

## Status of water quality of Masala Lake Durgapur, Dist. Chandrapur (M.S.)

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### Abstract

Masala lake is situated 6 Km. away from Chandrapur. The present study has been made to investigate the physico-chemical parameters of the lake. The present study was carried out from the month of Aug. 2006 to Jan 2007. Samples were collected on monthly basis from three sampling stations  $S_1$ ,  $S_2$  and  $S_3$ . The physico-chemical parameters like temp., pH, conductivity, DO, COD, BOD, free  $CO_2$ , chloride, total hardness, Ca hardness, Mg hardness, phosphate, sulphate, nitrate, nitrites, carbonates & bicarbonates were analyzed during the course of study. The study revealed that as compared to site  $S_1$  and  $S_3$ , site  $S_2$  showed higher concentration of sulphate, phosphate and bicarbonates during month of Nov and Dec 2006 and were recorded low during the month of Aug and Sept 2006 may be due to dilution, site  $S_2$  shows more TDS value because of domestic activities. In all there is definite impact on the water quality due to domestic and agricultural activities.

**Keywords:** *Masala lake, Water quality, Physico-chemical*

### Introduction

The water quality of lakes and tanks are deteriorating, mainly due to rapid increase in human settlement nearer to these places. Deforestation, grazing and removal of vegetation cover in the water shed results in silting of reservoir. The agricultural practices in the catchment area not only increased the siltation problem but are also responsible for the addition of large quantities of nutrients, pesticides and organic matter. The knowledge of physico-chemical characteristics of water bodies helps in planning and successful management of water bodies. To fulfill these criteria present investigation has been carried out.

### Materials and Method

Water samples were collected from three sampling stations viz. Station  $S_1$ ,  $S_2$  and  $S_3$  once in a month during study period for estimation of various physico-chemical parameters. Samples were collected and analysed according to APHA (1998). The samples were analyzed within few hours of collection. The pH, Temp. and DO were measured on the spot. Determination of chloride, sulphate, phosphate, carbonates, bicarbonates etc. were carried out by following standard methods given in the Table 1.

### Results and Discussion

Variations of physico-chemical characteristic during Aug 2006 to Jan 2007 are given in Table 2. Temperature

is basically important for its effects on a certain chemical and biological activities. The surface water temperature of the lake ranges from 24.8 °C to 29.4 °C, maximum temp. was recorded in month of Aug. at site S<sub>3</sub> and minimum in month of Jan. at site S<sub>1</sub> and S<sub>3</sub>. The temp. showed an inverse relationship with dissolved oxygen, which is consistent with result reported by Das and Shrivastava (1956) and Khanna (1997). The pH of lake water is alkaline and varied from 7.1 to 8.3. During the period of study, maximum pH value recorded in month of Sept 2006 at site S<sub>2</sub> and minimum was recorded in month of Aug 2006 at site S<sub>2</sub>. Conductivity was minimum 0.25 µmhos in month of Jan 06 at site S<sub>1</sub> and maximum conductivity 0.411 µmhos was observed in month of Sept. 06 at site S<sub>3</sub>. The dissolved oxygen is one of the most important factor in any aquatic system. Self purification of water system depends on presence of sufficient amount of oxygen dissolved in it. The DO content fluctuated between minimum 5.88 mg/ l in Aug 06 at site S<sub>1</sub> and maximum 7.81 mg/l recorded at site S<sub>2</sub> in month of Jan 2007. Bahura (1998) reported an inverse relationship of DO, with temperature. While comparing dissolved oxygen data with that of above authors, it is observed that DO is inversely proportional to temp and free CO<sub>2</sub>.

In present study BOD shows its maximum value 5.02 mg/l in month of Nov 2006 at site S<sub>3</sub> and minimum value 3.42 mg/l at site S<sub>2</sub> in month of Sept 06. The maximum COD value was recorded 15.20 mg/ l during month of Dec 2006 and minimum was recorded 10.50 mg/ l during the month of Sept 2006. TDS showed its high value during the whole study at site S<sub>2</sub> may be due to agricultural and domestic activities. TDS

**Table 1: Method used to evaluate parameters**

S.No.	Parameters	Methods/ Equipment utilised
1	Temp.	Direct measurement on site by thermometer
2	pH	pH meter (model EQ 610)
3	Conductivity	Conductivity meter (model EQ 660)
4	Alkalinity	Titrimetric method
5	DO	Modified Winkler's method
6	CO <sub>2</sub>	Titrimetric method
7	BOD	Modified Winkler's method
8	COD	Modified Winkler's method
9	TDS	Gravimetric method
10	Hardness	Titrimetric method
11	Ca- Hardness	Titrimetric method
12	Mg- Hardness	Titrimetric method
13	Phosphate	Spectrophotometer (EQ. 820)
14	Sulphate	Spectrophotometer (EQ. 820)

