



An Assessment of Physicochemical Parameters of Tikhi Lake of Dhule District, Maharashtra State

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ABSTRACT

Tikhi Lake is a small manmade water reservoir located on Anvar River near Tikhi village during British govt. in Dhule District of Maharashtra State. The physico-chemical properties of water were studied in January 2011 to December 2012. Tikhi Lake was studied for various physico-chemical properties for three seasons i.e. summer, monsoon and winter. Seasonal changes in the physico-chemical properties of water such as Dissolved Oxygen, Free CO₂, Temperature, PH, Transparency, Turbidity and Hardness

KEYWORDS : water quality, physico-chemical, pH, hardness, turbidity, Tikhi lake

INTRODUCTION

Today scarcity of drinking water is the major problem of the world because water is the important factor for the ecosystem.

Due to the increase of population every country facing the problem of scarcity of natural resources. Especially that of water. Water is the basic need of every living organism and hence use of water needs proper planning and management. So study concern with environmental and ecological sciences are necessary.

The Tikhi lake is 3 km away South from the Dhule city. It has a great storage capacity (69.34 MCFT). It measures the total length of 3 km and width is of 1.5 km. It is multipurpose point tank used for different purposes like drinking water supply, irrigation, fishing and tourism.

The water of Tikhi lake is water is supplied by the succession method to the southern part of the city. The frame work of the water supply method is designed by the famous architecture Sir M. Vishweshwarayya in last century.

About 1-3 thousand acre agricultural land is irrigated by the water of lake of nearby villages and hence the quality of water of Tikhi Lake should be checked at the regular time interval. Due to contaminated water, human population and other living animals may suffer from number of water borne diseases.

For the analysis of physicochemical properties of water the sample of water is collected from the two different stations i.e. S₁ and S₂ in the morning and in mid afternoon 12.30 pm. (two times) in the one liter sample polythene bottle.

The physico-chemical parameter like Temp, PH and Transparency recorded at same time of collection by using Digital thermo-meter, pocket Digital PH meter, Transparency was measured by Sacchi disc, Turbidity with turbidometer. Dissolved O₂ and free CO₂, total hardness of water is estimated by using standard method APHA, AWWA (84) Trivedi and Goel (2).

Materials and method

Study area To evaluate the water quality an effort was made to investigate the water in Tikhi Lake reservoir located on Anvar river near tikhi village in Dhule District of Maharashtra State, India. It lies between 20.786996 N Longitude and 77.774983 Latitude E. The climatic condition of the study area was moderate in summer and winter. The region gets much rainfall from south west monsoon. The place gets most of its rainfall from June to September during the monsoon. In October and November also increased rainfall from the north east monsoon. The water of this Reservoir is used for drinking, agriculture, fishing and tourism.

Collection of sample

In order to determine the water quality index two stations were chosen for sample collection from the reservoir during January 2011 to December 2012 in the first and third week of every month. Some of the results were recorded at the sampling stations whereas the others were recorded in the laboratory, according APHA, 2005, Kodarkar et al., 2008.

Results and discussion

(Results - Tables and Charts are given on separate page at the end of the manuscript)

The study of physico-chemical properties of water is as under study viz. The Tikhi lake where carried out for two years i.e. from January 2011 to December 2012. Month wise and Seasonal Variations are reported in the table No.1 and 2.

Following physico-chemical parameter were analyzed during the course of study: Water temp (°C) Transparency (CM), Turbidity (NTU), PH, Dissolved oxygen (Mg/L), free CO₂ (Mg/L), Total Hardness (Mg/L).

Water Temperature:

The water temp of Tikhi lake during year 2011 received between 19.0 to 29.0 Minimum temp is recorded in the month of Dec. and Maximum in the month of May. In the year 2012 received between 20.0 to 29.0 minimum temp is recorded in the month of Dec. and maximum in the month of May as far as the seasonal variation, the minimum 19.01 ± 2.5°C in the winter of year 2011-12 and the maximum to the extensive of 26.25 + 3.6°C in the summer 2011-2012.

The average temperature of Lake in the year 2011-12 were recorded to be 24.0 ± 5°C.

pH (Hydrogen ion Concentration) :

The PH during the year 2011 ranges between 7.0 to 8.5. The minimum value was recorded in the month of October and the maximum in the month of April. During the year 2012 it range between 7.1 to 9.2 the minimum in the month of December and Maximum in the month of January.

The annual average of the year 2011 was observed to be 7.2 ± 03 and of year 2012 8.9 ± 0.2

Dissolved Oxygen (DO):

The dissolved oxygen of the year 2011 ranges between 5.2 to 6.11 mg/l and minimum value was recorded in the month of Jan. and maximum in the month of June. During the year 2012 the dissolved oxygen ranges from 5.3 to 6.10 mg/l, the minimum in the March and Maximum in the June.

The annual average of year 2011 was observed 6 ± 0.5 and 2012 6 ± 0.2 .

