



**ANALYSIS OF WATER QUALITY USING PHYSICO-CHEMICAL CHARACTERS, LOWER TERNA RESERVOIR, NEAR MAKHANI, DIST. OSMANABAD, MAHARASHTRA, INDIA.**

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**Abstract:**

Water resources have been most important for all living beings. The study of fresh water resources is called limnology. The Lower Terna Reservoir is located in Osmanabad District near Makhani Village. It is an important water resource for Osmanabad district as well as Latur district. So study of physicochemical analysis of this water resource is need of time. This work presents the study of Physico-chemical Characteristics like Water temperature, TDS, Electronic conductivity, Transparency, pH, Dissolve Oxygen, Free Carbon dioxide, Alkalinity, Total Hardness are analyzed for a one-year duration from June 2018 to May 2019. For analysis, water is collected from different sites of the study area in the last week of month up to one year. The water temperature and pH was analyzed with help of pocket pH meter at site and other parameters are estimated in laboratory by using standard methods. Monthly variations in the physicochemical characters were observed on different sites. The result indicates that the Lower Terna reservoir is pollution free and it can be used for Fisheries, Irrigation and agriculture also, so their is a need of awareness among the people for water conservation and management.

**Keywords:** Lower Terna reservoir, Physico-chemical Characters, Monthly Variation.

**Article History**

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## **Introduction:**

The study of freshwater bodies like river, ponds and lakes is called Limnology. In the branch of limnology, Physico-chemical characters of waters are studied. There are many branches of limnology in which Physico-chemical and biological characters of water are studied. The main aspect of hydro biological study is the analysis of physiochemical parameter. They can help in utilizing the water bodies in particular manner, that is maintenances and management of water bodies and also conserve the aquatic biodiversity. Most of the industries are developed on the bank of freshwater resources and industrial wastes are mostly dumped in the nearest water bodies which increase the toxic level of water, which is dangerous for aquatic ecosystem. In some time, nutrients are washed down to irrigation field and drainage channels are mixed with freshwater bodies. There are serious problems of natural resource because growth of population and economic development has made so. Hence it is very important to do planning, development and management of water. The need for the integrated development and management of the lakes, reservoirs, river basin and wetlands has been recognized not only to harness the optimal benefits of this system but also to maintain the ecosystem that they indicate. Many researchers have worked on physico- chemical and biological characteristics of Rivers and dam water. The regular study of hydrobiology is very important part as they increases the productivity and conservation, also studies the pollution if any.

### **1. Material and Methods:**

#### **Study Area:**

In the given paper we have studied Analysis of Water Quality with respect to Physico chemical Characters of Lower Terna Reservoir, Near Makhani, Dist. Osmanabad, and Maharashtra, India. (Fig. 1) It is situated in 18°01'21.47"N to 76°29'49.57"E Latitude and longitude. The water in reservoir is basically used for Agriculture, irrigation and domestic purposes. There are several researchers who have done work on Physico chemical characters of the water but lower terna reservoir was neglected for the study. The given study was done in one year duration i. e. from June 2018 to May 2019.

