A COMPARATIVE STUDY OF PHYSICOCHEMICAL PARAMETERS OF STREAMS IN PUTTIGE VILLAGE

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ABSTRACT: Water is one of the most important of all natural resources known on earth. It is important to all living organisms, most ecological systems, human health, food production and economic development. Now days due to over population and increased pollution, water resources are contaminated. Quality of water becomes poor due to physical and chemical variation of water. Polluted water causes health problems in humans and also can damage the ecosystem. Therefore the quality of water must be tested for physical and chemical parameters at regular intervals. Hence the present study was made that to investigate the physical and chemical properties of two water samples from Puttige region. Their pH, Temperature, Dissolved oxygen, Biological oxygen demand, Chemical oxygen demand and Total Hardness were analysed. During the study it was found that maximum number of physical and chemical parameters were within the desirable limit.

Keywords: Ecosystem, Puttige, Physicochemical properties, Total hardness.

Introduction

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70 % of water. But due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants. Therefore it is necessary that the quality of drinking water should be checked at regular time interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases[1]. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. Natural water contains different types of impurities are introduced in to aquatic system by different ways such as weathering of rocks and leaching of soils, dissolution of aerosol particles from the atmosphere and from several human activities, including mining, processing and the use of metal based materials[2,3] People on globe are under tremendous threat due to undesired changes in the physical, chemical and biological characteristics of air, water and soil. These are related to animal and plants and finally affecting on it[4]. Industrial development results in the generation of industrial effluents, and if untreated results in water, sediment and soil pollution[5]. It is very essential and important to test the water before it is used for drinking, domestic, agricultural or industrial purpose. Water must be tested with different physic-chemical parameters. Selection of parameters for testing of water is solely depends upon for what purpose we going to use that water and what extent we need its quality and purity. Water does content different types of floating, dissolved, suspended and microbiological as well as bacteriological impurities[6]. The safety of drinking water is important for the health. The safety of drinking water is affected by various contaminants which included chemical and microbiological. Such contaminants cause serious health problems. Due to these contaminants quality of drinking water becomes poor. Sometimes such poor quality water causes many diseases in the humans, so that quality of water must be tested for both the chemical as well as for the microbial contaminants[7]. The 5 major Application of water are Hydropower, Domestics uses, Irrigation, Industrial uses, Commercial uses. The major water quality parameters considered for the examination in this study are pH, Odour, Colour, Taste, Temperature, Total Dissolved Solids (TDS), Dissolved oxygen (DO), Dissolved carbon dioxide, Total Hardness, Alkalinity.[8,9]

Materials and methods

Study area: The present study was carried out for two different streams located in Puttige village, Moodbidri. The area selected for our study are Nelligude and Kattanige belongs to Puttige village Moodbidri .

Sample collection: The Water samples were collected from two regions in the Puttige village.

The water temperature, Odour, Taste, TDS were analyzed immediately on the spot after the collection, whereas the analyses of remaining parameters were done in the laboratory. The collected water samples were brought to the laboratory and relevant analysis was performed.

1. **pH & Temperature**
   pH & Temperature was measured by using pH meter and Thermometer respectively.

2. **Electrical conductivity**
   Electrical conductivity was measured by using Digital Conductometer

3. **TDS**
   TDS was measured by TDS meter.

4. **Carbon Dioxide**
   Free carbon dioxide was measured by titrimetric method.

5. **Alkalinity**
   Alkalinity was determined by simple acid-base titration method using methyl orange indicator.

6. **DO**
   DO in sample is measured titrimetrically by Winkler's method after 5 days incubation at 293 K.

7. **BOD**
   DO in sample is measured titrimetrically by Winkler's method after 5 days incubation at 20^0C

8. **COD**
   Chemical Oxygen Demand was measured by titrimetric method.

9. **Ammonia (Nitrogen)**
   It was measured spectroscopically at 425 nm radiation by making a colour complex with Nessler's reagent.

10. **Total Hardness**
    It was measured by complexometric titration with standard solution of 0.01M ETDA using EBT as an indicator

11. **Calcium**
    It was measured by complexometric titration with standard solution of 0.01M ETDA using 0.01M ETDA using EBT as an indicator

12. **Magnesium**
    It was measured by complexometric titration with standard solution of 0.01M ETDA using EBT as an indicator

13. **Sodium & Potassium**
    Sodium & Potassium was measured with the help of flame photometer.

Results and Discussion:

In the present study all parameters were analysed by standard methods and the results obtained were given in the table below.

