

ANALYSIS OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS FOR WATER SAMPLES FROM KANYAKUMARI DISTRICT, INDIA

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ABSTRACT:

This Paper deals with the Physico - chemical Parameters for five water samples from Kanyakumari District, Tamil Nadu. Monthly Changes in Physical and Chemical Parameters Such as Water Taste, Turbidity, Total Dissolved Solids, pH, Total hardness, Conductivity for a period of one year from October2014 to September2015. All Parameters were within the permissible limits. The results indicate that the water in the five stations are Non-polluted and can be used for Domestic, Irrigation and Fisheries.

Keywords: permissible limit, Physico-Chemical Parameters, Monthly variation

1.INTRODUCTION

Water is one of the most important and most precious natural resources. It is essential in the life of all living organisms from the simplest plant and microorganisms to the most complex living system known as human body. Water a combination of hydrogen and oxygen atoms, with a chemical formula, H₂O and known to be the most abundant compound (70%) on earth surface. It is significant due to its unique chemical and physical properties (Onifade AK, Ilori RM

(2008), Osci Y (2005), Obi CN, Okocha CO (2007).

Water of good quality is required for all living organisms and most water bodies become contaminated by the incorporation of anthropogenic society. The increased demand for water as a consequence of population growth, agriculture and industrial development has made the environmentalist to determine the physical, chemical and biological features of all water resources (Jeyabhaye *et al.*, 2008). Water quality parameters furnish the basis for judging the suitability of water for its designated uses and for

improving the existing conditions (Shinde *et al.*, 2010). For the beneficial uses current information is needed on water quality programmes and it was analysed by several researchers (Kulkarni 2002, Ravindra 2003, Sadharam 2005, Jadhav *et al.*, 2006). In the present study the water bodies of five stations from kanyakumari district was chosen to study the impact of biotic activities on physico-chemical characteristics of water. The study was performed during October 2014 to September 2015.

2. MATERIALS AND METHODS

Study Area

Kanyakumari district is the southern most districts in the state of Tamil Nadu. It is situated between 77°15' and 77°36' east longitude and 8°03' and 8°35' north latitude. The district has borders with Tirunelveli district, the Gulf of Mannar, the Indian Ocean, the Arabian Sea and the state of Kerala. In Kanyakumari District Laterite soil is found at Thiruvattar, Killiyoor, Munchirai, Rajakkamanagalam, Thuckalay blocks.



Figure 1: Maps representing location sites

Sample Collection and analysis:

Water samples were collected during Oct 2014 to Sept 2015 from five stations (Munchira(S1), Mellapuram(S2), Killiyoor(S3), Rajakkamangalam(S4), Thuckalay(S5) representing the study area (Figure I). The Samples were analyzed using standard methods of APHA (1985).

3.RESULT AND DISCUSSION

pH

The pH is a measure of the hydrogen ion concentration in water. Drinking water with a pH between 6.5 to 8.5 is generally considered satisfactory. PH of the water is an essential factor that gives a precious indication of its quality and an index of pollution (Wang *et al.*, 2002, Rajkumaret *al.*, 2006). Present observation indicated lower pH value of about 5.45 was recorded at S5 and higher pHvalue of about 8.32 was recorded at S2, which could be attributed to the increased photosynthetic assimilation of dissolved organic carbon by planktons. The reduced photosynthetic activities decrease the assimilation of carbon dioxide bicarbonate which are ultimately responsible for increase in pH. (Chart-1)

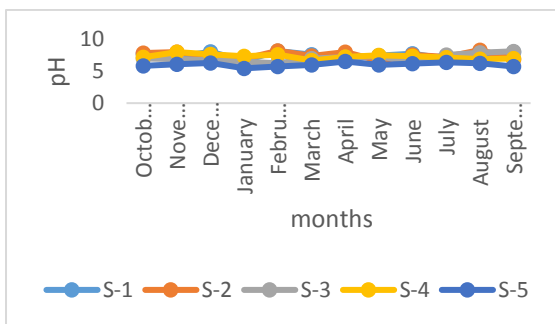


Chart-1 variation of pH

Electrical conductivity

The ability of a solution to conduct an electrical current is governed by the migration of solutions and is dependent on

the nature and numbers of the ionic species in that solution. This property is called electrical conductivity. It is a useful tool to assess the purity of water. The standard limit for electrical conductivity (EC) is 300-1500 $\mu\text{S cm}^{-1}$. EC of the collected samples ranged from 86.10 to 408.09. This showed that the EC values of all water samples were within standard limits and the potable water is safe in terms of EC.(Chart-11)

