



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 8.4
IJAR 2023; 9(1): 393-395
www.allresearchjournal.com
Received: 09-11-2022
Accepted: 11-12-2022

Vinita R Kashyap
Associate Professor,
Department of Zoology,
Govt. Science P.G. College,
Rewa, Madhya Pradesh, India

Physico-chemical analysis of Govindgarh Lake water of Rewa district in (M.P.) India

Vinita R Kashyap

Abstract

In order to understand the water quality of Govindgarh Lake, Physicochemical parameters were studied and analysed for the period of one year *i.e.* December 2021 to November 2022. Various physicochemical parameters, such as water temperature, air temperature, pH, humidity, conductivity, free CO₂, total solid, dissolved oxygen, Total alkalinity, Total hardness, CaCO₃, Ca⁺⁺, Mg⁺⁺ were studied. The results revealed that there was significant seasonal variation in some physicochemical parameters and most of the parameters were in normal range and indicated better quality of lake water. It has been found that the water is best for drinking purpose in winter and summer seasons.

Keywords: Physicochemical parameters, Govindgarh Lake, water quality

Introduction

Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life. The quality of water usually described according to its physical, chemical and biological characteristics. Rapid industrialization and indiscriminate use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environment leading to deterioration of water quality and depletion of aquatic biota. Due to use of contaminated water, human population suffers from water born diseases. It is therefore to check the water quality at regular interval of time.

The present investigation involves the analysis of water quality in relation to physicochemical parameters. Govindgarh lake of Rewa district of Madhya Pradesh was selected for physicochemical analysis of water. The lake is source of drinking and irrigation water. Now a day's lake water was polluted due to domestic waste and agricultural discharges. Physicochemical parameters of Govindgarh lake water were studied and analyzed for the period of one year *i.e.* December 2021 to November 2022. In India many researchers have worked on physicochemical and biological characteristics of reservoirs and rivers (Trivedy and Goel, 1986; Jakher *et al.*, 1990, Kodarkar, 1992; Subba Rao, 1993; Patil *et al.*, 2003; Kashyap, 2016; Mishra and Singh, 2022b and Shukla & Shukla, 2022) ^[1-8].

Material and Methods

The surface water samples from Govindgarh Lake were collected from two sampling stations during 10.30 am to 12.30 pm. Samples were collected at monthly interval in plastic cans of two litres capacity. Water temperature, Air temperature, pH and Humidity recorded at sampling station. Collected water samples were brought immediately to the laboratory for the estimation of various physicochemical parameters like, Conductivity, Total solid, Dissolved oxygen, Total Alkalinity, Total hardness, CaCO₃, Ca⁺⁺, Mg⁺⁺. Physicochemical parameters were analysed as per standard methods (Trivedy and Goel, 1986 and APHA, 1998) ^[1, 9].

Results and Discussion

The physicochemical parameters of the Govindgarh Lake have been given in the Table 1. The physicochemical features of Govindgarh lake water were influenced due to the discharge of domestic waste and agriculture at discharges. The atmosphere temperature was recorded between 22 °C to 31 °C. The temperature is one of the important factors in aquatic environment since it regulates physicochemical as well as biological activities (Kumar *et al.*,

Corresponding Author:
Vinita R Kashyap
Associate Professor,
Department of Zoology,
Govt. Science P.G. College,
Rewa, Madhya Pradesh, India

1996) [10]. The water temperature was recorded 21.44 °C to 29.98 °C. Higher temperature was recorded in May 29.98 °C. The Water temperature of Mohan Ram Talab of Shahdol was recorded by Shukla and Shukla (2022) [8]. The atmospheric humidity of Govindgarh lake site was ranged between 48.37% to 75.03%. Maximum humidity was recorded in monsoon and minimum was recorded in summer season. This

is an agreement with the finding of Mishra and Singh (2022b) [7]. They observed the Vindhyan region. The pH of Govindgarh lake water was slightly alkaline. pH value being greater than 7 at both stations. Minimum pH was recorded in Nov. (7.33) and maximum in the month of December (8.44). Significant changes in pH occur due to discharge of agricultural and domestic waste.

Table 1: Physicochemical parameters analysis of surface water Govindgarh lake from December 2021 to November 2022.

