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WATER QUALITY ANALYSIS OF CHINNA KANCHIPURAM, TAMIL NADU, INDIA

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ABSTRACT

Water samples have collected from different location of Chinna Kanchipuram, Tamilnadu, India and analyzed for different water quality parameters. Effects of municipal sewage, agricultural runoff, dyeing effluents on the water quality have been examined. The significance of Kanchipuram is growing city because of its Temples, Silk production and Textile business. This study entails determination of physical, chemical parameters of water samples. The ground water was originated to be hard forever due to its topographical character. The water was found a little alkaline. The examined values were compared with the standard values to appraise the pollution load. The results exposed that most of the water samples were within the confines in a few features according to the water quality standards.

Key words: Ground water, Alkalinity, Hardness, Chinna Kanchipuram, Textile business.

INTRODUCTION

The quality of ground water in the different locations of Chinna Kanchipuram is prejudiced by a range of natural processes and anthropogenic performances. The whole collection of life in water is exaggerated due to pollution in water[1]. In many areas, wastewater is inclined into the natural water bodies due to their ability to incorporate and dilute the injurious ingredients of the effluents. The trouble of river water quality worsening is mainly due to human actions such as discarding of dead bodies, expulsion of industrial and sewage wastes and agricultural runoff which are key root of ecological harm and cause severe health risks succumbs are being affected or vulnerable in numerous cases. This study explores water quality tendency and recognizes the major basis of pollution in the ground

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water. Physico-chemical distinctiveness of river water influence the biological characteristics and it is sign of the feature of water[3-7]. The intention of the study spot is to evaluate the current water quality in the course of analysis of some preferred water quality parameters like pH, conductivity, TH, TDS, alkalinity etc. In this study, a challenge has been prepared to study the environmental stipulation along the land and forecast the pollution category.

EXPERIMENTAL

Materials and methods

The water samples have collected from three different parts of Chinna Kanchipuram in Nathapettai. These spots are the agriculture based areas in Kanchipuram city. The samples have taken during the last week of March.

Bore water sample (Nearby [about 200ft] Sewage effluent) - Sample 1

Bore water sample (Faraway [about 1500ft] Sewage effluent) - Sample 2

Municipal Supply water sample - Sample 3

One liter pet bottles were used for the compilation of water samples for different quality parameter studies. Before the sample collection, all the bottles were washed with dilute acid followed by distilled water and before taking water samples, the bottles were rinsed three times with the respective samples. The test bottles were labeled with date. Samples were gathered in the month of March. Chemicals used were of Analar Grade. For the analysis of pH, electrical conductivity, total dissolved solids, alkalinity, chlorides, total hardness, sulphate and organic matter, standard procedures were followed.

RESULTS AND DISCUSSION

The various water analysis study results were given in the Table 1.

Table 1: Comparision studies

Parameter	Sample - 1 (ppm)	Sample - 2 (ppm)	Sample - 3 (ppm)
Temperature	28^oC	28^oC	28^oC
Total hardness	377.77	356.56	324.44
Permanent hardness	97.77	88.26	106.66

Cont…

Parameter	Sample - 1 (ppm)	Sample - 2 (ppm)	Sample - 3 (ppm)
Temporary hardness	280	268.3	217.78
Hydroxide alkalinity	75	50	50
Carbonate alkalinity	0	0	0
Bicarbonate alkalinity	0	0	0
TDS	126	114	112
Dissolved Oxygen	9.77	8.64	8.92
pH	7.9	7.6	7.7
Conductance (μS/cm)	134	126	102
Chloride	194.97	118.64	70.19

Hardness

The WHO précised the total hardness to be within 200-600 ppm of $CaCO_3$. Hardness values of water samples assorted from 324.44-377.77 ppm. Permanent hardness values vary from 88.26 to 106.55 ppm. Temporary hardness values diverge from 217.78 to 280 ppm. The pragmatic hardness values of all water samples were within the limits given by WHO, which is fit for drinking purpose and irrigation purpose too.

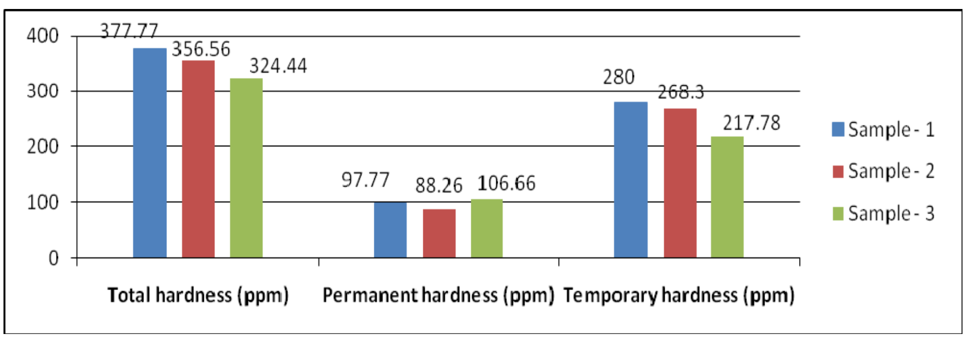

Fig. 1

Temperature

Water temperature has direct and indirect effects on almost all facets. For example, the amount of oxygen that can be dissolved in water is fairly managed by temperature. If, water temperature raise beyond their normal ranges for too elongated, plants and animals in waterways can become hassled and expire. Some of the aspects that influence water temperature are heat swap on the earth surface under restricted radiation in and out. Increases in yearly mean water temperature values of about 1.5^{o}C, and changes in summer mean temperatures of more than 2^{o}C, would have an brunt on the thermal environments of freshwater faunas (Pockl et al., 2003; Bruce and Franz, 2007)[8.9].

