



# International Journal of Fisheries and Aquatic Studies

E-ISSN: 2347-5129

P-ISSN: 2394-0506

(ICV-Poland) Impact Value: 76.37

(GIF) Impact Factor: 0.549

IJFAS 2024; 11(6): 139-141

© 2024 IJFAS

[www.fisheriesjournal.com](http://www.fisheriesjournal.com)

Received: 09-10-2024

Accepted: 14-11-2024

**Dr. Lalitha HM**

Department of Zoology,  
University College of Science,  
Tumkur University, Tumakuru,  
Karnataka, India

**Ramya SV**

Department of Studies and  
Research in Zoology, Tumkur  
University, Tumakuru,  
Karnataka, India

## A review on physico-chemical parameters of fresh water lakes of India

**Lalitha HM and Ramya SV**

DOI: <https://doi.org/10.22271/fish.2024.v12.i6b.3027>

### Abstract

Water is critical for the survival of living organisms and their development. It is the universal solvent which is an important and irreplaceable resource that nature has provided us with in abundance, including organic and inorganic compounds. Physico-chemical parameters play a crucial role in evaluating water quality and its suitability for various uses. Key parameters like temperature, pH, dissolved oxygen, turbidity, conductivity, and pollutant levels offer valuable information about the physical, chemical, and biological characteristics of water. The study emphasizes the ever-changing nature of water quality and stresses the need for ongoing research work monitoring to manage pollution effectively and safeguard aquatic ecosystems.

**Keywords:** Physico-chemical parameters, aquatic ecosystem

### Introduction

Water is an essential natural resource, covering about 71% of the Earth's surface, and is critical to all forms of life. It plays a vital role in biological, ecological, and chemical processes. Water exists in three states as liquid, solid (ice), and gas (vapor), cycling through the environment through processes like evaporation, condensation, and precipitation. It is used for various purposes like drinking, agriculture, industry, and energy production. Water quality is key to human health and environmental balance. Monitoring water quality involves tracking factors such as temperature, pH, dissolved oxygen, turbidity, and pollutants to ensure as it remains safe and supports ecosystems. If not carefully managed, water resources face threats from pollution, climate change, and overuse. Lakes are the important source of fresh water involved in ground water recharge, maintaining energy exchange and supporting the aquatic life. In recent days, lake water becomes polluted, unsuitable for drinking and irrigation purpose due to the contamination of unwanted impurities and harmful chemicals. Due to the industrialization, use of chemical fertilizers, pesticides, insecticides in agricultural fields causes the depletion of dissolved oxygen and enrichment of nutrients which leads to increase in biological oxygen demand causing pollution and eutrophication. It directly influences on the water quality and affects the aquatic organisms. Physico-chemical parameters of the water determine the composition, diversity and productivity of the water body. Hence, it is important to access physico-chemical parameters of the lakes to counter the water quality impairment.

### Materials and Methods

This review is based on the available published literature collected from scientific publications, reports, and online databases focused on physico-chemical parameters in freshwater lakes. Relevant information was gathered from Peer reviewed journals- Articles indexed in databases like Scopus, Web of Science, PubMed, and Google Scholar. The review considered studies of physico-chemical parameters in freshwater lakes between 2010 to 2024.

### Review of Literature

Manjare *et al.*, (2010) <sup>[8]</sup> examined the water quality of Tamdalg tank in Kolhapur District of Maharashtra by studying the monthly changes in physical and chemical parameters such as water temperature, transparency, turbidity, total dissolved solids, pH, dissolved oxygen, free

**Corresponding Author:**

**Dr. Lalitha HM**

Department of Zoology,  
University College of Science,  
Tumkur University, Tumakuru,  
Karnataka, India

carbon dioxide, and total hardness, chlorides, alkalinity, phosphate and nitrates. They found that all parameters were within the permissible limits. The tank is non-polluted and can be used for domestic, irrigation purposes including pisciculture.

