

Monthly Variations of Physico-Chemical Parameters Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region, India

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Abstract: The present study dealt with assessment of some physico-chemical parameters of Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region, India. The physico-chemical characteristics were studied and analyzed during January-December 2004. Monthly variations at three different sampling sites of the Ravivar Peth Lake were observed. The results revealed that the condition of this Lake in different months showed fluctuations in physico-chemical parameters.

Key words: Physico-chemical parameters • Monthly variations • Ravivar Peth Lake

INTRODUCTION

Water covers about 70% of the earth's surface out of which only 2.7% of the total water is fresh water, of which 1% is ice free water in the rivers, lakes and atmosphere as biological water. It has been estimated that only 0.00192% of the total water on earth is available for human consumption [1].

Water quality analysis is important to preserve and protect the natural ecosystem. The various physicochemical and biological methods have been carried out water quality management. The physicochemical and biological i.e. hydrobiological monitoring is useful to determine the sources and types of pollution. The study of different water parameters is very important for understanding of the metabolic events in aquatic ecosystem. The parameters influence each other and also the sediment parameters, as well as they govern the abundance and distribution of the flora and the fauna. Therefore, it has become obligatory to analyze at least the important water parameters when ecological studies on aquatic ecosystems are carried out. Such studies when done from time to time can indicate the favorable or unfavorable changes occurring in the ecosystem [2].

The quality of surface water including lakes and rivers depends on their physical, chemical and biological prosperities. Lakes are visible tools for managing fresh water resources, contributing to socioeconomic development and drinking water supply. Water body is useful for charging of ground water; aquaculture, food regulation, moderation and control, conditioning the microclimate, sustenance of biodiversity, flora and fauna interaction, parks, slit as a source for neighbor's hood, gardening, kitchen gardens and community assets with educational and cultural value.

In India some hydrobiological work on historic shallow water bodies like temple reservoir and village ponds have been done [2-12].

MATERIALS AND METHODS

The water samples for physico-chemical analysis were collected from Ravivar Peth Lake, geographical coordination 18° 45' N and 76° 10' E Aurangabad, (M.S) India, at 3 different sites viz., Station A (Gaothana Site), Station B (Domestic Site) and station C (Temple Site) in the early morning between 8 am to 11 am in the first week of every month from January-December 2004. The samples were collected in acid washed five liter plastic container from a depth of 5-10 cms below the surface of water.

Separate samples were collected for dissolve oxygen in 250 ml bottles and dissolved oxygen was fixed in the field by adding alkaline iodide-azide solution immediately after collection. The samples were analyzed immediately in the laboratory

The physico-chemical characteristics of the Lake water like Colour, Odour and Taste, Temperature, Turbidity and Transparency, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Hardness and Chlorides were determined in monthly variation according to standard methods [13, 14].

RESULTS AND DISCUSSION

The monthly physico-chemical parameters data of Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region India have been presented monthly values, seasonal coefficient variation of different parameters data has been presented in fig. 1. A to H.

Physico-Chemical Characteristic

Colour: The pure water is not colourless. It has got a pale green-blue tint in large volumes colour in natural water may occur due to the presence to humic acids,

