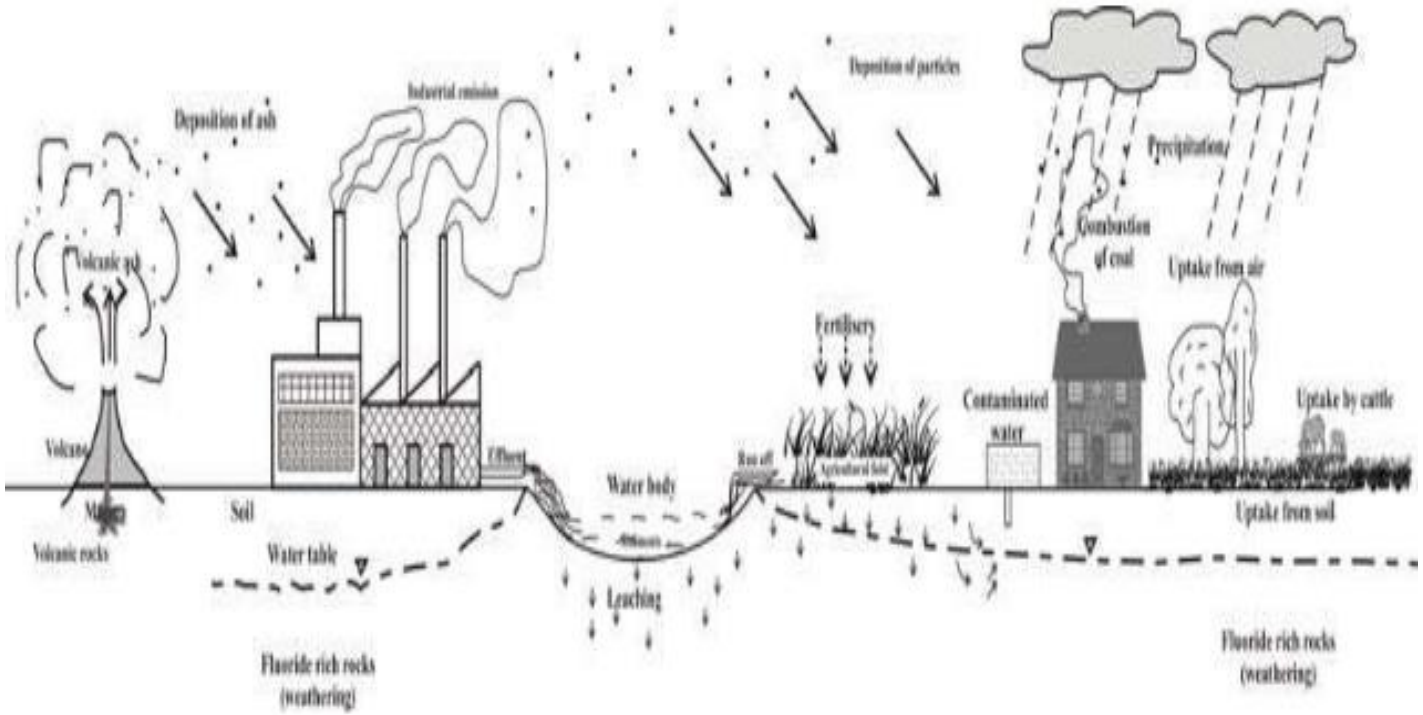
- Analysis through spectrophotometer.
- SPADNS.
- High F concentration causes **fluorosis**.
- < 0.7 mg/l result **dental problem**.
- Essential concentration 0.7 to 1.5 mg/l (ppm) in drinking water.

What is Fluorosis?

- Skeletal fluorosis is a bone disease caused by excessive consumption of **fluoride.**

CAUSES

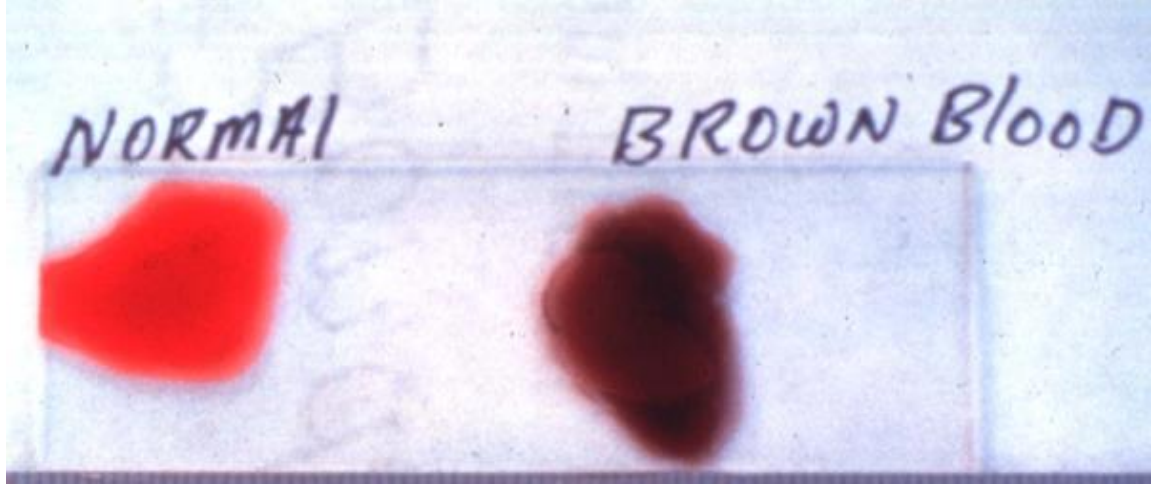
- Fly Ash – fossile fuel, combustion of coal
- Specially from power plants.
- Volcanic ash.
- Fertilizers- phosphate containing, potash,superphosphate,NPK
- Industry-Aluminium smelting,cement production and ceramic firing etc.



The possible causes and sources through which fluoride exists in the environment are schematically

NITRATE

- Analysis through spectrophotometer.
- Excessive conc. Of NO3 Hazardous for health.
- causing metheoglobinaemia (blue baby).
- Reduction in the oxygen-carrying capacity of blood.
- WHO 45mg/l (ppm).


NORMAL
BROWN BLOOD


CLEAN
WATER
FOR ME

CONCLUSION

- When we gone through this study I conclude that, if we do not use safe water we can be a victim of any disease. Hence for healthy life we should use pure water.

- WATER IS LIFE

Thank

YOU