STUDY ON STATUS OF GROUND WATER QUALITY IN KRISHNAGIRI MUNICIPAL AREA LIMIT

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Abstract:—
The present study on status of ground water quality in krishnagiri municipal area limit. The water collect different place such as Mittappalli, Singara Pettai, Cinnathala Pad,I Uthangarai, Kottukaram Patti. We analysed the colour, odour ,turbidity , EC, TDS, PH , Alkalinity, TH. All the samples at various points were collected using standard procedural methods. These samples were analyzed for various physico- chemical parameters employing known scientific methods.

Key words: EC, TDS, PH, Alkalinity, TH.

I. INTRODUCTION

Water is the most essential component for life on earth. Water is one of the five elements viz. Air, water, fire, earth and sky that constitute all matters in the Universe. It is essential component in all living things. Though there may be variations in the percentages of five elements, no matter is free from these elements. Water is nature's precious gift to humanity.

Ancient scriptures of India, the Vedas and Upanishads have described the origin, importance, relevance and significance of water in sustaining life on earth. Tirukkural, Tamil classical language text, devoted 10 verses to account for the essential characteristics of water to maintain human, animal and plant life on the earth's surface. The available water in the earth on its surface and sub-surface only a fraction of it is utilized for human consumption. Surface water such as oceans, seas, ponds, lakes, rivers and other water bodies form important water sources. Ground water too plays a vital role as water resource.

In recent years the increasing threat to ground water quality due to human activities has become a matter of great concern. The main factors affecting quality of ground water are Salt water intrusion, Organic and Inorganic and heat pollution by sewage and industrial waste, Pollution of good quality aquifers by bad quality aquifers because of faulty construction methods.

Industrialization and Urbanization like two faces of the coin have caused these major problems associated with ground water quality. Effective treatment procedures and reluctance in adapting to novel technologies have been consistently insisted and further needs to be emphasized as in many of the areas like Krishnagiri ground water is the only source for drinking.

The determination of the concentration levels of heavy metals in these waters as well as elucidation of the chemical forms in which they appear is a prime target in environmental research today.

A random sampling of ground water was collected from 5 villages belonging to Krishnagiri Municipal limit. Water quality assessment of these samples has been attempted to ascertain its suitability to domestic, industrial and agricultural purposes. It has also been proposed to study the pollutional load of these water samples. It has been envisaged to make public aware of quality of water that they are consuming.

Water is one of the most essential requirements of life and has occupied an important position in the activities of man. It is necessary to have a proper check on the quality of water supplied to the public..

I. Properties of Water

Water is the only inorganic liquid that occurs naturally on earth. It is the only chemical compound that occurs naturally in all three physical states – solid, liquid and vapour. Since life developed in water the properties of the 'Universal Solvent' or 'Life's natural habitat' or 'Life's preferred habitat' exerts a controlling influence over the many biochemical and physiological processes that

are involved in the maintenance and perpetuation of living organisms. It is rightly called 'the eccentric liquid' by Felix Franks.

Water is a simple molecule (H_2O) of molecular weight 18. It has high heat capacity which results in the phenomenon or reservoir of energy in oceans. The other physical properties that greatly influence our ecological and environment are the low density of ice relative to that of water and its negative expansion of coefficient of cold water. Water exhibits peculiar properties due to hydrogen bonding formation in the liquid state and its capacity to associate within the liquid.

II. Water Pollution

The pervasive nature of water, its importance for sustenance, its easy accessibility and other activities leave it open to a variety of man-induced changes causing heavy pollution. Such abuses over the last few decades have created serious problems of water quality and quantity. Water pollution has become all-pervasive ranging from small water bodies to ocean water.

The main activities that contribute to water pollution are discharge of untreated or partially treated sewage, agricultural wastes and industrial effluents, disturbance of land surface through mining operation umping of toxic and radioactive wastes and Oil spills from giant oil tankers.

Reservoir construction for irrigation, flood control and power generation produces a number of ecological and socio-economic conflicts as well as management problems between upstream and downstream user populations. These problems indicated above affect the living stream environments.

III. *Water Pollutants*

The following definition of a pollutant has been given by Werner in 1973. "A substance or effect normally considered to be a pollutant if it adversely alters the environment by changing the growth rate of a species, interferes with the food chain, is toxic or interferes with health, comfort, amenities or property values of people".

Generally a pollutant is a substance or effect introduced in to the environment in significant amounts as sewage, waste, accidental discharge or as a byproduct of manufacturing process or other human activity. A polluting substance can be a solid, semi-solid, liquid, gas or sub molecular particle. A polluting effect is normally some kind of waste energy such as hear, noise or vibration.

According to the Indian environment protection Act 1986 "A pollutant has been defined as any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to environment.

