

Water Pollution And Human Health Hazards

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Abstract

Water is essential component of the environment and it sustains life on the earth. Water is raw material for 'Photosynthesis and therefore very important for over 98% of the from water on the earth lies for crop production below its surface. The remaining 2% is in the form of lakes, rivers, streams and reservoirs. Of the fresh water below the surface, about 90% satisfies the description of ground water, that is , water table. About 2% water occur as soil moisture in the unsaturated zone above the water table and is essential for plant growth. Different parameters of water have been analyzed and assessed the suitability of drinking water in public hygiene scenario. Some parameters are prescribed by ISI and WHO while other are beyond the limits.

Key words: surface and ground water and health hazards

Introduction

Groundwater is brought to the surface by drilling into saturated rocks which are just below the water table whose pores and cracks are completely filled with water, and pumping the water out ground water acts as a reservoir by virtue of large pore space in earth materials as a conduit which can transport water over long distances and as a mechanical filter which improves water quality by removing suspended solids and bacterial contamination. It is the source of water for wells and springs, that is the recommended source of rural domestic use. It has low development and distribution cost in comparison to the costs in developing water from surface sources such as river , lakes , stream , ponds etc.

Pollution of Groundwater

About 90% of the earth's water cannot be consumed because it is either saline (97% in ocean and seas) or locked up as solid (2%) in polar ice caps, glaciers and ice sheets. Most of the remaining water (1%) is fresh and worth using and present in rocks as groundwater

(0.99%) About 0.01% of water on the earth is present in surface reservoirs like rivers, lakes, ponds, springs etc. In many parts of the world where surface source are either absent or polluted, groundwater is often the only source of fresh water. In India a large amount of water we consume comes from groundwater and this amount would undoubtedly rise as we become more developed. Although it is more difficult to pollute groundwater than surface water because the soil can either stop the pollutant reaching groundwater or help to reduce its concentration, many of our activities affect it adversely. Since it moves slowly (5-10cm/day) and experiences limited dilution, once it is polluted even with little toxic that reaches the water level, it can remain as such for many years. Thus it is not at all surprising if the groundwater of a place is more polluted than even the surface water.

Today human activities are adding industrial, domestic and agricultural wastes to ground water reservoirs at an

alarming rate. Groundwater contamination is generally irreversible i.e. once it is contaminated; it is difficult to restore the original water quality of the aquifer. Excessive mineralization of groundwater degrades water quality producing an objectionable taste an objectionable taste.

Experiments

For the analysis of physico-chemical parameters in water Three (03) samples were collected in wide –mouth plastic bottles. pH values of the ground water samples under investigation were measured using systronic pH meter ,type 361.The pH meter standardized by buffer solution of 4.0 pH and 9.2 pH .

The total hardness of the water samples were determined by complexometric titration with EDTA using eriochrome black-T as an indicator. The calcium hardness of the water samples were determined by complexometric titration with EDTA using ammonium parpurate as an indicator. The estimation of chloride ions is generally determined by titrating the water sample against a standard solution of silver nitrate using potassium chromate as an indicator. Sodium and potassium were estimated using flame photometer (128) technique. NO_3^{2-} , SO_4^{2-} were estimated using UV-visible spectrophotometer.

Chemical parameters and their methods used

Ph	H+ ion sensitive electrode methods.
Total Hardness (T.H.)	E.D.T.A. Titrimetric method.
Calcium Hardness	E.D.T.A. Titrimetric method.
Sodium	Flame Photometric Method
Potassium	Flame Photometric Method
Sulphate	UV-visible spectrophotometer Methods
Nitrate	UV-visible spectrophotometer Methods

Result and discusion

The pH of the water body indicates the degree of deterioration of water quality. The desirable pH range necessary for drinking water is from 7.0 to 8.5. The pH value of water sample in the study area ranged from 7.1 to 7.4. Total calcium and magnesium human dietary needs. They further state that in some instances, where dissolved calcium and magnesium are very high, water could be a major contributor of calcium and magnesium to the diet. The desirable limit for Total hardness in drinking water according to I.S.I. is 300mg/L. Its values in Ground-water samples varied from 165 mg/L to 180 mg/L.WHO permissible limit of calcium in the

ground water is 100 ppm. In the present investigation calcium content ranged from 70 mg/L to 90 mg/L.

Sodium is the primary cation in extracellular fluids in animals and humans. It is very importance for osmoregulation and fluid maintenance within the human body. Human body needs a small amount of sodium to help maintain normal blood pressure. The human body contains approximately 1.3 gm of Sodium. Water samples varied from 40.4 mg/L to 47.1 mg/L. Potassium is an important mineral to the body and plays role at both the cellular and electrical level. It is powerful element in improving health. Potassium values in water samples

varied from 1.2 mg/L to 6.1 mg/L. Excessive concentrations of nitrate in drinking water may cause **blue baby syndrome** in small

children. Nitrate is good for plant nutrient. Its values in ground water samples varied from 1.6 mg/L to 6.8 mg/L

Parameter	Sample Point-1	Sample Point-2	Sample Point-3
pH	7.2	7.1	7.4
T.H.	180	165	175
Ca ^H	75	70	90
Na ⁺	45.1	40.4	47.1
K ⁺	0.2	0.3	4.9
SO ₄ ²⁻	1.6	2.0	15.0
NO ₃ ²⁻	1.6	3.9	6.8

All the value are expressed in mg/L except pH

T.A. = total alkalinity, T.H. = total hardness, Ca^H=Calcium Hardness, Sample Point-1 Kharbya Village, Bhitwar, Gwalior, Sample Point-2 Kiratpur village Bhitwar, Gwalior, Sample Point-3 phatepur village Bhitwar, Gwalior

Conclusion

The above observations in the present study indicate some parameters of water sample suitability for drinking and domestic purposes.

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