**study OF SOME Physicochemical Parameters of Paliwal park lake water at agra, uttar pradesh**

**ABSTRACT**

Physicochemical analysis of Paliwal Park lake water at Agra, Uttar Pradesh, India carried out for period of eight months (July 2024 to February 2025) on the basis of monthly sampling. Various physicochemical parameters, such as water temperature, air temperature, pH, humidity, electric conductivity (EC), total dissolved solid (TDS), dissolved oxygen (DO), total hardness (TH) and turbidity were taken for study. The results revealed that significant variations were found in monthly water samples. The aim of this study was to analyze the monthly variations in Physicochemical Parameters of Paliwal Park lake water at Agra, Uttar Pradesh.

**Keywords - :** Physicochemical Analysis, pH, Lake, total dissolved solid, dissolved oxygen, total hardness.

**1. INTRODUCTION**

Water, the one of a very important factor of nature has assumed the vital role in the development of life from bio molecules to man. Every Ancient civilization developed on the banks of Rivers. The water assets are utilized to satisfy the interest for horticultural, mechanical and human settlement. Human wellbeing and strength of biological community is specifically related with quality and availability of water. The aquatic flora and fauna are depleted and the water quality is deteriorating due to rapid industrialization and recurrent consumption of fertilizers and pesticide in agriculture leads to pollution of aquatic environment. This contaminated water affects the surrounding of lakes which are unique assets and are very important ecosystems in the nature and society [1].

Water is regarded as the foundation of life, as it is an essential and unavoidable necessity for all living organisms. With increased economic development over the past few centuries, the population has also expanded, leading to a higher demand for fresh water. Water is one of our most unique natural resources for sustaining life; after air, it is expected to become a critically scarce resource in the upcoming decades. Most of our water needs are met by rainwater that accumulates in surface and groundwater sources [2, 3].

Agra ranks among the most densely populated cities in Uttar Pradesh and holds the 23rd position in terms of population in India. The city is a prominent tourist hotspot due to its numerous Mughal-era monuments, including the Tāj Mahal, Agra Fort, and Fatehpur Sikri, which are all recognized as UNESCO World Heritage Sites. K.D. Paliwal Park, also referred to as Hewitt Park, is situated in the center of Agra, India. It covers an area of approximately 70 acres (280,000 m2). K.D. Paliwal Park is one of Agra's leading attractions and draws a significant number of visitors daily, due to its central location within the city. The park boasts a diverse range of flora and fauna, along with a stunning lake enveloped by lush greenery. Initially called Hewitt Park, it was established during the British colonial period, but was subsequently renamed to pay tribute to Shri Krishna Dutta Paliwal, the first finance minister of Uttar Pradesh, while Shri Govind Ballabh Pant served as the Chief Minister of U.P. Visitors can partake in boating on the lake, making for an enjoyable experience [4, 5].

Groundwater encompasses water found in rivers, lakes, ponds, and similar bodies. It is a vital and extensively distributed resource on Earth. Excluding polar ice caps and glaciers, groundwater represents one of the largest supplies of fresh water available on our planet. Various parameters, such as pH, BOD, COD, electrical conductivity, nitrate, phosphorus, potassium, total dissolved solids, dissolved oxygen, total hardness, and turbidity, can be used to evaluate water quality [6, 7]. The study of variations in Physico-chemical properties of ground water is very important to know the quality of water. The aim of this study was to evaluate the monthly variations in Physicochemical Parameters of Paliwal Park lake water at Agra, Uttar Pradesh, India.

**2. MATERIALS AND METHODS**

**Sample Collection**

Water samples were gathered from Paliwal Park Lake in Agra, Uttar Pradesh, over an eight-month period (from July 2024 to February 2025) through monthly sampling. The samples were taken from the surface water at the chosen location in pre-cleaned one-liter polyethylene bottles.

**Physico-Chemical Analysis**

The gathered samples underwent analysis for key physical and chemical water quality indicators such as water temperature, air temperature, humidity, pH, electrical conductivity (EC), total dissolved solids (TDS), total hardness (TH), dissolved oxygen (DO), and turbidity. Water temperature, air temperature, humidity, pH, electrical conductivity (EC), total dissolved solids (TDS), and turbidity were measured using electronic digital meters. Total hardness (TH) was assessed using a volumetric technique through titration with a standard solution of ethylene diamine tetraacetic acid (EDTA). Dissolved oxygen (DO) levels were quantified using the Winkler method, also known as the iodometric method, which is based on titration [8, 9, 10].