Tharanitharan *et al.*, (2014) <sup>[15]</sup> analyzed the hydro-chemical water quality at Salem District of Tamil Nadu (Kannakurichi, Mookaneri, Attayampatti, Mathiyampatti and Cinna kollapatti). In the study, different parameters like pH, temperature, total dissolved solid, alkalinity, hardness, iron, dissolved oxygen, chloride, sulphate, biological oxygen demand were analyzed. The results concluded that parameters such as total dissolved solids, hardness and iron content were in high concentration in most of the lake water samples. Results of lake water samples were compared with the standard permissible values and found that lake water samples from Attayampatti and Mathiyampatti lakes are highly contaminated compared to other lake water samples. It is suggested to monitor the lake water quality by periodical assessment to prevent further contamination.

Biradar *et al.*, (2014) <sup>[2]</sup> assessed the physico-chemical parameters of Kotur lake. They found that some of the parameters were within the permissible limits and some parameters surpass the limits. They observed the minimum temperature in October and maximum in March and a maximum pH in January and minimum in March.

Mallikarjunaswamy *et al.*, (2015) <sup>[7]</sup> studied the hydrological parameters of Tiptur lake. Study revealed that most of the hydrological parameters found within permissible limits of BIS standards except pH. Lake water is slightly alkaline. Biological oxygen demand is less hence water is less polluted with less pressure of eutrophication. The lake water was suitable for pisciculture and for domestic purpose. They also recommended that bathing, washing and defecation, immersion of idols, domestic and septic tank effluent discharge must be strictly prohibited, as these activities alter water quality and affect adversely on the aquatic organisms. Unplanned growth of human habitation in the vicinity of the lake has to be checked.

Choudhary and Ahi (2015) <sup>[3]</sup> analysed water quality in polluted Sagar lake by investigating different physico-chemical parameters and found that results were above desirable limit. This result shows that the Sagar lake receives very high amount of pollution from the surrounding and the lake water is highly contaminated and opined that if similar condition is continued for the longer period, Sagar lake may soon become the ecologically inactive.

Murthy *et al.*, (2016) <sup>[9]</sup> examined physico-chemical parameters of Kamenahalli stream water in Chikmagalur. The study was conducted to measure various physico-chemical parameters like temperature, pH, electrical conductivity, free carbon dioxide, chloride, total dissolved solids, dissolved oxygen, total alkalinity, total hardness. The observation revealed that water was moderately oligotrophic in status and parameters were compared with the WHO and BIS standards and also found that the water quality of the stream was free of contaminants and served as a suitable habitat for aquatic life.

Lalitha and Ramakrishna (2017) <sup>[6]</sup> analysed the physico-chemical parameters of Kunigal tank. Parameters selected were temperature, pH, electrical conductivity, turbidity, chlorides, nitrates, sulphates, phosphates, and biological oxygen demand parameters. Result concluded that pH, temperature, turbidity, electrical conductivity, sulphate, phosphate, chloride and nitrate were within the permissible

limits of BIS standard except biological oxygen demand and also study revealed that increased biological oxygen demand level is due to the increased activities of human and reduction of water.

Thirumala and Kiran (2018) <sup>[16]</sup> studied the physico-chemical parameters of water samples in Shivamogga areas. Parameters such as pH, electrical conductivity, salinity, total alkalinity, total dissolved solids, chloride, iron, fluoride, total hardness, biological oxygen demand and dissolved oxygen were analyzed and the results were compared with the drinking water quality standards laid by WHO and concluded that water samples from selected areas are convenient for human consumption after treatment due to moderate levels of physico-chemical parameters.

Nama and Raj (2018) <sup>[11]</sup> focused on the water quality using Physico-chemical parameters of Palasani pond of Jodhpur (Rajasthan). Monthly change in physico-chemical parameter such as transparency, temperatures, turbidity, pH, dissolved oxygen, phosphate, biological oxygen demand, total alkalinity and total hardness was carried out. Present study shows that only dissolved oxygen is exceeding the permissible limits of WHO. The quality of water is within the permissible limits and can be used for domestic purpose and fishculture.

Naik *et al.*, (2019) <sup>[10]</sup> estimated the water quality of Hebbal lake. The parameters like temperature, dissolved oxygen, biological oxygen demand, chemical oxygen demand, electrical conductivity, total hardness, total dissolved solids and chloride were analysed. The study is aimed in the qualitative assessment and its remedial measures for water crisis in Bangalore city. As per the standard prescribed by BIS, the results indicated that biological oxygen demand exceeded the maximum limit and other parameters were within the permissible limits.