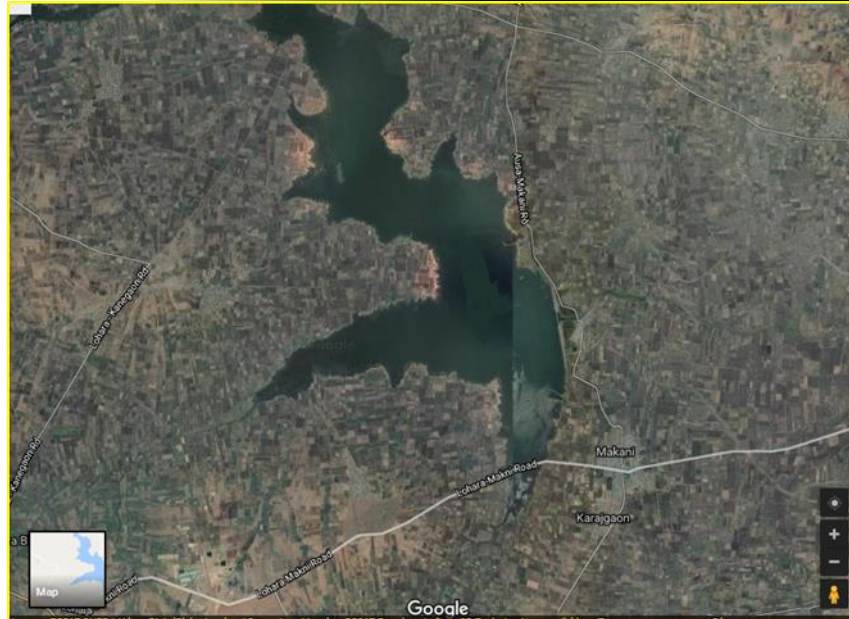


Figure 1: Study area showing sampling sites

The water sample was collected from four sites of Lower Terna reservoir in the morning in can and using BOD bottles for every month. The collected water sample were immediately carried to the laboratory for the analysis of various Physico-chemical characters like water temperature, TDS, Transparency, electronic conductivity, pH, Dissolve Oxygen, free CO<sub>2</sub>, Total Alkalinity, Total hardness of water. Water temperature, pH and TDS was recorded during collection of samples by using pocket thermometer, pH meter and secchi disc. Remain parameter was analysed in laboratory by using standard literature like APHA, Trivedy and Goel etc.

## 2. Results and Discussion:

The results are arranged in below (Tab.1). The Temperature was found in the range of 140c to 400c. The minimum temperature of site A in the month of January and the maximum temperature was also site A in the month of May. The transparency was in the range of 28 to 104. The minimum transparency was site B in the month of June and the maximum transparency was at site D in the month of December. The T.D.S. was in the range of 68 to 192. The minimum value was at site A in the month of November and the maximum value was site D in the month of May. The pH was found in the 6.6 to 8.2 range. The minimum pH was at site C in the month of December and the maximum value was site D in the May. The Dissolve Oxygen was found in the range 3.3 Mg/L to 7.0 Mg/L. The minimum pH was at site A in the December and the maximum pH was at site D in the June month. The free CO<sub>2</sub> was in the range of 1.8 to 5.1 Mg/L. The minimum free CO<sub>2</sub> was found at

site C in the month of July and maximum value was found at site D in the month May. The total alkalinity was in the range of 110 to 176 Mg/L. The minimum range was at site D in the December and the maximum range was at site C and D in the month February. The hardness was in the range of 120 Mg/L to 210 Mg/L. The minimum value at site B in the month December and the maximum value was at site C in the December.

Table 1: Physico-chemical Parameters of Lower Terna Reservoir June2018 to May2019

Months	Collection site	Temperature	Transparency	TDS	pH	DO	CO <sub>2</sub>	Total Alkalinity	Total Hardness
June	A	34.30	29	168	7.7	6.5	2.1	126	142
	B	34.70	28	168	7.9	6.8	2.3	129	141
	C	34.50	29	169	7.8	6.9	2.2	129	143
	D	34.60	30	170	7.8	7.0	2.1	131	145
July	A	27.50	33	105	7.6	6.1	1.9	131	146
	B	27.70	34	105	7.5	6.0	2.0	130	145
	C	27.70	35	107	7.5	6.1	1.8	133	147
	D	27.90	33	109	7.6	6.1	1.9	133	153
August	A	28.70	27	102	7.4	5.1	2.5	145	146
	B	28.80	28	101	7.4	5.0	2.8	146	145
	C	28.70	29	100	7.3	5.0	2.9	146	152
	D	28.70	30	100	7.5	5.0	2.7	146	150
September	A	30.10	32	86	7.1	4.8	2.8	168	129
	B	30.10	33	88	7.0	4.5	2.9	168	123
	C	30.40	34	90	7.3	5.3	3.2	169	125
	D	30.20	34	90	7.3	4.2	3.5	170	127
October	A	32.20	60	76	6.9	4.4	3.5	146	140
	B	32.00	62	78	6.8	4.2	3.8	147	140
	C	32.01	62	78	7.1	4.1	3.6	147	141
	D	32.06	61	78	7.1	4.0	3.7	147	148
November	A	25.40	83	68	6.8	4.9	3.7	136	130
	B	25.30	83	69	6.7	4.9	3.8	138	121
	C	25.30	86	69	6.7	4.8	3.9	138	128
	D	25.40	85	69	6.9	5.0	3.9	135	125
December	A	19.60	101	70	6.7	5.5	3.2	110	127
	B	19.70	103	69	6.7	5.7	3.2	113	120

