

Physico-Chemical Assessment of Sarangpuri Lake Water of Arvi, District Wardha, Maharashtra, India

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Abstract- The key objective of this study is to analyse the lake water quality for drinking purpose. Study was carried out during February 2018, to test the water quality of the Sarangpuri Lake near taluka place Arvi, District Wardha, Maharashtra, India. The physiochemical analysis was carried out on sample using standard methods. The result shows that most of the parameters are under allowable limit.

Keywords- Sarangpuri Lake, Physico-Chemical Parameters, Water, Permissible limits.

I. INTRODUCTION

Healthy safe water for human consumption has become serious issue in developing nations. Water is one of the key components in the environment. Surface water is a key source of water supply all over the world [1]. Term surface water is normally used for the water that occurs on the table of soil in the form of lake, river and sea [2]. Ground water is most suitable fresh water resource for human consumption compared to surface water. It is used for drinking, irrigation, industrial and many commercial purposes [3].

India receives about 1400-1800 mm of rainfall annually. About 96% of this water is used for agriculture, 3% for domestic use and 1% for industrial activity. An analysis discovered that about 70% of all the available water in our country is polluted due to the discharge of effluents from the industries, domestic waste, land and agricultural drainage [4]. Due to use of polluted water consumption, human population suffers from water borne diseases. Polluted water affects the aquatic environment.

The present study covers the examination of water quality in way of physico-chemical parameters of Sarangpuri Lake water near Arvi city of Arvi Taluka, District Wardha in Vidarbha region of Maharashtra State. The location of Arvi is on Ravandev Garmasur Plateau 20.59°N 79.14°E. It has an average elevation of 328 metres (1075 feet). The Sarangpuri Lake river locates at 21.017°N, 78.256°E.

II. EXPERIMENTAL WORK

Sample of water was collected in cleaned glass bottles from lake in morning at around 9 a.m. in the month of February 2019. The temperature was note down while collection of water sample by using Pocket Digital Thermometer. Other some water parameters were estimated using standard methods [5-6]. AR grade reagents, Borosil glassware and distilled water were used for solution preparation. Deluxe conductivity meter Model 601, Deluxe pH meter Model 101 and Digital Nephelometer of EI (Electronics India) were used to determine Conductivity, pH and turbidity respectively. Total Hardness was determined by EDTA method i.e. complexometric titration using Eriochrome Black-T as an indicator. The 250 ml water sample was boiled and then filtered through Whatman filter paper. A result from this gives removal of Temporary Hardness. The filtrate was diluted to 250 ml with distilled water. Then Permanent Hardness was determined as above by EDTA method. Temporary Hardness was calculated by subtracting Permanent Hardness from Total Hardness. Water alkalinity was determined by titrating it against standard H₂SO₄ acid solution using Phenolphthalein and Methyl Orange as indicators.

III. RESULTS AND DISCUSSION

Results found throughout the analysis were shown in the Table-1 which is compared with WHO [7], ICMR [8] and BIS [9] drinking water standard values.

Sr. No	Parameters	Sample	WHO	ICMR	BIS
1	Temperature, °C	19-21	----	----	----
2	pH	9.6	6.5-8.5	6.5-9.2	6.5-8.5
3	Electric Conductance, us/cm	226	300	300	300
4	Turbidity, NTU	0.4	10	10	10
5	Chloride	77.6	200	1000	100

	Content, mg/l				0
6	Total Hardness, mg/l	146	600	600	600
7	Temporary Hardness, mg/l	44	----	200	----
8	Permanent Hardness, mg/l	102	----	100	----
9	Total Alkalinity, mg/l	172	500	600	600

Table-1: Physico-Chemical Parameters of Sample Sarangpuri Lake.

Water sample collected was clear, colorless and odorless. The air temperature ranges between 18°C to 25°C and water temperature ranged from 19°C to 21°C. pH is term used worldwide to show the amount of acid or alkaline condition of water. pH plays important role in human life and in the point of view of flora and fauna and irrigation. The lake water pH shows value of 9.6, which is alkaline for some extent due to the existence of carbonates and bicarbonates. Electrical conductivity is used to measure water's ability to pass electrical flow. This ability shows the concentration of ions in the water. Electrical conductance value 226 $\mu\text{S}/\text{cm}$ shows the existence of some ionized form of dissolved inorganic substances in water. Turbidity of lake water shows 0.4 NTU. It shows lower amount of salinity of water and all solids (mineral salts) that are dissolved in water. Total hardness is determination of minerals content in water in the form of salts of Ca^{2+} and Mg^{2+} . In this study lake water shows Total hardness as 146 mg/litre. Concentration of bicarbonates (HCO_3^-) and carbonates (CO_3^{--}) dissolved in water gives Temporary Hardness. Water sample shows Temporary and Permanent hardness as 44 and 102 mg/l respectively. Presence of carbonates, bicarbonates and hydroxides compounds of Ca^{2+} , Mg^{2+} and Na^+ shows the alkalinity of water. Total Alkalinity value for the sample was found as 172 mg/l.

IV. CONCLUSION

In this current study the concentration of all the parameters in water sample were found within the permissible limit as prescribed by WHO, ICMR and BIS standards [7-12] except pH and permanent hardness. pH shows sample is more alkaline and permanent hardness is slightly at higher side but total hardness is within permissible limit. There is no presence of industrial zone near Sarangpuri Lake. The results specify

that water of Sarangpuri Lake is non-polluted and it is used for fisheries, drinking and irrigation purposes.

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