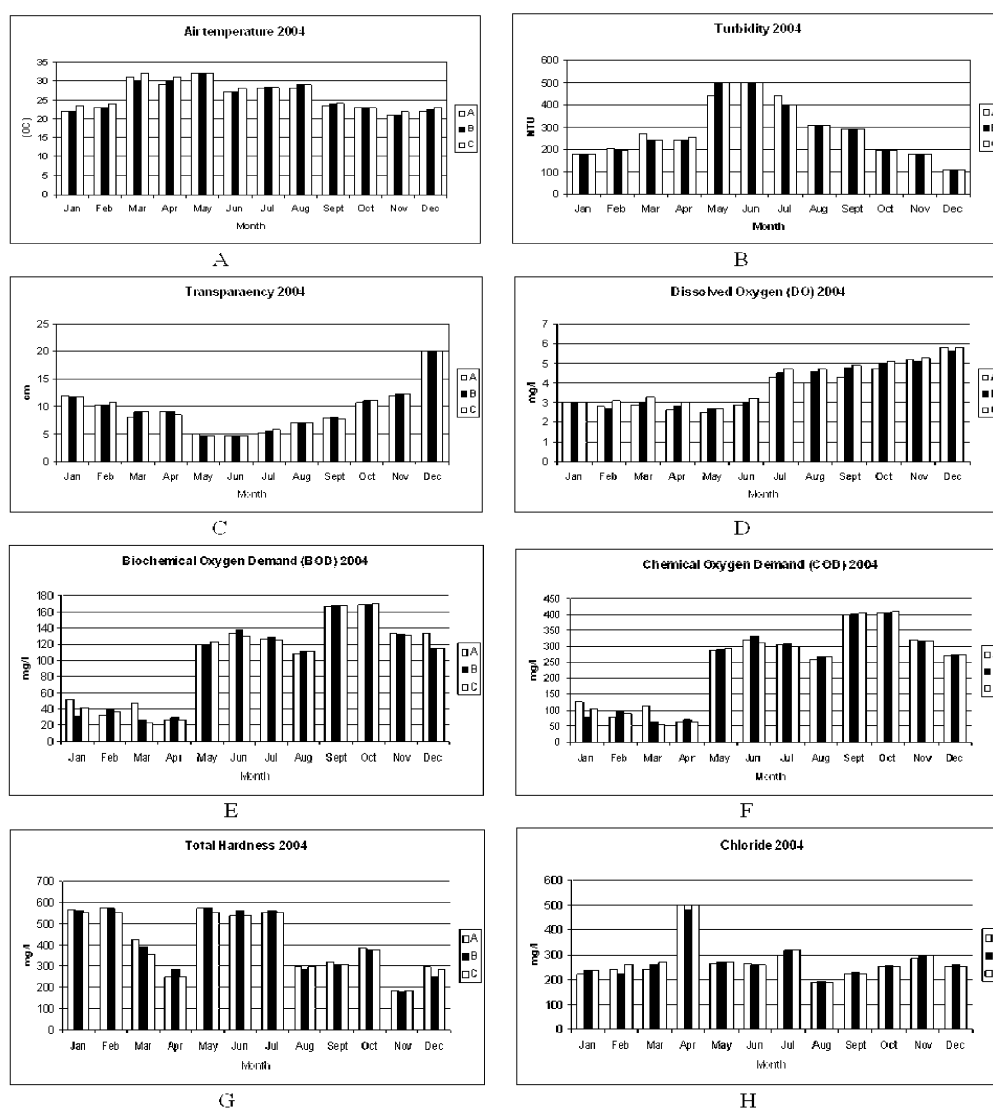


Fig. 1: Graphs showing average monthly variations of three sites in Colour, Odour and Taste, Temperature, Turbidity, Transparency, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Hardness and Chlorides (A to H) at different months of Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region, India. (During January-December 2004).

fulvic acids, metallic ions. Such as iron and manganese, suspended matter, phytoplankton, weeds and industrial water etc. According to ISI colorless water is potable.

In the present investigation the colour of Ravivar Peth Lake at three different stations A, B and C was found colourless in January, February and March. The colour of water was observed slightly green in April to November during the study period. The slight green colour of water was due to the presence of green algae in the water

Odour and Taste: Odour and taste are the two important physical parameters along with colour which decides the portability of water with the help of sense organs. The high salinity renders salty taste to water which is due to high sodium contamination. Oily smell or odour to water is due to oil contamination by nuisance bacteria [15, 16].

In the present study the Ravivar Peth lake water taste and odour was found close related with each other.

Air Temperature: Temperature plays an important role in aquatic ecosystem as a critical factor. It affects biochemical reaction, population fluctuations in water body as well as the physical and chemical characteristics of water.

During the first year study (January to December 2004), the Air temperature noted were ranged, 21 to 32 °C. At station 'A', the minimum air temperature was recorded, 21°C in the month of November, while maximum temperature was recorded, 32 °C in the month of May. At station 'B', minimum air temperature was recorded, 21°C in the month of November, while maximum value temperature was recorded, 32 °C in the month of May. At station 'C' the minimum air temperature was recorded, 22 °C in the month of November, while maximum value was recorded, 32 °C in the month of March and May and graphically represented in fig. no. A.

The rising of water temperature particularly in summer in the present study can be attributed to overall increasing trend in atmospheric temperature in addition to exothermic chemical process of the human activities prevail all along the dam. [17] observed that rise in temperature can be resulted in high rate of evaporation, may cause decline in water level during summer months.

Turbidity and Transparency: Turbidity and transparency may be caused by wide variety of suspended materials ranged from colloidal to coarse dispersion, make water unfit for drinking. According to WHO the turbidity permissible limit is up to 5 NTU and Indian standard up to 10 NTU turbidity for drinking water [18].

During the first year study (January to December 2004) the turbidity were ranged, 107 to 500 NTU. At station 'A' the minimum value of turbidity was recorded 107 NTU in the month of December, while maximum value was recorded, 500 NTU in the month of June. At station 'B' the minimum value of turbidity was recorded 107 NTU in the month of December, while maximum value was recorded, 500 NTU in the month of June. At station 'C' the minimum value of turbidity was recorded, 107 NTU in the month of December, while maximum value was recorded, 500 cm in the month of June and graphically represented in fig. no. B.

During the first year study (January to December 2004) the transparency ranged, 4.63 to 20 cm. At station 'A', the minimum value of transparency was recorded, 4.73 cm in the month of June, while maximum value recorded, 20 cm in the month of December. At station 'B', the minimum value of transparency was recorded, 4.63 cm in the month of June, while maximum value was recorded, 20 cm in the month of December. At station 'C' the minimum value of transparency was recorded 4.63 cm in the month of June, while maximum value was recorded, 20 cm in the month of December and graphically represented in fig. no. C.

High values of turbidity in monsoon might be due to higher wind flow which created water waves in rainy season which brought clay silt and organic matter, where as low values were in summer might be due to reduction in the water level of dam. The water was less transparent during monsoon as compared with winter and summer. Similar observations were made by [19, 20].