Farnaz and Rahmatullah (2021) <sup>[4]</sup> examined the water quality of Maharani Pokhar pond and Raj Pokhar pond of Darbhanga (Bihar) using physico-chemical parameters. The water samples were analyzed for water temperature, transparency, pH, free carbon-dioxide, chloride, carbonate, bicarbonate, magnesium, dissolved solids and biological oxygen demand. Present study revealed that Maharani Pokhar pond water physico-chemical parameters were comparatively higher than Raj Pokhar pond water. They also observed that the higher value of biological oxygen demand, indicated the sewage water pollution, eutrophication and it showed negative impact on the fish production.

Priya *et al.*, (2022) <sup>[12]</sup> studied the comparison of physico-chemical parameters in Saroornagar lake and Ramanthapur Pedda Cheruvu Lake. Various parameters selected for the study were chlorides, total hardness, total solids, biological oxygen demand, chemical oxygen demand and dissolved oxygen. They found that total solids were higher than permissible limits and dissolved oxygen is in very low concentration in Saroornagar lake compared to the standard values. It shows that the Saroornagar lake water quality is severely deteriorated and indicates eutrophication. Hence, it is unfit for drinking, domestic and recreational purposes. They also concluded that Ramanthapur Pedda Cheruvu lake water is mildly polluted.

Premasudha *et al.*, (2022) <sup>[13]</sup> evaluated the physico-chemical parameters of Hussain Sagar and Saroor Nagar lake water quality in Hyderabad. The present study examined the selected lake water samples for physico-chemical parameters such as pH, total hardness, total dissolved solids, calcium, magnesium, chloride, bicarbonate, carbonate, dissolved

oxygen, biological oxygen demand and chemical oxygen demand. Observations were compared with standard water quality, irrigation standards and compared with previous study to analyze the parameters limits. The results indicating pH of Hussain sagar lake has acceptable limit but Saroor nagar lake has high. In both the lakes pH, total hardness, total dissolved solids, calcium, magnesium, chloride, bicarbonate, carbonate were more than acceptable limits and dissolved oxygen, biological oxygen demand and chemical oxygen demand were within the acceptable limits.

Garg A. (2022) <sup>[5]</sup> studied the physico-chemical parameters of water of Taraori pond and Karna lake of Karnal (Haryana). Parameters like temperature, pH, carbon-dioxide, dissolved oxygen, chloride, phosphate, alkalinity, nitrates, organic matter, nitrogen, salinity, etc. were measured monthly. The results revealed that pond water of Taraori was found to be polluted due to the discharge of sewage wastes, domestic wastes and industrial wastes and also found that Karna lake water was not much polluted than Taraori pond and dissolved oxygen was also recorded optimum due to boating. They observed that the universal relationship among the primary productivity levels and fish productivity was not supported as a range of variables such as ammonia production, organic load and quantity and quality of fertilizers affect such relationships.

Santhi *et al.*, (2023) <sup>[14]</sup> focused on physicochemical parameters of two lakes, Vanderthangal lake and Dharapadavedu lake of Vellore (Tamil Nadu). Parameters like colour, odour, turbidity, electrical conductivity, pH, alkalinity, total hardness, calcium, magnesium, ammonia, nitrite, nitrate, chloride, fluoride, sulfate, phosphate, biological oxygen demand, and chemical oxygen demand were selected for the study. The observation revealed that Vanderthangallake had higher concentrations of ammonia, fluoride, and phosphate than the Dharapadavedu lake, indicating that it was more polluted.

Basavaraj and Kadadevaru (2024) <sup>[1]</sup> assessed the physico-chemical parameters and zooplankton community at Gopalaswamy tank of Chitradurga. They found that the water body exhibits low transparency due to the algal bloom and more alkaline with the highest pH value. The highest value of phosphate, sulphate and nitrate indicated the excess nutrient load in the water body. The algal bloom, alkalinity, nutrient load indicates the eutrophication of the water body; however the electrical conductivity values were within permissible limit. The assessment of physico-chemical parameters showed unsuitability of water for potability.