Parameters	Dec.	Jan	Feb	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.
Water Temp.	21.44	22.10	23.47	24.28	26.18	29.98	28.97	27.23	27.14	24.32	22.55	24.92
Air Temp.	23.35	24.51	25.78	26.91	28.68	31.90	31.32	29.48	29.26	29.38	24.35	22.90
Humidity	72.02	71.92	69.97	61.55	52.10	48.37	51.70	68.07	75.26	63.68	49.37	60.26
Conductivity	234.76	202.84	232.01	229.82	236.00	286.78	215.30	195.40	212.13	186.83	189.83	183.75
pH	8.44	8.41	8.14	7.92	7.88	7.33	7.88	7.82	7.54	7.83	7.65	7.43
Total Solid	167.70	148.75	157.03	150.40	173.58	182.17	190.80	188.40	196.42	199.18	149.75	198.18
Dissolved oxygen	8.38	8.08	7.75	7.35	7.53	7.47	7.63	7.77	7.48	7.48	7.45	7.38
Total Alk.	114.51	121.32	109.31	122.17	190.25	233.34	197.33	126.33	120.50	115.00	109.83	115.33
Total Hard	98.16	99.01	104.69	102.50	140.25	193.67	165.00	100.00	80.00	69.33	69.53	67.67
CaCO ₃	61.14	58.26	57.33	59.20	63.35	68.34	63.77	65.78	47.62	38.70	39.70	45.33
Ca ⁺⁺	24.68	23.33	22.75	23.8	25.37	27.37	25.54	26.61	19.07	15.49	17.49	23.00
Mg ⁺⁺	8.99	9.90	11.44	10.52	18.74	30.45	24.59	8.31	7.87	7.44	7.84	8.46

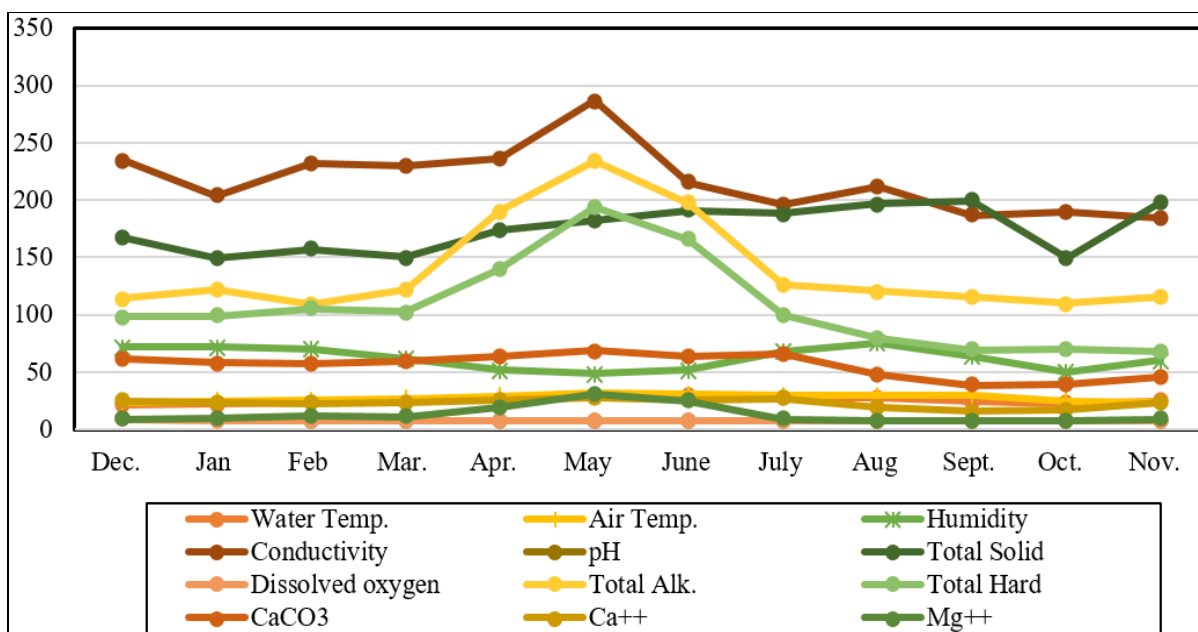


Fig 1: Graph analysis at physicochemical parameters of surface water Govindgarh lake from December 2021 to November 2022.