Dissolved Oxygen (DO): Dissolved oxygen (DO) is one of the most important and limiting parameter of water quality assessment which maintains aquatic life. It regulates the metabolic processes of aquatic organisms.

In the first year study (January to December 2004) the dissolved oxygen values were ranged, 2.5 to 5.8 mg/l. At station A, the minimum value of dissolved oxygen was recorded, 2.5 mg/l in the month of May, while maximum value was recorded, 5.8 mg/l in the month of December. At station B minimum value of dissolved oxygen was recorded, 2.7 mg/l in the month of February and May, while maximum value was recorded, 5.6 mg/l in the month of December. At station C minimum value of dissolved oxygen was recorded, 2.7 mg/l in the month of May, while maximum value was recorded, 5.8 mg/l in the month of December and graphically represented in fig. no. D. [21] observed the maximum Dissolved Oxygen concentration during winter and minimum during summer in religious

Lake Budha Pushkar near Ajmer, Rajasthan. [22] reported maximum values of DO in winter and monsoon and minimum in summer in Girna Dam of Nashik (M.S.).

Biochemical Oxygen Demand (BOD): Biochemical oxygen demand (BOD) is defined as the amount of oxygen required by microorganisms while stabilizing biologically decomposable organic matter in water under aerobic conditions.

During the first year study (January to December 2004) the BOD values were ranged, 23.3 to 170.3 mg/l. At station A, minimum value of BOD was recorded 26.6 mg/l in the month of April while maximum value was recorded, 168.6 in the month of October mg/l. At station B the minimum value of BOD was recorded, 26.6 mg/l in the month of March, while maximum value was recorded, 169 mg/l in the month of October. At station C minimum value of BOD was recorded, 23.3 mg/l in the month of March, while maximum value was recorded, 170.3 mg/l in the month of October and graphically represented in fig. no. E. [23] reported lower value of BOD in summer.

Chemical Oxygen Demand (COD): COD is defined as the amount of oxygen consumed for the oxidation of organic matter with the help of chemical oxidant. It is used for measuring pollution level of waste water, as most of the organic compounds can be oxidized to CO₂ and water by the action of strong oxidizing agents, regardless of biological substances.

During the first year study (January to December 2004) the COD values were ranged, 56 to 408.8 mg/l. At station 'A', minimum value of COD was recorded, 64 mg/l in the month of April while maximum value was recorded, 404.8 mg/l in the month of October. At station B the minimum value of COD was recorded, 64 mg/l in the month of March, while maximum value recorded, 403.2 mg/l in the month of October. At station C the minimum value of COD was recorded 56 mg/l in the month of March, while maximum value was recorded, 408.8 mg/l in the month of October and graphically represented in fig. no. F. Similar results were reported [24].

Total Hardness: Water hardness is commonly defined as the sum of the polyvalent cations dissolved in water. The most common cations are calcium and magnesium; although iron and magnase may be contribute.

During the course of first year study (January to December 2004) the total hardness values were ranged, 177.2 to 572.2 mg/l. At station A, minimum value of total hardness was recorded, 184.3 mg/l in the month of November while maximum value was recorded, 572.2 mg/l

in the month of May. At station B minimum value of total hardness was recorded, 177.2 mg/l in the month of November, while maximum value was recorded, 572.2 in the month of May. At station C minimum value of total hardness was recorded, 184.34 mg/l in the month of November, while maximum value was recorded, 553.2 mg/l in the month of May and graphically represented in fig. no. G. [25] found the values of total hardness 48.75 mg/ltr during summer and 34.5 mg/ltr during rainy season.

Chlorides: Chlorides are present in all potable waters, usually present in the sewage as a metallic salt. The presence of chloride in natural water can be attributed to salt deposits, discharge of effluents from chemical industries, sewage discharge, irrigation drainage, contamination from refuge leachates and sea water intrusion in coastal areas.

During the first year of study (January to December 2004) the Chlorides values were ranged, 190 to 500 mg/l. At station A, minimum value of Chlorides was recorded, 190 mg/l in the month of August, while maximum value was recorded, 500 mg/l in the month of April. At station B the minimum value of Chlorides was recorded, 194 mg/l in the month of August, while maximum value was recorded, 480 mg/l in the month of April. At station C minimum value of Chlorides was recorded, 190 mg/l in the month of August, while maximum value was recorded, 500 in the month of April and graphically represented in fig. no. H.

The high values of chloride might be due to low water levels during summer [2].

CONCLUSIONS

The present study show detailed physico-chemical characteristics and quality of water in Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region, India.

- BOD, COD, Total hardness and Chlorides in this region were beyond the permissible limit according to WHO and ISI standards for drinking purpose in the year.
- The water of present lake is not useful for irrigation as well as fish culture.
- The water parameters indicate that the lake becomes polluted.
- To improve quality of water there should be continuous monitoring of pollution level.
- To maintain the favorable conditions essential for fish survival, growth and reproduction in Ravivar Peth Lake at Ambajogai Dist. Beed Marathwada Region India.

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