	C	19.70	104	69	6.6	5.7	3.1	112	122
	D	19.80	104	69	6.7	5.5	3.3	110	128
January	A	14.30	90	81	7.5	6.3	3.6	120	133
	B	14.50	92	83	7.5	6.4	3.5	123	132
	C	14.50	92	87	7.4	6.7	3.5	123	134
	D	14.70	92	87	7.3	6.7	3.3	121	136
February	A	21.10	81	124	7.3	4.7	4.2	170	178
	B	21.30	81	126	7.2	4.7	4.2	172	177
	C	21.50	80	128	7.1	4.9	4.2	176	182
	D	21.70	83	127	7.1	4.8	4.6	176	181
March	A	28.80	58	152	7.6	4.5	4.4	167	180
	B	28.30	58	158	7.5	4.4	4.4	166	179
	C	28.50	59	157	7.4	4.4	4.3	166	181
	D	28.50	60	157	7.5	4.5	4.2	166	183
April	A	35.60	42	176	7.6	5.0	4.7	161	204
	B	35.40	43	176	7.7	5.0	4.5	163	203
	C	35.40	43	179	7.7	4.9	4.8	168	210
	D	35.40	41	178	7.7	4.8	4.8	161	207
May	A	40.20	38	191	8.0	4.2	5.0	158	181
	B	40.10	37	193	8.1	3.9	4.9	159	180
	C	40.10	37	192	8.1	4.1	4.9	159	182
	D	40.10	39	192	8.2	3.3	5.1	159	183



Figure 2: Graph of Physico-chemical characters of water with monthly variation

The monthly variation in physico-chemical characters in different month at different sites graphically represented in Fig. 2. In the given figure, we observed that the Dissolve Oxygen and water temperature showed an invert relationship with each other from the other literature study, it is found that minimum temperature is in the month November to February and the maximum temperature was in the month March to May and somewhat October also and an unfavourable connection between dissolve oxygen the water temperature was interpreted in the given observation. . For determining dissolve oxygen, the temperature and turbidity plays important role Increase the concentration of oxygen that can be dissolved in water is function of temperature. there for dissolve oxygen content of water may vary from place to place and time to time the water hardness was minimum in November to January and maximum in April and May A many factors and geological conditions affect the correlations between different pairs of physico - chemical parameters of water samples directly or indirectly The aquatic temperature effect on the aquatic organism and ecosystem . The seasonal variation of temperature is effect on other parameters

#### **Conclusion:**

In the present research monthly variation in the physicochemical characters was alkaline and the dissolve oxygen is in normal limit, it can be concluded the water quality can be maintained by sustainable use of reservoir. this can be done by regular monitoring and proper management of water reservoir.

#### **References**

1. Abd Ellah R.G et.al (2020): study of Physical properties of inland lakes and their interaction with global warming: A case study of Lake Nasser;46(2):103-115.
2. APHA 1995. Standard methods of examine water and wast water.
3. Chapman J.L. and Reiss M.J. (1995), Book, Ecology: Principles and applications, Cambridge University press, Page no-222 to 227.
4. Dayal Gopal et. al (1992): Limnological studies on Kitham lake of Agra an assessment of water quality. Ind. J. of Env. Prot. 12(2) pp 102-104.
5. Kulkarni Rajendra Rao and et. al (2002): Diurnal variation of physico-chemical aspects of pollution in Khushavathi river at Quepam, Goa, J. Aqua. Biol. Vol. 17(1). pp. 27-28.

6. Patil and Sadu Abbasi SA and et.al (1996): Studies on Limnology of Kuttadi lake (North Kerala), *Eco. Env. Cons.*, 2,17-27.
7. Pawar B. A., Mane U.H. Hydrobiology of Sadatpur lake near Pravaranagar, Ahmednagar District, Maharashtra. *J Aqua Biol.* 2006;21(1):101-104.
8. Prasad N.R. and Patil J.M. (2008): A study of physico-chemical parameters of Krishna River water, *Rasayan Journal of Chemistry (RJC)*, vol.1(4):2008, pp. 943-958.
9. R.K. Trivedy and P.K. Goel (1986): Study of Chemical and Biological method for water pollution . *Envi. Publ.*, Karad(India).
10. Reddy Vasumathi. K, et. al (2009): Study of Physico-chemical parameters of Pakhal Lake of district Warangal, A.P, India. *J. Aqua. Biol.*, 24 (1): 77-80.
11. Trivedi et.al (2009): Study of Water Quality, Physico – Chemical Characteristics of Ganga River at Kanpur by using Correlation Study. *Nature and Science*, 2009;1(6): 91-94.
12. Trivedy RK, PK Goyal and CL Trishal (1998): Practical methods in Ecology and Environmental Science. *Env. Media Publications*, Karad.
13. Venkatasubramani R, Meenambal T (2007). Study of surface water quality in Mattupalayam Taluk of Coimbatore district Tamil Nadu. *Nat. Environ. Poll. Tech.* 6: 307-310