

WATER QUALITY PARAMETERS AND PRIMARY PRODUCTIVITY OF KAYLANA LAKE, JODHPUR, RAJASTHAN, INDIA

Ravindra Choudhary^{*1}, S. K. Sharma², B. K. Sharma¹, B. Upadhyay³ and M. L. Ojha⁴

¹Department of Aquaculture, College of Fisheries, MPUAT, Udaipur - 313 001, India.

²Department of Aquatic Environment Management, College of Fisheries, MPUAT, Udaipur - 313 001, India.

³Department of Agriculture Statistics and Computer Application, Rajasthan College of Agriculture, MPUAT, Udaipur-313 001, India.

⁴Department of FRM, College of Fisheries, MPUAT, Udaipur - 313 001, India

*e-mail : ravindrachoudhary8888@gmail.com

(Received 3 October 2021, Revised 27 November 2021, Accepted 14 December 2021)

ABSTRACT : The Lake situated in west of Jodhpur city is primary used for drinking water supply in addition also used for fisheries purpose. Kaylana Lake's water quality was tested for three months using fortnightly sampling. The study provides the first hand data on lake water quality. The value of various physio-chemical parameter were temperature (28.50°C to 31.50°C), average visibility 102.13 cm, pH (7.78 to 8.38), electrical conductivity (309.50 to 351.25 $\mu\text{S}/\text{cm}$), dissolved oxygen (7.50 to 8.90 mgL^{-1}), total alkalinity (24.75 to 28.25 mgL^{-1}), total hardness (140.00 to 166.50 mgL^{-1}), total dissolved solid (199.00 to 226.50 mgL^{-1}), nitrate (0.42 mg L^{-1} to 0.49 mgL^{-1}), phosphate (0.26 mgL^{-1} to 0.34 mgL^{-1}). The mean value of primary productivity of the lake was 0.30 $\text{gCm}^{-3}\text{h}^{-1}$ GPP, 0.16 $\text{gCm}^{-3}\text{h}^{-1}$ NPP and CR of all stations was 0.13 $\text{gCm}^{-3}\text{h}^{-1}$ recorded.

Key words : Lake, Kaylana, Jodhpur, physicochemical, water quality.

How to cite : Ravindra Choudhary, S. K. Sharma, B. K. Sharma, B. Upadhyay and M. L. Ojha (2022) Water quality parameters and primary productivity of Kaylana Lake, Jodhpur, Rajasthan, India. *J. Exp. Zool. India* **25**, 1439-1442. DocID: <https://connectjournals.com/03895.2022.25.1439>

INTRODUCTION

Lakes are the most visually appealing and picturesque feature of our global environment, have a diverse range of resource values, and play a vital part in the hydrologic cycle. Water is an essential nutrient for most creatures and a significant natural resource. Water is a necessary component of the environment that supports life on Earth. Water is essential for the life of all species. They demand substantial water to survive. Water quality evaluates the status of water in respect to the requirements of one or more biotic organisms (Johnson *et al*, 1997).

The aim to maintain freshwater fisheries has resulted in an increase in study on their water quality requirements, which include physicochemical aspects. These factors serve as the foundation for the richness or biological productivity of any aquatic habitat (Imevbore, 1970).

In the present study, the selected water quality status and primary productivity of Kaylana lake are studied for a short duration of three months. With historical background the lake's primary used for drinking water need of the Jodhpur city. Though, recreational activities and fisheries are the allied activities on the lake.

By providing boating amenities, it also serves as a source of aesthetic enjoyment and vacation leisure for both visitors and local people. The lake also draws a large number of migrating birds. However, there are fewer information available on the Lake's water quality. Some notable aspects of the lake are described in physico-chemical components affecting parameters and the delicate dynamics supported by them is critical in developing appropriate environmental management strategies and protecting the lake from deterioration. The study of physicochemical parameters of Kaylana lake may be of significant use for its efficient fisheries management. Adequate knowledge of the many physicochemical components impacting parameters, as well as the delicate dynamics supported by them, is critical for developing suitable environmental management strategies and protecting the lake from degradation.

As a result, the temperature, transparency, pH, Electrical Conductivity (EC), total dissolved solids (TDS), dissolved oxygen, alkalinity, acidity, total hardness, dissolved oxygen, nitrate, phosphate and primary productivity of water were all studied in the Kaylana lake. The wise management and efficient exploitation of this

Kavindra *et al* (2019).

Water hardness is determined mostly by the presence of calcium and magnesium cations, as well as anions such as carbonates, bicarbonates, and hydrogen sulphide. Sumitra (2007) observed hardness in Pichhola lake at a minimum of 126.00 mg l⁻¹ and a maximum of 208.00 mg l⁻¹ during her studies. However, Hardness levels ranged from 140.00 mg l⁻¹ to 166.50 mg l⁻¹, as shown in the findings of the current investigation (Tables 1) by Kavindra (2019) noted similar results during study of Jawai Dam.

The range of nitrate nitrogen during the present study was 0.42 -0.49 mg/l in Kaylana lake. , Sharma *et al.*, (2012) in Bada Madar Tank, Mishra *et al.*, (2012) in Goverdhan Sagar and Amrita *et al* (2019) also reported nitrate values in the range of 0.44-0.46 mg/l in lake Pichhola.

During the present research work, orthophosphate concentrations ranged from 0.24 to 0.35 mg l⁻¹. In Rangasagar, a highly eutrophic water body connected to Lake Pichhola, Rao (1984) found orthophosphate variations ranging from 0.065 to 0.525 mg l⁻¹.

