



A STUDY ON PHYSICO-CHEMICAL PARAMETERS OF THALLY LAKE OF TAMIL NADU, INDIA

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ABSTRACT

Present paper deals with the study of Physico-chemical parameters of Thally Lake, (Krishnagiri district, Tamil Nadu). Monthly variations in the physical and chemical parameters such as temperature, pH (6.7 to 8.9), Dissolved Oxygen (5.2-7.5 mg/L), Total Hardness (68 to 190mg/L), Chlorides (11 to 1030mg/L), Phosphate (0.30 to 2.86mg/L) Nitrate (0.88 to 10.40mg/L) etc, were investigated. All the parameters were beyond the permissible limits.

KEYWORDS : Water; Physico-chemical parameters; Thally lake

Introduction

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now, Earth is the only planet having about 70 % of water. But due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants (Ramachandra Mohan 2018). Pollution of water is measured by assessing the physiochemical parameters of water (Ramachandra mohan et al 2012). Physico-chemical analysis is the prime consideration to assess the quality of water for its best utilization like drinking, irrigation, fisheries, and industrial purpose and helpful in understanding the complex processes, interaction between the climatic and biological processes in the water (Salve and Hiwara 2006).

The objective of the present study was to assess the ecosystem of Thally lake, (Krishnagiri district, Tamil Nadu) by estimating the various physicochemical parameters like pH, Temperature, Total Dissolved solids, Total Alkalinity, Total Hardness, Phosphate, Nitrate, Turbidity, Fluoride, Chloride, Dissolved Oxygen, Iron and Conductivity.

Materials and Methods

Study area

The study area is of Thally lake, (Krishnagiri district, Tamil Nadu) which is located in Latitude: 12.5801255°N, Longitude: 77.6641885°E . Study was conducted from September(2016)-December (2017). Water sample from the lake was collected every month. The Water samples were immediately brought to the Laboratory for the Estimation of various Physico- chemical parameters. The physical parameters such as Temperature of Air, Water and pH were recorded by using Thermometer and Digital pH Meter (Systronics) respectively. The transparency of water to light was measured by using Secchi disc. The chemical parameters of water such as Dissolved Oxygen, Total Alkalinity, Hardness, Chlorides, Sulphates and Total Dissolved Solids etc. were determined by standard methods in the laboratory as per the standard method APHA (2005).



Results and Discussion

The data on physico-chemical analysis of Thally Lake water has been given in Table No.1

Physical parameters

Temperature: During the study period water temperature varied from 23.0°C±0.33.0C to 32±0.560C. The maximum temperature (32°C) was observed during the month of September, 2016 and minimum temperature (23°C) was observed during the month of December, 2017. Jayabhaye et al., 2005 and Salve and Hiwara, 2006 observed that during summer, water temperature was high due to low water level and clear atmosphere.

Turbidity: The turbidity ranged from 0.2-13.5 NTU units. The maximum value (13.5 NTU units) observed during the month of January, 2016 and minimum value (3.1 NT units) was observed during the month of September, 2017. Similar result was observed by Manjare et al., 2010 turbidity of water fluctuated from 0.41±0.02 NTU to 3.51±0.72 NTU.

Total dissolved solids [TDS]: During the present study, the TDS wavered from 403 mg/L to 2740 mg/L. The higher value of total dissolved solids found in the month of July (2740 mg/L) and lower value found during the month of October (403 mg/L). Alaka, 2014 reported that the amount of total dissolved solids detected from water sample at Borgaon was 347.16 mg/L to 738.0 mg/L.

Electrical Conductivity [EC] : The electrical conductivity in the water of the pond analyzed during the study period has been found to be fluctuating between 146 and 860 mho/cm. Kashyap, (2016) analysed the Ramnai (Rewa Rural) drinking water for EC and reported that 180 mho/cm.

Chemical parameters

pH: During the present investigation, the pH of the water sample ranged from 6.8 in the month of September , 2016 to 8.9 in the

month of March, 2017. This range indicates that the water is alkaline in nature. Similar finding was observed by Joshi et al., 2009 pH of the Ganga River at Haridwar was slightly alkaline. It ranged from 7.06 to 8.35.

Dissolved oxygen: The Dissolved Oxygen value ranged between 5.2-5.7.5 mg/L. Lowest values were recorded during November 2016 . Meme et al.,(2014) reported the range of Dissolved Oxygen was 6.02 to 7.01 mg/l at Oinyi River, Nigeria.

Biological Oxygen Demand : The Biological Oxygen Demand value ranged between 2-68 mg/L. Lowest values were recorded during November 2016.

Chemical Oxygen Demand: The Chemical oxygen Demand value ranged between 8-288 mg/L. Lowest values were recorded during November 2016.

Phosphate: The phosphate value ranged between 0-0.48 mg/L. Lowest values were recorded during November 2016.