In present study conductivity values range from 183.75 to 286.78 μmhos/cm. The dissolved oxygen concentration ranged from 7.35 to 8.38 mg/lit. Dissolved oxygen was minimum in March and maximum in December. Earlier workers also observed similar trend of dissolved oxygen in fresh water lakes. (Shukla and Shukla, 2022) [8]. The total solids in the lake water fluctuated in the range of 148.75 to 199.18 mg/l Prajapati (2016) [11] observed values of Sarfa Dam, Shahdol district (M.P.) India. Total alkalinity of the lake was varied from 109.31 to 233.34 mg/lit. and maximum the minimum value was recorded in February and the maximum in May. Das and Chand (2003) [12] recorded low alkalinity during monsoon, which might be due to dilution effect of rainfall. Katariya *et al.*, (1996) [13] have measured maximum value of alkalinity due to confluence of industrial and domestic waste. Our results are in well agreement with the findings of above authors. Sakare

and Joshi (2003) [14] found the alkalinity values from 672 to 1023 mg/lit. in Papnas in minor wetland in Tuljapur town, in Maharashtra. Total hardness in water is the sum of concentration of alkaline earth metal cation such as Ca⁺⁺, Mg⁺⁺. The total hardness is the total soluble magnesium and calcium salts present in the water expressed as its CaCO₃ equivalent. Total hardness are also includes the sulphates, chlorides of calcium and magnesium. In most natural water the predominant ions are those of bicarbonates associated mainly with calcium to lesser degree with magnesium and still less with sodium potassium. The total hardness of Govindgarh Lake found the range from 69.33 to 193.67 mg/lit. In Harsal dam it was from 83.8 to 178 mg/lit (NEERI, 1987) [15], minimum values was recorded during monsoon.

Conclusion

The result revealed that there was significant seasonal variation in some physicochemical parameters and most of the parameters were in the normal range and indicates better quality of lake water.

Acknowledgement: Author is thankful to the authority of Govt. Science P.G. College, Rewa (M.P.) for kind cooperation to carry out to this work.

References

1. Trivedy RK, Goel. Chemical and biochemical methods for water pollution studies, Environmental Publication, Karad, Maharashtra; c1986.
2. Jakhar GR, Bhargava SC, Sinha RK. Comparative limnology of Sambar and Didwana lakes. Geobiology; c1990.
3. Kodarkar MS. Methodology for water analysis. Physico-chemical, Biological and Microbiological Indian Association of Aquatic Biologist Hyderabad; pub. 1992;2:50.
4. Subba Rao. Fresh water molluscs of Indian Recent advances in fresh water. Anmol publications pvt. ltd. New Delhi; c1993. p. 47-52.
5. Patil S, Patwari JM. Ground water quality from Prarava area, district Ahmednagar (M.S.). J Aquatic Biology. 2003;18(2):85-86.
6. Kashyap, Vinita R. Physico-chemical analysis of various water samples of Rewa district (M.P.) India. International Journal of Applied Research. 2016;2(1):311-313.
7. Mishra, Reenu, Singh Neeta. Assessment of water quality status of major aquatic bodies of Vindhyan region (M.P.) India, International Journal of Advanced Academic Studies. 2022b;4(3):18-22.
8. Shukla Bramhanand, Shukla, Nidhi. Physicochemical analysis of Mohan Ram Talab of Shahdol (M.P.), International Journal of Advanced Academic Studies. 2022;4(3):189-191.
9. APHA. Standard methods for the examination of waste water. American public Health Association, Washington D.C; c1998. p. 874.
10. Kumar A, Gupta HP, Singh DK. Impact of sewage pollution on chemistry and primary productivity of two fresh water bodies in Santal Paragana (Bihar) India, J Ecol. 1996;23(2):82-86.
11. Prajapati, Roopshah. Water quality index assessment of Sarfa Dam, Shahdol district (M.P.) India. International Journal of Applied Research. 2016;2(2):638-642.
12. Das SK, Chand BK. Limnology and biodiversity of Ichthyofauna in a pond of Southern Orrissa. India. J Ecotoxicol Environ. Monit. 2003;13(2):97-102.
13. Kataria HC, Iqbal SA, Shandilya AK. Limno-chemical. Studies of Tawa Reservoir. IJEP. 1996;16(11):841-846.
14. Sakare, Joshi. Environmental aspects of lake water and its quality management; c2003.
15. NEERI. A laboratory manual on water analysis; c1987.