During present investigation a mean value of 0.30 gCm⁻³h⁻¹ GPP, 0.16 gCm⁻³h⁻¹ NPP and CR of all stations was 0.13 gCm⁻³h⁻¹ was recorded (Table 1). Earlier researchers Mishra (2016) found relatively higher values of primary productivity in Goverdhan sagar lake indicating lesser human interference in Kaylana lake with relatively moderate levels of nutrients and primary productivity parameters of lake may also be significant use for its efficient fisheries management

CONCLUSION

The study recommends proper management strategies for such an important aquatic environment, such as the cultivation of suitable fish species for turning available primary production and nutrients into a lucrative fish crop. It is also recommended to stock more number of planktivorous and omnivorous fishes eg. Catla, silver carp and common carp to flourish on the lake's primary productivity.

REFERENCES

- Amrita P S, Sharma S K, Sharma B K, Upadhyay B and Jat G (2019) A study on physico-chemical parameters of Lake Pichhola, Udaipur (Rajasthan). *J. Entomol. Zool. Stud.* 752-755.
- Ananya B A, Sharma A P, Patra B C, Bera A, Manojit B and Roy C (2016) Phytoplankton assemblage of Sarni Reservoir, Madhya Pradesh. *American Research Thoughts* 2(6).
- APHA (2005) *Standard Methods for the Examination of the Water and Waste water*. 21st Ed. American Public Health Association Inc., Washington DC.
- Baghela B S (2006) Studies on biodiversity, survival and density of freshwater zooplankton in relation to salinity changes. *Ph.D. Thesis* submitted to M. L. Sukhadia University, Udaipur.
- Balai V K (2007) Current fish and planktonic biodiversity in the Jaisamand reservoir Udaipur, (Rajasthan) *Ph.D. (Limnology) Thesis*, Maharana Pratap University of Agriculture and Technology, Udaipur.
- Das S K and Chand B K (2003) Limnology and biodiversity of Ichthyofauna in a pond of Southern Orissa, India. *J. Ectotoxicol. Environ. Monitr.* 13(2), 97-102.
- Dangi P L and Sharma B K (2017) Water quality status of Lake Pichhola, Udaipur, Rajasthan. *Int. J. Fish. Aquatic Stud.* 5(3), 181-187.
- Deorari B P (1993) Productive potential of a manmade reservoir of Tarai of Uttar Pradesh with particular reference to Fish fauna. *Ph.D. Thesis*, Rohilkhand University, Bareilly, 291 pp.
- Gupta M C (1988) Some aspects of limnology, primary productivity and zooplankton of a shallow pond in Udaipur, Rajasthan. *M.Sc. Thesis* submitted to Rajasthan Agricultural University, Bikaner, Rajasthan.
- Imebvora A M A (1970) Some preliminary observations on the ratios and fecundity of the fish in River Niger. In: Visser S A (ed). *Kainji Lake Studies*. Vol. I, Ecology, S.A Visser (ed) 87-88.
- Ingole S B, Naik S R and Kadam G (2010) Study of phytoplankton of freshwater reservoir at Majalgaon on Sindphana river district Beed (M. S). *Int. Res. J.* 1(13), 87 - 88.
- Johnson L B, Richards C, Host G E and Arthur J W (1997) Landscape influences on water chemistry in midwestern stream ecosystems. *Freshwat. Biol.* 37, 193-208.
- Kavindra J, Sharma S K, Sharma B K and Ojha M L (2019) Physico-chemical properties and primary productivity of Jawai dam, Pali, Rajasthan. *J. Entomol. Zool. Stud.* 7, 865-868.
- Mishra V, Sharma S K, Sharma B K, Upadhyay B and Choubey S (2012) Phytoplankton, primary productivity and certain physico-chemical parameters of Goverdhan Sagar lake of Udaipur, Rajasthan. *Universal J. Environ. Res. Tech.* 2, 569-574.
- Mishra V, Surnar S R and Sharma S K (2016) Some limnological aspects of Goverdhan Sagar lake of Udaipur, Rajasthan to suggest its fisheries management. *Int. J. Sci., Environ. Tech.* 5, 2943-2948.
- Olsen S (1950) Aquatic plants and hydrospheric factor, I. Aquatic plants in Switzerland, Arizona. *J. Sevensk Botanisk Tidsskrift* 44, 1-34.
- Rajkumar (2005) Some aspects of fish biology and fisheries potential in relation to current water quality status of Daya Reservoir, Udaipur (Rajasthan). *Ph.D. (Limnology) Thesis*, Maharana Pratap University of Agriculture and Technology, Udaipur.
- Rawat H S (1991) Studies on the Limnology and fisheries of Tumaria Reservoir. *Ph.D. Thesis*, Kumaun University, Nainital. 188p.
- Rao P S (1984) A study of primary productivity, plankton and some physicochemical features of the lake Jaisamand in relation to fisheries. *Ph.D. Thesis*, Mohan Lal Sukhadia University, Udaipur, Rajasthan.
- Sharma L L and Durve V S (1990) Water clarity of 26 waters of Rajasthan in relation to phytoplankton. In: *The Proceedings of the second Asian Fisheries Forum*, Tokyo, Japan, 17-22 April, 1989 (Ed. Hirono, R. and Hanyu, I.). 915-918.
- Sharma M S (1980) Studies on Plankton and productivity of Udaipur waters in comparison to the selected waters of Rajasthan. *Ph.D Thesis* from University of Udaipur, Udaipur. pp. 1-277.
- Sharma R, Sharma V, Sharma M S, Verma B K, Modi R and Singh K G (2012) Studies on limnological characteristic, planktonic diversity and fishes (species) in lake Pichhola, Udaipur, Rajasthan (India). *Universal J. Environ. Res. Tech.* 1, 274-285.
- Sumitra M, Sharma R, Sharma V and Sharma M S (2007) Trophic status of lake Pichhola in relation to physicochemical characteristics of its water. *National Symposium on Limnology* 244-248.