Free CO₂:

The free CO₂ during the year 2011 ranges between 3.8 mg/l to 6.5 mg/l. The minimum value was recorded in the month of July and maximum in the month of December.

During the year of 2012 it was ranges between 3.6 mg/l to 6.8 mg/l. Minimum in the month of July and Maximum in the month of December.

Seasonal variation in the minimum value was recorded 3.8 ± 0.3 mg/l in the monsoon season of the year 2012 and the maximum 6.8 ± 0.48 mg/l in winter season of the year 2012.

The average of year 2011 was recorded to be 4.9 ± 1.6 mg/l and in the year 2012 it was 5.5 ± 1.6 mg/l.

Total Hardness:

The total hardness during the year 2011 ranges between 100 mg/l to 290 mg/l. The minimum value was recorded in the month of March and maximum in the July. During the year 2012, it was ranges between 106 mg/l to 290 mg/l., the minimum in the month of May and the maximum in the month of July.

The annual average of the year 2011 was observed to be 197 ± 80.6 mg/l and of the year 2012 as 205.5 ± 60.1 mg/l.

Transparency:

The transparency during the year 2011 ranges from 9.6 to 60.9 cm. The minimum Transparency was recorded in the month of June and Maximum in the month of October in the year of 2012. It ranges between 9.0 to 78.6 cm. The minimum in the month of April and maximum in the month of September.

The average transparency was observed to the extent of 39.31 ± 2.0 cm in the year 2011 and 37.70 ± 2.0 cm in the Summer Season of year 2012.

Turbidity:

The Turbidity during the year 2011 ranges from 0.9 to 10.0 NTU the minimum in the month of November and maximum in the month of march during the year 2012 ranges from 0.9 to 10.4 minimum in the month of November and maximum in the month of April.

CONCLUSIONS

All the physical and chemical properties of Anvar Reservoir water were within desirable limits. The results obtained from the present investigation shall be useful in future management of the reservoir. The physico-chemical characteristics of reservoir water suggested that there was no harmful to pisciculture, irrigation and drinking water.

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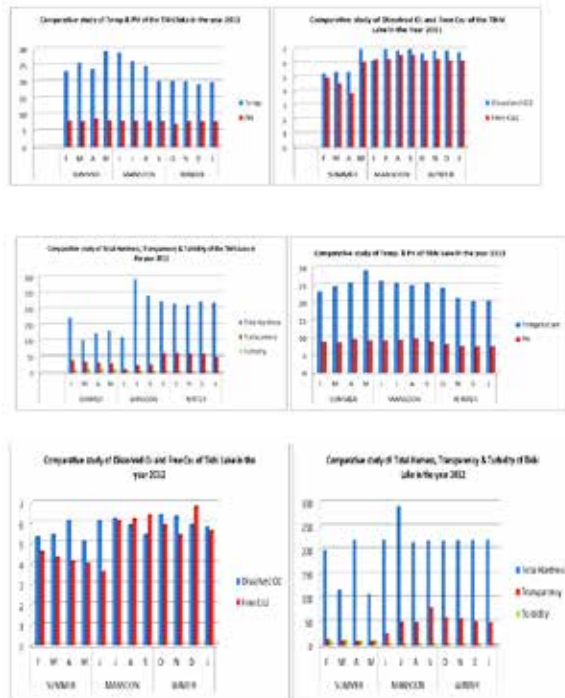
Table No.1: Physico-chemical data of Tikhi Lake during January 2011 to December 2011

Season	Month	Temp.	PH	Dis-solved O ₂	Free Co ₂	Total Hardness	Transpa-rency	Tur-bidity
SUM-MER	F	23.0	7.9	5.2	4.9	170	38.6	8.1
	M	25.5	7.8	5.3	4.5	100	32.6	10.0
	A	23.6	8.5	5.3	3.8	120	30.6	9.2
	M	29.0	8.0	6.9	6.0	130	27.4	9.1

MON-SOON	J	28.6	7.9	6.11	6.2	110	9.6	5.8
	J	26.0	7.9	6.9	6.2	290	21.6	2.9
	A	24.5	7.8	6.8	6.5	240	24.5	2.4
	S	20.0	7.8	6.9	6.5	220	60.5	2.8
WIN-TER	O	20.0	7.0	6.6	6.1	214	60.9	2.8
	N	19.8	7.8	6.8	6.2	210	58.7	0.9
	D	19.0	7.7	6.8	6.1	220	58.1	1.40
	J	19.6	7.7	6.7	6.1	218	48.7	3.6

Table No. 2: Physico-chemical data of Tikhi Lake during January 2012 to December 2012

