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“Studies On Physico- Chemical Parameters Of Lahanewadi Dam, Phulambri District- Chhatrapati Sambhajinagar”.

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ABSTRACT: The present study was carried out from June 2023 to May 2024. During the study period water quality studied. Various quality parameters are measured including pH, air temperature, Water Temperature, DO, free. All water parameters are within the permissible limit and suitable for biodiversity. The result indicated and discussed.

Key Words: Parameter, Lahanewadi temperature

INTRODUCTION

Water is an important resources for all living organisms. All the living organisms are depends on water for drinking, agriculture, food production, industries and very importance for waste disposal.

The other biota is also depends on freshwater sources like river, dam well and lake etc. The condition of drinking water may be polluted with pathogen, toxic metal, chemical compounds such as pesticides, herbicides and other industrial waste becomes waterborne outbreaks.

Our main resources of freshwater is dams and from last two decade it will observed that our resources get polluted and hence the time comes to get reform and analysis the water quality of our near by dams.

Water is the essential resource that we have on Earth; Earth has life because of water. Nearly 70% of the Earth's surface is covered by water, mainly in oceans and seas. There are about 97 % of the world's waters; ice at the poles makes up 2 %, and the rest is freshwater found in streams, ponds, lakes, rivers, dams, and groundwater (Bwire, G. et al., 2020; Jadhav, V. R., 2018). The majority of the communities still lack a pipelined water supply. Even if there isn't one, ponds and rivers provide water.

This water is also used for agricultural, and home uses. Researchers can use the physicochemical and microbiological features of water to characterize its quality. It is critical to regularly monitor many quality factors to properly maintain water quality through suitable management techniques (Deepali, S., & Patole, S. S., 2019).

Researchers worked on the physical, chemical, and biological aspects of water used to determine its quality; the complexity of analyzing a large number of values is a significant issue in water quality monitoring in various dams (Agale M. C; Agale, M. C., & Patel, N. G., 2013; Desai, J. et al., 2008).

Water is the foundation of our existence. Irrigation, domestic needs, industries, sanitation, and waste disposal are dependent on water. Limnology studies freshwater bodies, such as lakes and ponds, concerning physical, biological, geographical, and other characteristics (Ekhande, A. P. et al., 2013; Shantilal, J. D., et al., 2017; Sharma, R. et al., 2020).

The study of limnology is a study of the structural and functional interactions between organisms of inland waters as they interact with their physical, chemical, biotic environments, and also studied toxic metal ions (Mishra, S., & Kumar, A., 2021; Nandan, S. N., & Kumavat, M. R., 2004). The present study was aimed at analyzing some important characteristics of water quality is of vital concern for the mankind because it related to human welfare.

STUDY SITE

Lahanewadi dam is a medium irrigation project constructed by Irrigation department, Government of Maharashtra, on river Girja Lahanewadi Phulambri Dist-Chhatrapati Sambhajinagar (M.S) India. The dam was constructed in the year 1992. It is situated on latitude 20.088863, N and longitude 75.418274 E. (Google Earth). The basic purpose of this dam is to supply water for drinking, domestic use and irrigation purpose to near by villages. Fishing practices are carried under Assistant Commissioner of fishery Phulambri.

MATERIAL AND METHODS

To study the water quality from June 2023 to May 2024 which define as physical, chemical and biological characteristics of water samples were collected monthly at 2 feet depth from the surface area of the water body from the two sampling points in between 7 to 11 am during the study period. The first sampling point (S₁) near the wall of the dam and second sampling site (S₂) at the river entry point and the distance between two sampling points were approximately 2 to 5 km.

The parameters studied were pH, air temperature, water temperature, free CO₂, DO, . Parameters like pH, air temperature and dissolved oxygen was measured at the site, and samples in 5 liter plastic cans were brought to the Fishery research laboratory, Department of Zoology, Rajarshi Shahu Art's, Commerce and Science College, Pathri Chhatrapati Sambhajinagar for further estimation by using standard water analysis method described by APHA (1992), Kodarkar (1992), Trivedy and Goel (1986).

MORPHOMETRIC STUDY

Study of physical parameters: Physical parameters such as air temperature, water temperature, total solids, total dissolved solids and total suspended solids were analyzed by the standard methods by Trivedy and Goel(1986), Kodarkar (1992).

i) pH (Hydrogen ion concentration): pH of water was recorded by field pH Meter Hanna –Model champ during study period on sampling site.

ii) Temperature: Water and air temperature of sampling site was recorded from June 2023 to May 2024. The temperature was recorded with a centigrade mercury thermometer (0.0 °C to 110 °C) in the field.