Many pollutants that concern may occur in nature although chlorinated hydrocarbons like DDT and certain short lived radioactive isotopes have been exceptions.

II. MATERIALS AND METHODS

The samples have been collected at 5 selected places as composite samples. At every point sample have been collected as per the standard procedures and then the samples were mixed together and composite samples have been obtained. The samples are given the serial numbers as follows.

A.Reagents

All reagents used were of analytical grade and solutions were made of demineralised water. Various water quality parameters were determined using standard analytical methods. The instruments used were calibrated and used for observing readings. The repeated measurements were made improve precision and accuracy of results.

III. RESULT AND DISCUSSION

All the five water samples were collected from various bore well located at Krishnagiri Municipal limit and the properties are shown in Table 1.Out of five samples the four samples (S_1,S_2,S_3,S_4) were colourless and clear, but the sample S_5 are slightly turbid. Four samples (S_1,S_2,S_3,S_4) do not have any dissolved organic and inorganic matter but the one sample (S_5) may contain organic and inorganic matter which may impart colour to a water sample. All the five samples (S_1,S_2,S_3,S_4,S_5) were odourless. It shows that the five samples were not having dissolved organic matter

Turbidity measures the concentration of dissolved inorganic ions and organic matter in a sample of water. According to, Bureau of India standards (BIS), and world

health organization (WHO), guideless the desirable limit is 5NTU permission limit is 10NTU for drinking water. Out of five samples was the turbidity various from 0.1 to 1NTU. This confirms that all the five samples $(S_1, S_2, S_3, S_4, S_5)$ are may be suitable for drinking purposes.

Electrical conductivity reflects the amount of inorganic ions present in a sample of water. The measured electrical conductivity varies from 234-2120 µmhos/con in studies. These values are well within the permissible limit (2500µmhos/con).

The total dissolved solids (TDS) value ranges from 338 to 1484 mg/L in all these five samples. TDS is a significant measure as it shows the amount of suspended and dissolved matter. As per WHO specifications the desirable limit for total dissolved solids is 500 m/l and maximum permissible limit is 1000 m/L for drinking purposes. The four $(S_1, S_2, S_3, S_4,)$ samples are within the desirable limit but the one S_5 sample is deviated from the WHO standards.

pH is a measure of hydrogen ion concentration in a sample of water or in a solution. pH value is 7 that indicates the samples is neutral, below 7 it is acidic and above 7 it is alkaline. It is desirable that P^H value should lie below 7.1-8.0 for all purposes. In this analysis all five samples $(S_1, S_2, S_3, S_4, S_5)$ was P^H varies from 7.2 to 8.2. This confirms that all these samples are suitable for drinking purpose.

Most of the natural water contains substantial amounts of dissolved carbon di-oxide which is principle source of alkalinity and this can be conveniently estimated by acid titration. An increase in the temperature or decrease in pressure causes a reduction in the solubility of CO_2 in water. According to, BIS and WHO, guidelines the desirable limit is mg/L and permissible limit is 600 mg/L for drinking and agricultural purposes. The all five samples $(S_1, S_2, S_3, S_4, S_5)$ are within the BIS and WHO limits.

Hardness of water is due to the presence of salts of calcium and magnesium in the form of its carbonates, bicarbonates and chlorides. Hardness of water determines it's suitable to use ground water or surface water for a specific purpose. The total hardness measurement varied from 115-650 mg/L in all five samples. Similarly the calcium and magnesium concentration ranges from 21-130 mg/L and 15-79 mg/L respectively. All these observed values are within the limit except S_5(TH). The standard value of BIS and WHO standards (Hardness 300 mg/L - 500 mg/L: calcium 75 mg/L - 200 mg/L).

Table.1 PHYSICO – CHEMICAL PARAMETERS OF GROUND WATER ANALYSIS

S.No	Sample station	Colour	Odour	Turbidity	EC	TDS	P^H	Alkalinity	TH
1	Mittappalli	C & C	None	0.1	234	395	7.4	210	190
2	Singara pettai	C & C	None	0.1	258	435	7.1	210	158
3	Cinnathala padi	C & C	None	0.1	478	380	7.3	250	198
4	Uthangarai	C & C	None	1	483	338	8.0	146	115
5	Kottukaram patti	Slightly Turbid	None	1	2120	1484	7.05	400	650

Where, C & C-Colourless and Clear

IV. .CONCLUSION

The present study revealed that physico-chemical of all the five samples of ground water (Bore well) were compared with the standards prescribed by WHO and BIS. The above observation indicates that the higher values in some parameters of the samples minimize the suitability of these samples for domestic, agricultural and industrial purposes without physico-chemical treatment. All these sources of water been used extensively for irrigation purposes for a quite long time. It is imperative that a regular use of bore well waters may lead to soil infertility. Hence these sources of water should be treated properly before it is taken for public consumption.

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