Alkalinity

The typical enviable limit of alkalinity in drinking water is 120ppm (WHO, 1984)[10]. The highest permissible level is 600ppm. In this study, the average values of alkalinity were within the pleasing limits in all the water samples. The assessment of alkalinity in water affords an idea of natural salts present in water. The source of alkalinity is the minerals which dissolve in water from soil. The different ionic groups that give to alkalinity include bicarbonates, hydroxides, phosphates, borates and organic acids. These features are accountable for the alkalinity of water sources. The sewage, drain water, industrial effluents may direct to increase in alkalinity of surface water in future. Hence appropriate care must be taken to maintain the quality of water.

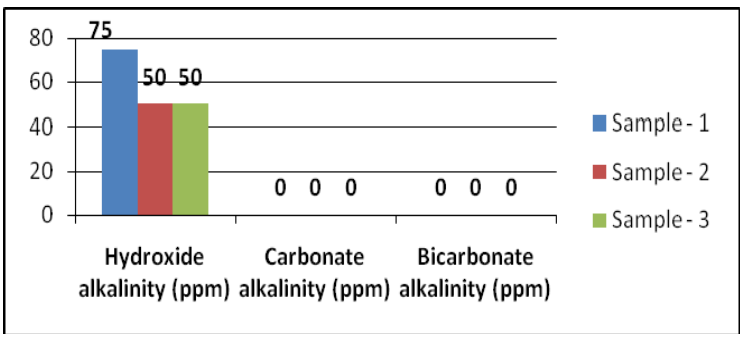

Fig. 2

Total dissolved solids

High TDS levels can build water taste like minerals and create it objectionable to drink and source water balance troubles for organisms. Low TDS levels may bind growth of aquatic life. Phytoplankton and floating aquatic plants, for example, totally need the nitrates and phosphates dissolved in the water because they have no origin to take up those nutrients. Total dissolved solids grounds toxicity through enhance in salinity, transforms in the ionic composition of the water and toxicity of individual ions. Increases in salinity have been exposed to cause shifts in biotic communities, limit biodiversity, exclude less-tolerant species and cause acute or chronic effects at specific life stages (Phyllis and Lawr)[11]. The total dissolved solids (TDS) in the water samples composed in three different areas assorted from 112-126ppm. Outcomes are within the perimeter.

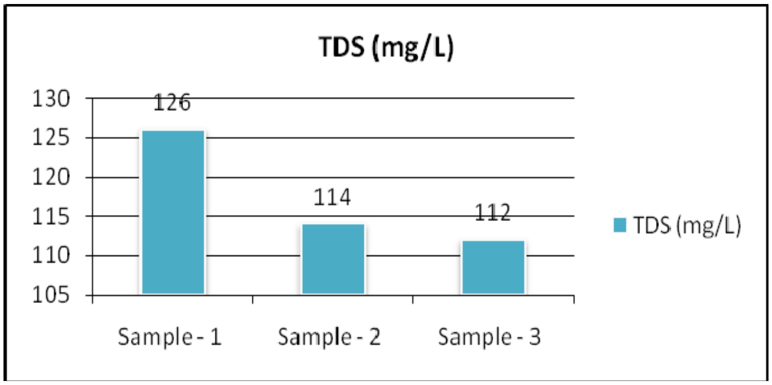

Fig. 3

Dissolved oxygen

The solubility of oxygen in water depends on aspects like pressure, temperature, and altitude and chloride concentration. It plays a key task in various metabolic behaviors. Low oxygen content in water is typically connected with organic pollution. The solubility of atmospheric oxygen in fresh water varies from 14.6mgs/L at 0^0 C to about 7 mgs/L at 35^0C at 1 atmosphere pressure. This evidently signifies that the solubility of atmospheric oxygen decrease with increase of temperature. DO is ranged from 8.64 to 9.77 mg/l in the derived samples. In this analysis, the dissolved oxygen of sample 2 is originated to be low when comparing with the other water samples. The pollutants from speedy growing inhabitants, geography, fabric business etc., may be the basis.