Study of Chemical parameters: Water samples from sampling site during the study period June 2023 to May 2024 were collected monthly and brought to Department of Zoology, Rajarshi Shahu Arts, Commerce and Science College Pathri, Chhatrapati Sambhajinagar, for analysis of various chemical parameters. Chemical parameters like dissolved oxygen, free CO₂, were determined by standard methods as described by Trivedy and Goel (1986), Kodarkar (1992).

v) Dissolved oxygen :- Dissolved oxygen was estimated in the laboratory by using Winklers iodometric method as described by Trivedy and Goel (1986).

vi) Free Co₂ :- Free Co₂ was estimated in the laboratory by using titration method as described by Trivedy and Goel (1986).

Table : 01

“PHYSICO- CHEMICAL PARAMETERS OF LAHANEWADI DAM, PHULAMBRI DISTRICT- CHHATRAPATI SAMBHAJINAGAR ”.

JUNE 2023-MAY 2024

Parameter s	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Air Temp.	24.5	26.25	26.5	26.75	23.55	23.95	22.5	22.1	24.65	26.1	28	29.02
Water Temp.	22.55	20.1	20.5	23.4	21.25	21.4	20.05	20.55	22.05	23.95	26.35	27.2
pH	7.85	8.0	8.05	7.9	8.05	7.85	7.55	8.0	8.2	8.15	8.0	8.15
DO	5.0	5.05	5.0	5.55	8.05	7.3	6.05	5.65	5.0	4.6	3.5	3.7
CO₂	5.85	6.85	6.5	6.4	3.1	3.3	3.4	3.35	4.35	6.0	6.75	7.35

All values are expressed in mg/L except Temperature (°C) and pH.

RESULTS & DISCUSSION

AIR TEMPERATURE : In the study period from June 2023 to May 2024 it was observed that Lahanewadi Dam had air temperature ranging between 22.1 °C and 29.02°C

The minimum air temperature was 22.1°C in January 2024 and maximum was 29.02 °C in May 2021 ,29.02°C in May 2024 (Table 01).

In the present investigation it was observed that air temperature is minimum in winter season and maximum in summer season.

Salve and Hiware, (2006) reported air temperature range between 27.0°C to 35.0°C where minimum temperature was recorded in winter season and maximum temperature in summer season from Nagapur near Parli Vaijanath, Beed district. Mane and Pawar, (2007) reported similar results from Manar river, Nanded district, Sunkad and Patil, (2003) also reported minimum air temperature in winter season and maximum in summer season from Rakasakoppa reservoir of Belgaum, Karnataka.

Air temperature was minimum in winter season and maximum in summer season during the study period June 2023 to May 2024. This change in temperature may be related to the photoperiod.

WATER TEMPERATURE : Recorded water temperature at Lahanewadi Dam from June 2023 to May 2024 ranged between 20.1 °C and 27.2°C. The average minimum water temperature was 20.1 °C in July 2023 and maximum was 27.2 °C in May 2024 (Table 01).

Results show that water temperature was minimum in winter season and maximum in summer season.

Salve and Hiware (2006) reported water temperature range between 21 °C and 31.1°C where the water temperature is lower than the atmospheric temperature by 1°C to 3.9 °C. Mane and Pawar, (2007) from river Manar, Nanded district, Sunkad and Patil, (2003) from Rakasakoppa reservoir of Belgaum, Karnataka, have also reported similar findings.

The water temperature was minimum in winter season and maximum in summer season this must be related to the air temperature.

pH : During study period from June 2023 to May 2024 it was observed that Lahanewadi Dam had pH ranging between 7.55 and 8.20. The average minimum pH was 7.55 in December 2021 and maximum was 8.2 in February 2022 (Table 01). In the present investigation pH is alkaline in nature and ranges between 7.0 and 8.3. The high range of pH may be due to the biological activity and temperature changes. Significant changes in pH also occur due to disposal of drainages, seasonal variation may be due to variation in the photosynthetic activity which increases pH due to consumption of carbon dioxide in the photosynthetic process.

These results are identical to those reported by Muley and Patil, (2006) from Pauna river, Pune district, Sharma and Shrestha, (2001) from Tinau river Western Nepal. Tripathi Namrata Nath *et al.*, (2008) from Sikandrapur reservoir, Basti (U.P.), Shah Nawas *et al.*, (2009) from Bhadra rivers of western Ghats (India), Ashashree *et al.*, (2008), Korai *et al.*, (2008) from Keenjhar Lake district, Thatta, Sindh, Pakistan.

According to Swingle, (1969) water pH within the range of 6.5 to 8.5 is most suitable for pond aquaculture. (Sinha, 2000; Singh, 2002) reported pH range between 7.0 to 8.6 in different water bodies of North Bihar, where fish production has been recorded to be maximum. The high range of pH indicates higher productivity of water, Khan and Khan, (1985).