Season	Month	Tem-perature	PH	Dis-solved O ₂	Free Co ₂	Total Hard-ness	Trans-parency CM	Tur-bidity NTU
SUM-MER	F	23.0	8.7	5.3	4.6	198	12.5	8.5
	M	24.5	8.4	5.4	4.3	116	10.0	10.4
	A	25.5	9.4	6.10	4.1	220	9.0	9.0
	M	29.0	8.9	5.10	4.0	106	9.0	9.5
MON-SOON	J	26.0	8.9	6.10	3.6	220	24.5	4.5
	J	25.2	9.1	6.2	6.1	290	49.0	1.9
	A	24.8	9.6	5.9	6.2	214	48.5	2.4
	S	25.4	8.8	5.4	6.4	218	78.4	2.8
WINTER	O	24.0	7.9	6.4	5.9	217	58.5	2.8
	N	21.0	7.4	6.3	5.4	219	55.1	0.9
	D	20.1	7.2	5.9	6.8	219	50.0	1.4
	J	20.3	7.3	5.8	5.6	220	48.0	1.6



REFERENCES:

- [1] APHA Standard (1985) Methods for the examination of water and waste water (10th Ed.) Washington, DC: American Public Health Association.
- [2] Kumar A. and Bahadur Y. (2009), physico-chemical studies on the pollution potential of river Kosi at Rampur , India. W.J. of agri. Sci. 5(1), 1-4.
- [3] Bhandari N. S., and Nayal K. (2008), E-Journal of Chemistry, 5(2), 342-346.
- [4] Garg D. K., Goyal R. N., and Agrawal V. P. (1990), Ind. J. Envir. Prot., 10(5), 355-359.
- [5] Gupta S., Bhatnagar M. and Jain R. (2003), Physico-Chemical characteristics and analysis of Fe and Zn in tube well water and sewage water of Bikaner City. Asian J. Chem. 15: 727.
- [6] Hutchinson G. E. (1957), A Treatise on Singh S.P., Pathak D. and Singh R. (2002), Eco. Env. And Cons., 8(3), 289-292.

- [7] Jayaraju P. B., Prasadrao G. D. V. and Sharma S. V. (1994), Seasonal variation in Physico-Chemical parameters and diversity in the flora and fauna of the river Munneru, A tributary to river Krishna, (A.P.) India. *Aqua. Biol.* 9, 19-22.
- [8] Kolo R. J. (1996). The assessment of Physico-Chemical parameters of Shiroro Lake and its major tributaries. In: Eyo A. A. (Ed) proc. of the annual conf. of Fisheries Soc. of Nigeria. pp. 262-268.
- [9] McKee J.E. and H.W. Wolf (Eds). 1976. *Water Quality Criteria Publication No. 3-A*, California State Water Resources Control Board.
- [10] Merck E. (1980), *Complex metric Assay Methods Titriplex*. Germany.
- [11] Mustafa M. K. and Omotosho J. S. (2005), An assessment of the physicochemical properties of Moro lake, Kwara State, Nigeria. *African J. of App. Zoo. and Envtl. Bio.*, 7:3-77.
- [12] Ownbey C. R. and D. A. Kee. 1967. Chlorides in Lake Erie. *Proc. Conf. Great Lakes Res. Int. Assoc. Great Lakes Res.*, 10: 382-389.
- [13] Pandey P. K. and Pandey, G. N. (1980), *J. Inst. Engr. India*, 60, 27-34 [5]
- [14] Petak W. J. (1980), *Environ. Managem.* 1980, 4, 287-295.
- [15] Trivedi P., Bajpai A., and Thareja S. (2009), Evaluation of Water Quality: Physico – Chemical Characteristics of Ganga River at Kanpur by using Correlation Study; *Nature and Science*, 1(6)
- [16] Manjare S. A., Vhanalakar and Muley D. V. (2010), Analysis of water quality using physico-chemical parameter Tamdolge tank in Kolhapur international journal of advanced biotechnology and research Vol. 1(2), 115-119.
- [17] Sarkar M., Banerjee A., Pratim P. and Chakraborty S. J. (2006), *Indian Chem. Soc.*, 83, 1023-1027.
- [18] Sharma, M. S. Liyaquat, F., Barbar, D. and Chisty N., (2000), Biodiversity of freshwater zooplankton in relation to heavy metal pollution. *Poll. Res.*, 19(1), 147-157.
- [19] Sinha A. K., Singh V. P. and Srivastava K. (2000), Physico-chemical studies on river Ganga and its tributaries in Uttar Pradesh –the present status. *Pollution and Biomonitoring of Indian Rivers* (ed.) Dr. R. K. Trivedi (Ed.), ABD publishers, Jaipur. 1-29
- [20] Srivastava R. K. and A. K. Sinha. (1996), Water quality of the river Gangaat Phaphamau (Allahabad): Effect of mass bathing during Mahakumb. *Envtl. Tox. Water quality*. 11(1): 1-5.38
- [21] Tare V., Yadav, A. V. S. and Bose P. (2003), *Water Research*, 37,67-77.
- [22] Trivedi R. K. and Goel P. K. (1986), *Chemical and Biological Methods for Water Pollution Studies*, Environmental Publication, India.
- [23] World Health Organization (1993), *Guide lines for drinking water quality-I, Recommendations*, 2nd Ed. Geneva WHO, [www. lenntech. com/ drinking water- standards. htm](http://www.lenntech.com/drinking-water-standards.htm)