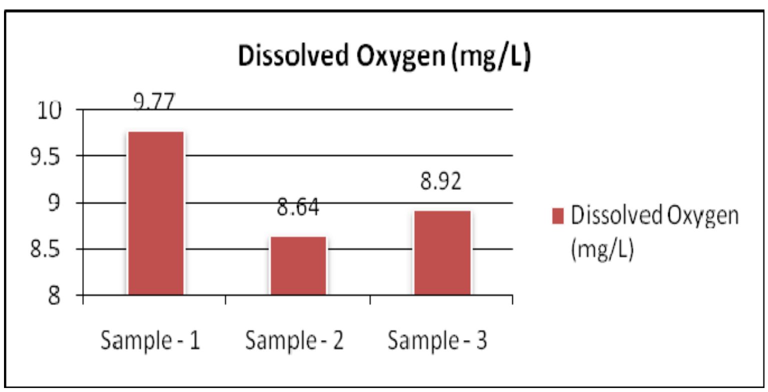

Fig. 4

pH: pH is the marker of acidic or alkaline state of water quality. It is noticeable that the pH value is within the drinkable restrictions as it ranged from 7.6-8.5. Ground water with a pH of 5.5 and below is principally at hazard. The pH of ground water can also be worsted by organic acids from crumbling plant life or the disbanding of sulphide minerals. Low pH level causes aquatic species destroy by stressing animal organism and causing physical harm, which in turn create them more defenseless to disease. It is believed that the temperature of the atmosphere and the animal and plant behaviors, caused by it, has much persuade (Hanya, 1949; Bahadur and Chandra, 1996)[12,13]. In this analysis, the samples are within the limit.

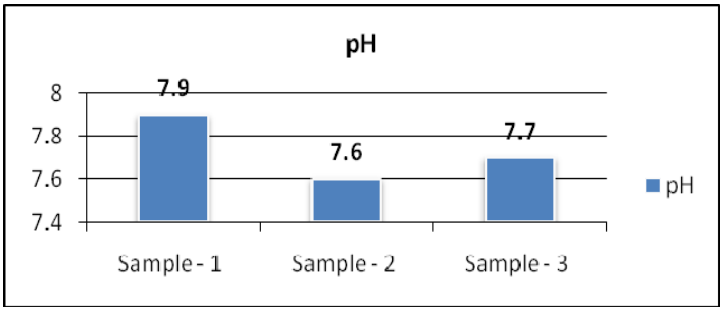

Fig. 5

Conductivity: The conductivity (EC) mean values ranged from 138-380 µs cm^{-1} (Shiddiky, 2002)[14]. The highest and the lowest values acquired were 102 µS.cm^{-1} and 134 µS.cm^{-1}, respectively. These designate that the ground water had dissimilar quality in different places. The higher EC Values show the occurrence of higher concentration of dissolved salts in the sample 1 and EC values are a excellent assess of the comparative distinction in water quality between different aquifers make it horrible to drink.

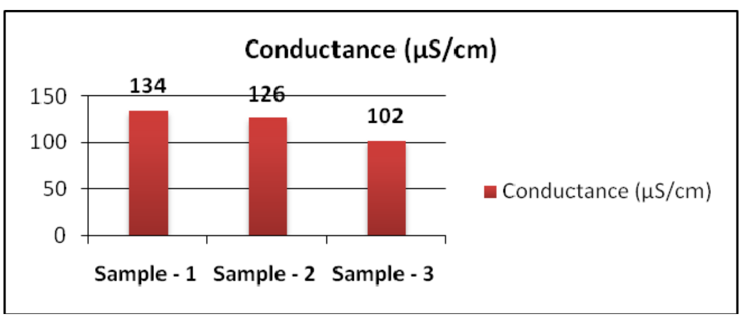

Fig. 6

Chloride: The allowable boundary of chloride in drinking water have to be 250 ppm (WHO, 1984)[10]. The chloride salts in surplus of 100 ppm give brackish taste to water. When united with calcium and magnesium, may enhance the corrosive action of water. In this study, Chloride concentrations were varying from 70.19 to 194.97 ppm. The values of chloride derived in the ground water were within the range.

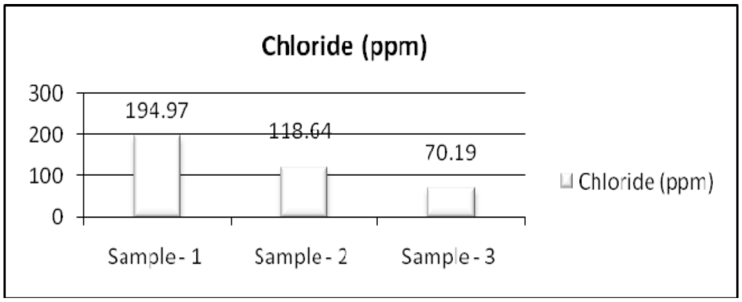

Fig. 7

CONCLUSION

This analysis illustrates the samples can be used for household purpose. The industrial effluent like dyeing effluent, agricultural run off, urbanization, domestic sewage etc., have not been exaggerated greatly. The landscape may be the one of the cause for hardness and alkaline nature. Typically the pollution is taking place through soil easily. Since the sample 3 was collected from municipal water supply, the contamination was not much. Among the three the sample 3 was better than the other two. The samples can be used after decontaminate them for consumption purpose.

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