Free CO₂ During the study period from June 2023 to May 2024 it was observed that Lahanewadi Dam had free CO₂ ranging between 3.1 mg/L and 7.35 mg/L. The average minimum free CO₂ was 3.1 mg/L in October 2023 maximum was 7.35 mg/L in May 2024 (Table 01).

The free CO₂ concentration was minimum in winter, this might be due to high photosynthesis activity and maximum in summer which may be due to less photosynthetic activity because of low phytoplankton population. In the present investigation maximum carbon dioxide was observed in summer season and minimum in winter season.

Similar result have been recorded by Muley and Patil, (2006) from Pauna river, Pune district Maharashtra. Sharma and Shrestha, (2001) from river Tinau Western Nepal.

Salve and Hiware, (2006) from Wanparakalpa Reservoir, Nagapur, near Parli-Vaijanth, district Beed, Marathwada, Ashashree *et al.*, (2008) from Savalanga pond Davangere district Karnataka. Dutta *et al.*, (2001) from river Basantar Chandigarh also reported similar results. The lower values of free carbon dioxide observed during rainy and winter season is due to complete utilization of free carbon dioxide by the phytoplankton's (Rawson, 1939).

8) DO (Dissolved Oxygen) : Concentration of dissolve oxygen at Lahanewadi Dam from June 2023 to May 2024 was between 3.5 mg/L and 8.05 mg/L. The average minimum DO was 3.5 mg/L in April 204 and maximum was 8.05 mg/L in October 2023 (Table 01).

In the present investigation it was observed that dissolved oxygen is maximum in winter season and minimum in summer season. These results are identical to those reported by Mulay and Patil, (2006), Korai *et al.*, (2008); Sharma and Shrestha, (2001); Tripathi Namrata Nath *et al.*, (2008). Shahnawaz, (2009) from Bhadra River of western Ghats India, Martin, (2004) from South Indian River Tamiraparani, Munwar, (1970) from freshwater ponds of Hydrabad.

Boyd, (1982) from water quality management of pond fish culture, Pandey *et al.*, (1999) studied Do from river Ramjan (Klshanganj) in relation to its impact on biological components.

The 6 mg/L to 9 mg/L range of DO is supported for potability and aquaculture, Yogesh and Pendse, (2001). During the study period the maximum temperature was recorded in the month of may 40 °C and minimum in November 21.75 °C.

Salve B.S; Pawar R.T. and Hiware C.J.(2006) reported air temperature range between 27.0°C to 35.0°C where minimum temperature was recorded in winter season and maximum temperature in summer season from Nagapur near Parli Vaijanath, Beed district.

Mane A.M. & Pawar S.K.(2007) reported similar results from Manar river, Nanded district, Air temperature was minimum in winter season and maximum in summer season at paintakle dam ,this change in temperature may be related to the photoperiod.

Maximum pH was 8.3 in November and minimum in the month of September 7.05 the high range of pH may be due to the biological activity and temperature changes. Significant changes in pH also occur due to disposal of drainages, seasonal variation may be due to variation in the photosynthetic activity which increases pH due to consumption of carbon dioxide in the photosynthetic process.

These results are identical to those reported by Muley D.V. and Patil I.M.(2006) from Pauna river, Pune district, Tripathi Namrata Nath, Shukla J.P., Mishra, M.(2008) from Sikandrapur reservoir, Basti (U.P.).

Shahnawaz A., Venkateshwarlu M., Somashekar D.S. & Santosh K.(2009) from Bhadra river of western Ghats (India), Mane A.M. & Pawar S.K.(2007) The maximum CO₂ was observed in the month of May 7.6 and minimum was recorded in December 3.0 the free CO₂ concentration was minimum in winter, this might be due to high photosynthesis activity and maximum in summer which may be due to less photosynthetic activity because of low phytoplankton population recorded similar result, maximum DO was recorded in the month of December 11.2 and minimum was recorded in the month of May 3.8.

These results are identical to those reported by Tripathi Namrata Nath, Shukla J.P., Mishra, M.(2008), Tripathi Namrata Nath, Shukla J.P., Mishra, M.(2008); from Bhadra River of western Ghats India. Martin, (2004) from South Indian River Tamiraparani, Munwar,. The 6 mg/L to 9 mg/L range of DO is supported for portability and aquaculture, Trivedy R. K. and Goel P. K.(1986) DO is inversely proportional to CO₂.

CONCLUSION

In the present study all the water parameters are within permissible limit and helpful for the biodiversity. From present investigations we concluded that the quality of most of the water samples under study was suitable for drinking purpose except in rainy season.

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