**3. RESULTS AND DISCUSSION**

The chosen physico-chemical parameters, including air temperature, water temperature, humidity, pH, electric conductivity, turbidity, dissolved oxygen, total dissolved solids, and total hardness of water from specific locations, were assessed over an eight-month period (July 2024 – February 2025). The monthly variation of the physico-chemical parameters of the Paliwal Park lake water in Agra is displayed in Table 1. All parameters were reported as mean values alongside their standard deviations.

**Table 1: Mean Results of the Physicochemical Parameters of Paliwal Park lake water at Agra for July 2024 – February 2025**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | Air temp.In 0C | Humidity in % | Water temp. in 0C | pH | TDS in ppm | ECµs/cm | DO in mg/l | Hardness in mg/l | Turbidity in NTU |
| July | 35.7 | 67 | 34.8 | 8.9 | 1750 | 3500 | 8.8 | 364 | 3 |
| Aug | 31.0 | 74 | 30.8 | 8.5 | 1314 | 2968 | 9.0 | 490 | 2 |
| Sept | 32.7 | 66 | 32.6 | 8.4 | 1912 | 1956 | 9.2 | 408 | 5 |
| Oct | 31.2 | 55 | 31.4 | 8.1 | 1262 | 2466 | 10.2 | 320 | 2 |
| Nov | 25.1 | 53 | 30.2 | 7.4 | 1020 | 2556 | 9.6 | 364 | 2 |
| Dec | 18.1 | 51 | 28.1 | 7.2 | 1008 | 2473 | 9.3 | 402 | 2 |
| Jan | 20.3 | 58 | 20.3 | 8.3 | 1588 | 3362 | 9.2 | 406 | 3 |
| Feb | 20.4 | 53 | 20.5 | 7.9 | 1681 | 3366 | 7.7 | 340 | 2 |
| Range | 18.1-35.7 | 51-74 | 20.3-34.8 | 7.2-8.9 | 1008-1912 | 1956-3500 | 7.7-10.2 | 320-490 | 2-5 |
| Mean | 26.81 | 59.62 | 28.58 | 8.08 | 1441.87 | 2830.8 | 9.12 | 386.75 | 2.62 |
| SD | 6.68 | 8.38 | 5.40 | 0.56 | 340.04 | 552.54 | 0.71 | 52.63 | 1.06 |

In study period during sampling, range of air temperature, humidity, and water temperature were noticed as 18.1-35.7 0C, 51-74 % and 20.3-34.8 0C, respectively. Mean TDS of Paliwal park lake water was 1441.87 ± 340.04 ppm while WHO standard was less than 250ppm. Mean hardness of Paliwal park lake water was 386.75 ± 52.63 mg/L while WHO standard was less than 200 mg/L for drinking water. Mean turbidity of Paliwal park lake water was 2.62 ± 1.06 NTU while WHO standard was less than 5 NTU for drinking water. Mean electric conductivity of Paliwal park lake water was 2830.8 ± 552.54 µs/cm while WHO standard was less than 500µs/cm for drinking water in term of EC [11, 12, 13, 14, 15].

Gupta S., et al., (2023), studied some physicochemical parameters of Paliwal Park Lake water at Agra, and showed there were significant monthly variations in selected physicochemical parameters of water samples. In that study it was also concluded that these water samples did not meet the drinking water standards as prescribed by WHO [16].

Pragasan and Gomathi (2024) conducted research on the water quality of five lakes in Coimbatore, India: Krishnampathi, Ukkadam, Kurichi, Sulur, and Singanallur, during the period from December 2016 to April 2017. They examined twenty physicochemical parameters and measured the concentration of twelve heavy metal elements in the lakes using inductively coupled plasma-mass spectrometry. The findings of their research indicated that the levels of 17 physicochemical parameters exceeded the pollution limits recommended by the WHO. They also highlighted the pressing need for ongoing monitoring and comprehensive management strategies to address the declining water quality in the lakes of Coimbatore district [17].

**4. CONCLUSION**

Due to use of contaminated water, humans suffer in many aspects such as water born disease, health hazards and environmental hazards etc. it is therefore to check water quality at regular time interval is essential. The result of present study revealed that there were significant monthly variations in selected physicochemical parameters of water samples from Paliwal Park Lake at Agra, Uttar Pradesh.

**CONSENT**

It is not applicable.

**ETHICAL APPROVAL**

It is not applicable.

**Disclaimer (Artificial intelligence)**

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