Fluoride: The fluoride value ranged between 0.36-2.2 mg/L. Lowest values were recorded during November 2016.

Iron: The iron value ranged between 0.2-3.4 mg/L. Lowest values were recorded during November 2016.

Total Alkalinity: The Total Alkalinity value ranged between 40-145

mg/L. Lowest values were recorded during November 2016.

Total Hardness: The Total Hardness value ranged between 52-190 mg/L. Lowest values were recorded during November 2016.

Chloride: The Chloride value ranged between 14-102 mg/L. Lowest values were recorded during November 2016

Nitrate: Nitrate content in the water ranged between 0.88-11 mg/L. Lowest values were recorded during November 2016. Simpi et al., 2011 reported that the values of nitrate ranged from 2.1 mg/l to 12.8 mg/l in Hosahalli Tank, Karnataka.

Conclusion

A study of Physico-chemical parameters of Thally lake of (Krishnagiri District, Tamil Nadu) was carried out by taking important parameters like Temperature, pH, Dissolved Oxygen, Total Alkalinity, Total Hardness, Chlorides, Phosphate, etc., for the period of September 2016 to December 2017. In the present investigation pH, Total Alkalinity, Total Hardness, Chloride etc., were beyond the permissible limit. Hence, Thally Lake water is considered as polluted water. The physico-chemical characteristics of Thally lake water suggests that, it is harmful for pisciculture, irrigation and drinking purposes.

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Table 1: Monthly variation in physico- chemical parameters of THALLY LAKE (September 2016 To December 2017)

Months	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Turbidity(NTU)	2.3	2.3	2.1	2.6	3.3	3.0	2.8	3.9	4.3	4.5	6.2	8.8	13.2	13.8	0.4	0.2
pH	8.2	8.0	8.3	7.9	7.4	7.2	8.9	7.0	7.2	7.1	7.0	6.9	6.8	7.0	7.0	6.7
Conductivity (µS/CM)	432.0	432.0	450.0	460.0	490.0	470.0	568.0	860.0	790.0	689.0	452.0	264.0	174.0	146.0	190.0	209.0
Total Hardness (mg/L)	142.0	148.0	144.0	136.0	120.0	120.0	128.0	190.0	174.0	138.0	106.0	89.0	71.0	52.0	68.0	72.0
Calcium Hardness (mg/L)	92.0	96.0	96.0	87.0	76.0	74.0	27.0	52.0	50.0	47.0	38.0	24.0	15.0	11.0	12.0	16.0
Magnesium Hardness (mg/L)	50.0	52.0	48.0	49.0	44.0	46.0	15.0	14.0	14.0	12.0	10.0	7.0	7.0	5.8	6.8	7.7
Chloride (mg/L)	40.0	40.0	41.0	42.0	44.0	44.0	59.0	106.0	102.0	80.0	58.0	36.0	20.0	14.0	16.2	19.5
Total Dissolved Solids (mg/L)	298.0	284.0	292.0	298.0	319.0	305.0	368.0	557.0	548.0	398.0	320.0	162.0	102.0	95.0	123.0	134.0
Sulphate (mg/L)	22.0	11.8	12.2	14.6	18.6	18.0	28.6	65.6	48.0	27.0	20.2	13.0	6.8	6.5	4.2	1.57
Nitrate (mg/L)	2.7	2.2	2.3	2.7	3.7	2.9	7.0	11.9	9.8	5.8	5.2	4.7	3.2	1.4	1.2	0.88
Fluoride (mg/L)	1.3	0.83	0.79	0.90	1.9	0.8	1.7	2.2	2.0	1.2	0.97	0.80	0.71	0.54	0.46	0.36
Iron (mg/L)	0.25	0.20	0.23	0.25	2.7	0.5	1.8	3.4	3.2	2.4	1.8	1.2	0.65	0.60	0.56	0.42
Dissolved Oxygen (mg/L)	5.8	5.6	5.2	5.4	5.6	5.8	6.4	5.6	5.4	6.2	6.8	7.2	7.4	7.5	7.2	7.1
Phosphate (mg/L)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.12	0.14	0.2	0.24	0.48	0.08	0.05
BOD (5 DAYS AT 21 °C)	14.0	10.0	12.0	12.0	15.0	14.0	45	68.0	60.0	42.0	26.0	5.0	2.0	2.0	2.0	2.4
COD	67.0	70.0	73.0	76.0	123.0	121.0	180.0	298.0	288.0	256.0	180.0	21.0	16.0	15.0	15.0	8.0
Total Alkalinity (mg/L)	138.0	142.0	145.0	142.0	140.0	142.0	129.0	113.0	110.0	88.0	64.0	48.0	42.0	40.0	60.0	80.0
Total Coliform/100ML	240.0	30.0	33.0	33.0	40.0	43.0	50.0	452.0	432.0	280.0	140.0	92.0	72.0	68.0	30.0	17.0

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