Table 1: Physico-Chemical Parameters of two streams in Puttige village

Sl. No.	Parameter	Sample 1 (Stream near the temple)	Sample 2 (Stream near the road)
1	Colour	Agreeable	Agreeable
2	Odour	Agreeable	Agreeable
3	Temperature	28^0C	28^0C
4	pH	6.2	6.3
5	Electrical conductivity (µS)	72.5	64.8
6	Alkalinity (ppm)	7.8	7.9
7	Total dissolved solids (mg/l)	98	87
8	Dissolved Oxygen (mg/l)	8.02	7.35
9	B.O.D. (mg/l)	1.1	0.95
10	C.O.D. (mg/l)	2.0	1.8
11	Total hardness (mg/l)	36	72
12	Free CO_2 (mg/l)	36.2	37.6
13	Magnesium(mg/l)	12.6	20.8
14	Chloride(mg/l)	6.3	7.1
15	Calcium(mg/l)	22	34
16	Sodium(mg/l)	20	21
17	Potassium(mg/l)	1.5	1.7

In the present study it was found that the water temperature of two streams was 28^0C and pH was 6.2 and 6.3. This variation is due to alkalinity of water sample. Physical parameters like, Odour, Taste & Colour was agreeable in both the samples. The electrical conductance was found to be 72.5µS and 64.8µS. This indicates there must be decrease in number of dissolved inorganic salts. The DO of two water sources was found to be 8.02mg/l and 7.35mg/l. In India average tropical temperature is 27^0C. Corresponding to this temperature, average dissolved oxygen saturation concentration is reported to be 8 ppm[9]. This is the saturation limit at specific temperature; this represents 100% concentration. The percentage of DO is suitable for survival of aquatic life. BOD is a measure of organic material contamination in water. In the present study BOD of two water samples were found to be 1.1 mg/l and 0.95mg/l which indicates water is not contaminated. In our study, COD was found to be 2.0mg/l and 1.8mg/l. COD provides a measure of the oxygen equivalent of that portion of the organic matter in a water sample that is susceptible to oxidation under test condition[8]. The hardness of water depends upon dissolved salts present in water. Sample 1 showed total hardness of 36mg/l and sample 2 showed higher total hardness of 72mg/l. In the present study total hardness in the sample 2 is maximum. The increase in hardness may be due to the domestic activities like washing clothes, animals, vehicles etc. It was found that mineral content were comparatively higher in sample 2 than in sample 1. Calcium, Magnesium and Sodium concentration was significantly higher in sample 2 than in sample 1.