### Conclusion

Physico-chemical parameters are fundamental in evaluating and managing the water quality. They offer valuable insights to the physical, chemical, and biological properties of water, which are crucial for assessing its suitability for various uses, including drinking, agriculture, and industrial activities, as well as for preserving aquatic ecosystems. Continuous monitoring of parameters like temperature, pH, dissolved oxygen, turbidity, conductivity, and pollutant levels is essential for ensuring safe and sustainable water resources. Proper management of these parameters is vital for safeguarding both human health and the environment from the impacts of pollution and other water-related challenges.

### Conflict of Interest

The authors have no conflict of interest.

### References

1. Basavaraj SK, Kadadevaru GG. Assessment of Physico-chemical Parameters and Zooplankton Community at Gopalaswamy Tank, Chitradurga, Karnataka. *Indian J Sci Technol.* 2024;17(4):368-372.
2. Biradar NV, Sindagi AS, Bellad AS, Reddy J, Navalur R, Naykar S, *et al.* Assessment of physico-chemical and microbiological parameters of Kotur lake, Dharwad, Karnataka, India. *Int. J Curr Microbiol Appl Sci.* 2014;3(2):88-96.
3. Choudhary A, Ahi J. Analysis of water quality in polluted Sagar Lake by investigating different physicochemical parameters. *Int J Multidiscip Res Dev.* 2015;2(9):25-30.
4. Farnaz S, Rahmatullah M. Study of water quality using of Physico-chemical parameters of two perennial ponds of Darbhanga district, Bihar. *Int. J Fisheries Aquat Stud.* 2021;9(5):95-98.
5. Garg A. The physico-chemical parameters and planktons of water samples from Taraori pond and Karna Lake, Karnal (Haryana). *Int. J Res Eng Sci.* 2022;10(9):456-464.
6. Lalitha HM, Ramakrishna S. Assessment of physico-chemical parameters of Kunigal tank, Tumkur Dist, India. *Int J Adv Res.* 2017;5(12):957-964.
7. Mallikarjunaswamy GC, Kousar H, Basavaraddi SB, Shylaja MB. Studies on hydrological parameters of Tiptur Lake, Tumkur District, Karnataka State, India. *Int J Res.* 2015;3(7):29-34.
8. Manjare SA, Vhanalakar SA, Muley DV. Analysis of water quality using physicochemical parameters Tamdalge tank in Kolhapur district, Maharashtra. *Int. J Adv Biotechnol Res.* 2010;1(2):115-119.
9. Murthy KN, Gujjar KN, Kiran BR. Physico-chemical parameters of Kamenahalli stream water in Chikmagalur, Karnataka. *Int. J Appl Adv Sci Res.* 2016;2(1):128-132.
10. Naik PR, Sankalpasri SS, Bhavya BS, Reshma TV. Water quality assessment of Hebbal lake in Bangalore city. *Int. J Innov Technol Explor Eng.* 2019;8(11):520-527.
11. Nama P, Raj D. Water quality assessment using physico-chemical parameters of Palasani pond, Jodhpur district, Rajasthan, India. *Int J Res Anal Rev.* 2018;5(3):935-938.
12. Priya KP, Seeta Y, Reddy PM. Comparative study of physico-chemical parameters in Saroornagar Lake and Ramanthapur Pedda Cheruvu. *Int. J Sci Res Sci Technol.* 2022;9(2):11-15.
13. Premsudha R, Tirupathi G, Madhusudhan G, Swaroopa L, Sathyavathi L, Reddy N, *et al.* Evaluation of physico-chemical parameters to assess Hussain Sagar and Saroor Nagar Lake water quality in Hyderabad, Telangana, India. *Int. J Adv Res Sci Commun Technol.* 2022;2(1):543-550.
14. Santhi K, Lakshmi NUC, Noornissabegum M, Lesley AN. A study of the physiochemical parameters of two lakes in Vellore District, Tamilnadu State, India. *J Survey Fisheries Sci.* 2023;10(3S):6707-6715.
15. Tharanitharan V, Ragul E, Nandhakumar D, Abith A, Keerthivasan K. Hydro chemical analysis of lake water quality at Salem District, Tamil Nadu, India. *Chem Sci Rev Lett.* 2014;3(10):148-155.
16. Thirumala S, Kiran BR. Studies on physico-chemical parameters of water samples in Shivamogga area, Karnataka. *Res Rev Int J Multidiscip.* 2018;3(8):85-88.