

18. Physico-Chemical Analysis of Water of Pohara Lake near Amravati, Maharashtra

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Abstract

In order to understand the water quality of Pohara Lake, the various physico-chemical parameters were studied for the period of one year i.e January 2021 to December 2021 to observe the monthly changes in Physical and Chemical parameters such as Temperature, Turbidity, Total Dissolved Solids, Dissolved oxygen, Total Hardness, Alkalinity, Chlorides, Phosphate etc. The overall observations revealed that in some physico-chemical parameters there was seasonal variations, whereas the most of the parameters showed normal range which is the indication of good quality of water with very minimum pollution and can be used for irrigation and other purposes.

Key words: Physico-Chemical Parameters, Pohara Lake, Water Quality, Seasonal Variations.

Introduction

Water is one of the most important compounds to the ecosystem that mostly influence life. The quality of water is determined by its chemical properties, physical nature, and biological characteristics. According the reports and statistic published by the WHO near about the 36 % of urban and 65 % of rural Indian were without access to safe drinking water. Secondly, the water quality gets contaminated due to increased interference of man-made activities, industrialization, excess use of fertilizers resulted into heavy loss of natural aquatic resources leading to unsafe water quality and depletion in aquatic Biota. The Amravati district is known for the lakes and other small water bodies among the most popular are wadali lake, chatri lake, simbhora lake, kondeshwar lake and pohara lake and many others. All these lakes are main source of drinking water, irrigation, and fish culture for locally residential people. The present study involves the analysis of water quality in terms of physic-chemical parameters of Pohara Lake near Chandur Railway in Amravati District of Maharashtra. It is located in 20°50'29.9" N Latitude and 77°58'00.1" E Longitude. The Pohara Lake is a major source of drinking water and irrigation

for nearby villages. The physico-chemical parameters of pohara Lake were studied and analysed for the period of one year from January 2021 to December 2021. The quality of water is of vital concern for the human beings and it is directly linked to human health, to know about the water quality of different reservoirs many researchers in India worked on the water quality of such lakes and rivers, Trivedy and Goel, (1986), and Kodarkar (1992). The area of present study is shown in Fig. 1.



Fig. 1 – Image of Pohara Lake, Amravati

Materials and Methods

The present study was carried out on pohara lake located in the dense forest area surrounded by hills, shrubs, mix heighted trees and agricultural land. The water samples were collected for a period of 1 year from January 2021 to December 2021. In the present study the water samples were collected from three different sites once in a month between 8.30 am to 10.30 am and the water samples were collected in polyethylene bottle. The collected samples then mixed to prepare an integrated sample. The spot parameters like pH, Humidity, Water temperature was recorded at sampling spot by using Thermometer and Pocket digital pH meter similarly the turbidity is measured by turbidity meter, whereas the analysis of other physico-chemical parameters like TDS, Dissolved oxygen, Chlorides, Phosphate etc were estimated as per standard methods prescribed by APHA(1998),APHA(2012) and Kodarkar (1992).

Results and Discussion

The monthly variations in physico-chemical parameter of pohara lake is given in Table No.1. In present study the atmospheric temperature of study area was recorded lowest in the month of mid winter 17 ° C and highest in hot summer, it was recorded up to 41.2°C, which is

completely depending on the surrounding area and it is one of the most important factor in aquatic environment as it regulates all physical, chemical, and biological activities of the water body. Kumar et.al (1996), similar variations were recorded in water temperature. The maximum water temperature was recorded in the month of May in hot summer (26°C) and minimum (20°C) in the month of December. The change in temperature is due to the atmospheric temperature. Similar observations were recorded by Salve and Hiware (2008). The pH of pohara lake water was slightly alkaline, the values range from 7.2 to 8.13. The maximum value 8.13 was recorded in the month of May and minimum 7.2 in the month of November. Significant changes in the pH were due to change in air temperature secondly due to domestic waste. Most of the bio chemical and chemical reactions are influence by pH. The turbidity of lake water fluctuates due to the human activities, depletion in water level and due to the suspended matter. The minimum value was observed (0.5 NTU) in winter season and maximum value (15.12 NTU) was recorded in April. The maximum value of Total Dissolved Solids was maximum 2.16 g/l in the month of July and minimum 0.28 g/l in the month of March. The similar finding was recorded by Musaddiq and Fokmare (2002). The values of concentration of Dissolved Oxygen in pohara lake water ranged from 7.12 mg/l to 8.87 mg/l. As the water temperature rises the oxygen solubility decreases, similar finding was recorded in the present study. The minimum concentration of DO was recorded in the month of April and Maximum in December. Pandey et.al.(1993)and Jayabhaye et.al. (2006) recorded the similar observation in fresh water lake. Total alkalinity ranges from 106 mg/l to 196 mg/l. The maximum and the minimum was recorded in the month of January and June. Das and Chand (2003) recorded low alkalinity during monsoon, which may be the effect of heavy rainfall. Total hardness of water is the sum of the concentration of alkaline earth metal such as calcium and magnesium. The range of total hardness of lake water was 76 mg/l to 158.5 mg/l. The maximum value was noted in the month of May and minimum value was noted in November. Similar findings were recorded by NEERI (1987) and WHO (1993). Chlorides, which is an essential element of life is present in both fresh water and salt water and elevate chloride level is a major indicator of pollution in water body. In present study the value of chloride is within range and recorded the maximum value (52.17mg/l) was recorded in May and minimum value (28.10mg/l) was in January. Similar result was reported by Swarnalatha and Narsing Rao (1998). The value of phosphate was recorded maximum in the month of rainy season i.e August(10.54 mg/l) and minimum (0.24mg/l) in November in winter

season. It was due to the rain, agriculture practices, man-made activities. Arvindkumar (1995) reported the similar observations.

Table – 1: Physico-Chemical Parameters of Pohara Lake during January 2021 to December 2021.

Parameter/ Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Air Temp. °C	17.8	21.3	26.8	34.2	41.2	38.0	33.1	30.2	31.4	33.4	24.1	17
Water Temp. °C	21.1	22	23	24	26	24	24	25.2	25	22	21	20
Turbidity (NTU)	4.19	8.16	11.14	15.12	13.17	10.01	7.15	4.06	2.10	1.14	0.5	0.59
TDS (g/l)	0.36	0.39	0.28	0.52	0.73	1.23	2.16	1.01	0.63	0.58	0.45	0.41
pH	7.82	7.91	8.01	8.05	8.13	8.09	8.00	7.96	7.45	7.25	7.2	7.61
Dissolved Oxygen	8.01	7.71	7.52	7.20	7.12	7.54	7.46	7.56	7.82	7.98	8.42	8.87
Alkalinity	196	182	173	161	158	126	106	130	142	153	168	175
Hardness	96.2	100	115.2	126.4	158.5	162.1	132.4	129.3	114	100.5	76	80.1
Chlorides	28.10	29.2	35.1	40	52.17	48.2	44.12	36.2	42	36.21	34.1	30.4
Phosphate	1.45	3.12	3.57	4.61	5.12	6.78	8.89	10.54	4.15	0.65	0.24	0.89

Conclusion

After physico-chemical analysis, it was found that the water of Pohara Lake is free from pollution and it is ecologically balanced and is safe enough to be consumed by humans.

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