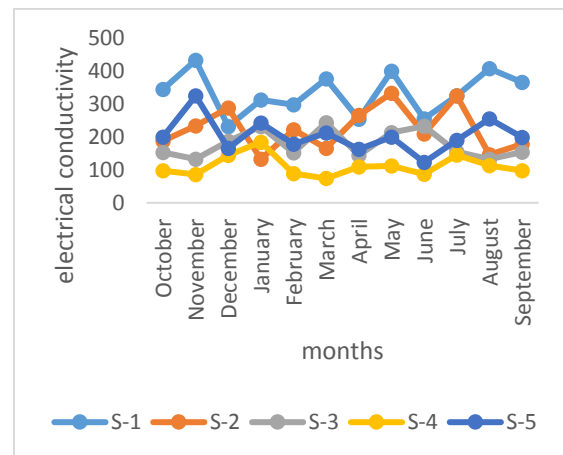


Chart-II variation of Eectrica conductivity

Turbidity

The turbidity in the water samples is an indication of pollution of water. WHO has prescribed the highest desirable limit 5 NTU and maximum permissible limit 25 NTU. The maximum turbidity value of about 10.9 was recorded in S5 and minimum turbidity value of about 1.1 was recorded in S4.the high value of turbidity 10.9 recorded in S5 was due to the source

near the drain and manured ground.
 (Chart-111)

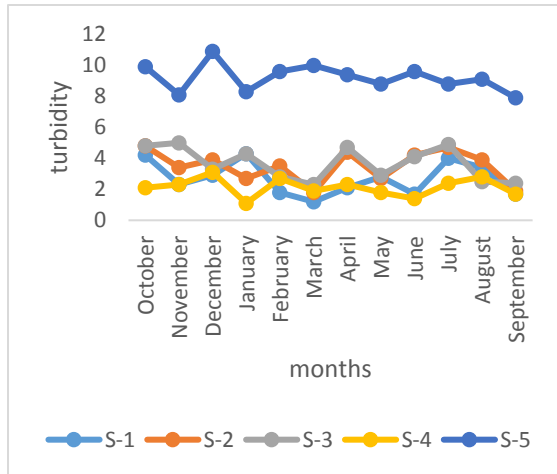


Chart-III variation of turbidity

Total dissolved solids

TDS can be taken as an indicator for the general water quality because it directly affects the aesthetic value of the water by increasing turbidity. High concentrations of TDS limit the suitability of water as a drinking source and irrigation supply. The acceptable range of TDS is 500 mg/L. In the present study the range of TDS of analyzed water samples varied between 56-245mg/L. The highest TDS value was observed at S1 and the lowest TDS value was observed at S4. However; all the values were within the standard limit of WHO (500 mg/L). Therefore, the drinking water is safe in terms of TDS.
 (Chart-1V)

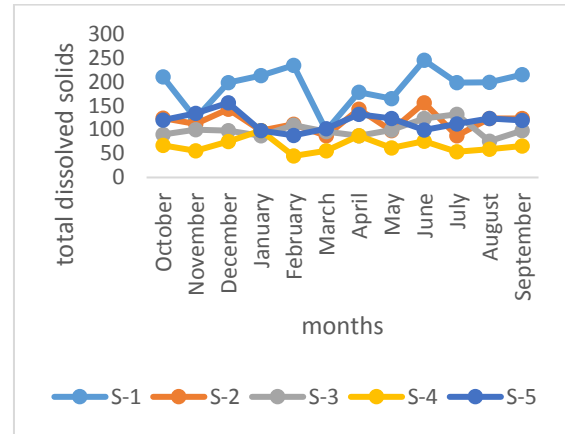


Chart-IV variation of total dissolved solids

Total hardness

In groundwater hardness is mainly contributed by bicarbonates, carbonates, sulphates and chlorides of calcium and magnesium. So, the principal hardness causing ions are calcium and magnesium. The acceptable limit of total hardness is 300 mg/L whereas the maximum limit is 600 mg/L. The hardness of analyzed water samples varied from 11-87mg/L as CaCO₃. The highest value of total hardness was observed at S1. Durfor et al, have classified water as soft, moderate, hard and very hard. As per this classification most of the samples comes under moderate to hard category. On the basis of this classification it has been observed that no water samples are soft but all the measured values were within the acceptable limit values of BIS (300 mg/L) and WHO (500 mg/L). (Chart-V)

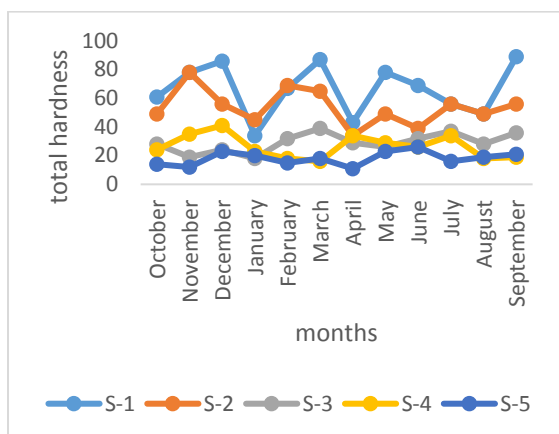


Chart-V Variation of total hardness

Taste

The taste of water samples was in the disagreeable manner for S1 to S5. This is due to the contamination of water by sewage disposal, fertilizers, detergents, etc.

4.CONCLUSION

- In this study the collected water samples of Kanyakumari district were analyzed for physicochemical parameters of pH, electrical conductivity, turbidity, total dissolved solids total hardness and taste.
- The result revealed that almost all the measured parameters were within the standard drinking water quality given by WHO, BIS and US-EPA.
- In general, the present investigation found that the maximum parameters were not at a level of

pollution and may not cause harmful effect to the consumers.

- The taste of water is disagreeable due to the use of detergents, bathing of cattle.

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