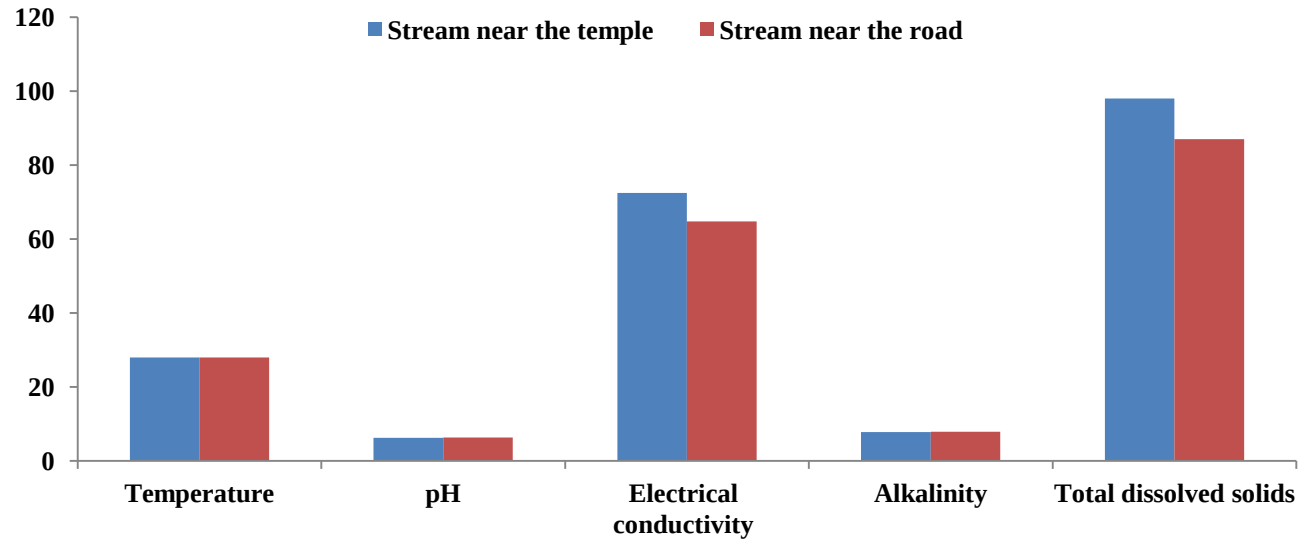

Fig 1: Physico-Chemical Parameters of two streams in Puttige village

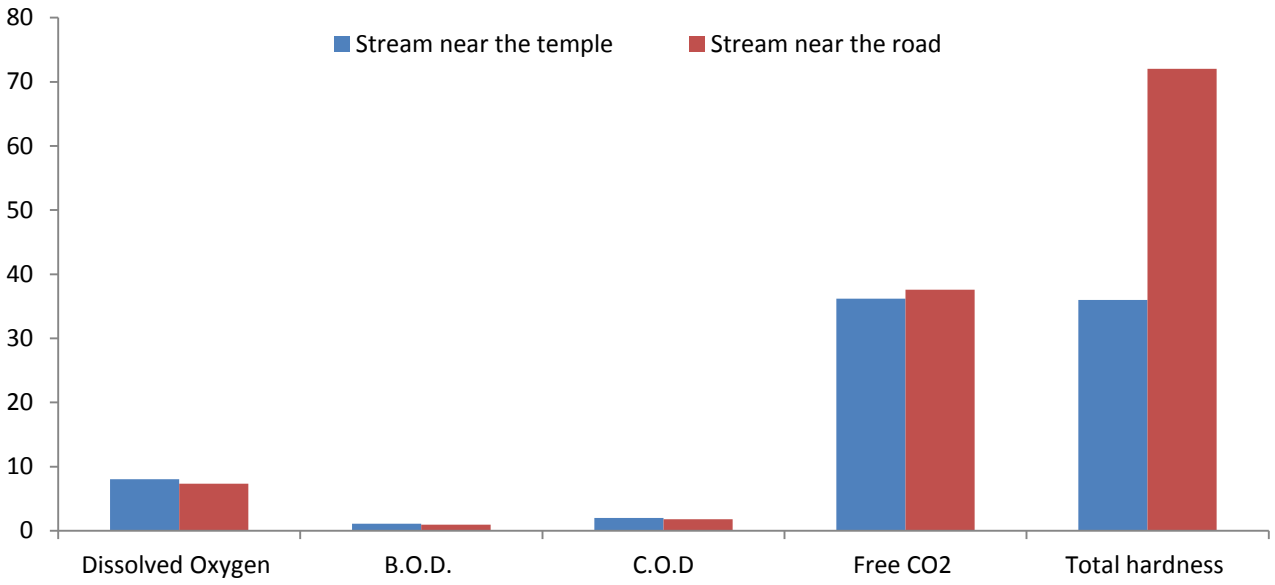

Fig 2: Chemical Parameters of two streams in Puttige village

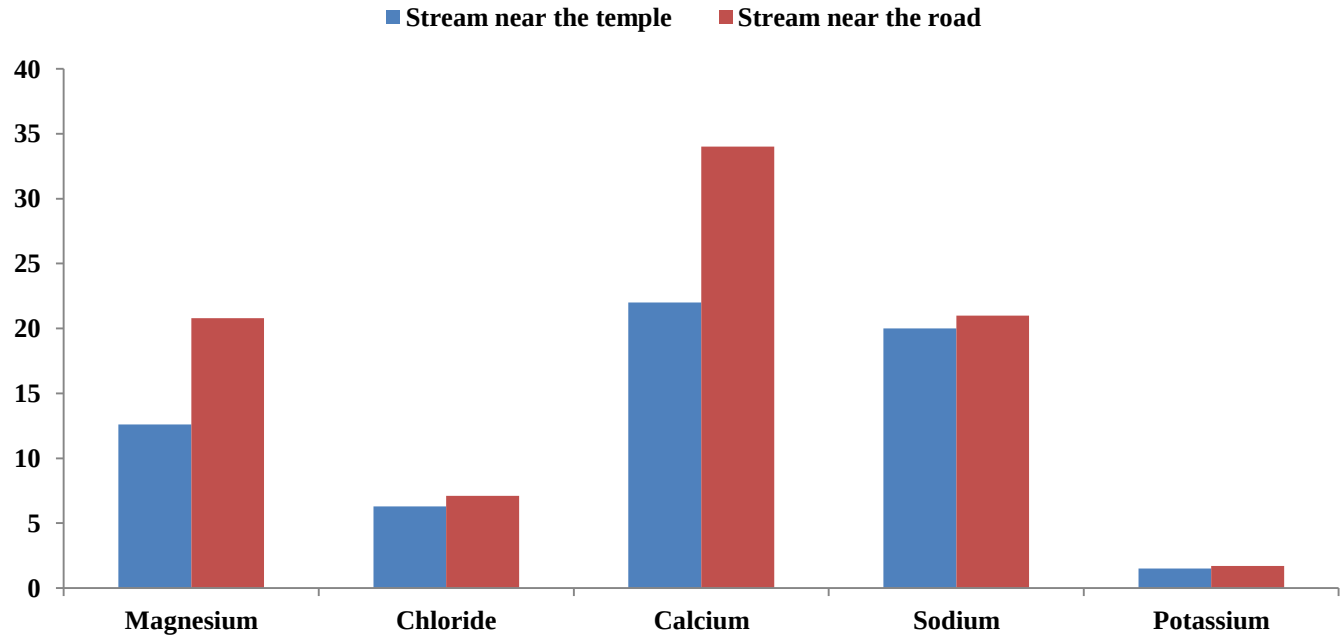

Fig 3: Mineral content of two streams in Puttige village

Conclusion:

In the present investigation, the result of physicochemical analysis indicates that the various parameters studied are within the maximum permissible limit prescribed by WHO and Indian standards specification for drinking water. Therefore the two water streams in the study area are suitable for drinking purpose and also for aquatic organisms.

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