Table 2: Physico-chemical parameter of Masala lake during Aug. 2006 to Jan. 2007

S.No.	Mon/Param	Aug			Sept			Oct			Nov			Dec			Jan		
		S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
1	Temp	29.3	29.3	29.4	28.4	28.3	28.1	28.1	28.0	28.1	27.1	27.3	27.2	25.4	25.9	25.7	24.8	24.9	24.8
2	pH	7.2	7.1	7.2	8.1	8.3	8.2	7.98	7.98	7.91	7.98	7.88	7.97	8.01	8.03	7.99	7.3	7.2	7.4
3	Conductivity	0.390	0.398	0.401	0.405	0.410	0.411	0.404	0.409	0.404	0.380	0.382	0.378	0.262	0.279	0.281	0.250	0.260	0.262
4	CO <sub>2</sub>	3.52	3.56	3.41	2.19	2.27	2.38	2.22	2.42	2.38	2.58	2.67	2.59	3.01	3.04	3.03	2.97	2.81	2.86
5	DO	5.97	6.02	5.88	6.00	7.02	6.81	6.03	7.08	6.18	6.58	7.68	7.02	6.89	7.33	6.91	7.09	7.81	7.02
6	Chloride	20.2	21.0	20.5	19.2	20.2	19.3	19.4	20.1	19.0	18.6	19.12	18.4	16.3	16.5	16.2	17.8	17.9	17.7
7	Total Hard.	238	245	231	240	257	245	189	198	186	151	159	157	131	140	139	132	150	139
8	Ca Hard.	192	181	183	180	171	176	132	143	137	112	106	105	89	112	91	98	104	94
9	Mg Hard.	46	64	48	60	86	69	47	45	49	49	51	52	42	38	48	33	46	35
10	TDS	980	1020	996	940	918	860	689	702	691	554	629	562	565	602	557	358	492	371
11	Alkalinity	162	178	162	161	171	158	187	192	180	191	205	189	182	219	179	212	187	182
12	Carbonate	98	102	78	69	90	62	102	56	70	68	64	62	81	78	62	90	86	79
13	Bicarbonate	64	76	83	92	81	96	82	136	110	123	142	127	101	141	114	122	101	103
14	BOD	4.12	4.09	4.08	3.69	3.42	3.54	4.12	4.00	4.02	4.97	4.02	5.02	4.86	3.85	4.76	4.86	3.82	4.09
15	COD	12.8	12.9	13.1	10.5	10.6	11.0	12.9	12.6	12.7	15.0	13.1	15.1	15.2	13.2	15.1	14.1	12.1	12.3
16	Sulphate	1.0	1.08	1.02	1.09	1.08	1.07	1.42	1.68	1.52	1.32	2.41	1.29	1.28	2.62	1.42	1.33	2.12	1.3
17	Phosphate	1.8	1.92	1.81	1.2	1.3	1.25	2.01	2.07	2.01	1.85	2.89	1.84	1.78	2.84	1.61	2.03	2.07	2.05
18	Nitrate	7.02	7.06	7.0	7.04	7.09	7.02	7.62	7.81	7.06	8.03	8.14	8.11	8.29	8.31	8.20	8.89	8.96	8.76
19	Nitrites	0.01	0.03	0.01	0.02	0.03	0.02	0.2	0.4	0.1	1.02	1.04	1.03	1.01	1.31	1.2	1.32	1.48	1.31

\*All values are in mg/l except pH, Temp. (°C) &amp; Conductivity (µmhos)



showed maximum value 1020 mg/l in month of Aug at site S<sub>2</sub> and minimum value was recorded 358 mg/l at site S<sub>1</sub> in month of Jan 2007. Chloride content was found fluctuating between 16.02 mg/l to 21.01 mg/l. The maximum value was recorded in month of Aug at site S<sub>2</sub> and minimum was at S<sub>1</sub> in month of Dec 2006. Total hardness range between 131 mg/l to 257 mg/l. The maximum value was observed in month of Sept 06 at site S<sub>2</sub> and minimum was in the month of Dec 06 at site S<sub>1</sub>. It may be due to presence of carbonates and bicarbonate.

Among the important nutrients Nitrates showed the range of 7.00 mg/l to 8.98 mg/l. The level was maximum in the month of Jan 2007 at site S<sub>2</sub> and minimum was in Aug 06 at site S<sub>3</sub>. The level of phosphate ranges between 1.20 mg/l to 2.89 mg/l, values were maximum in Nov 2006 at site S<sub>2</sub> and minimum in Sept 06 at site S<sub>1</sub>, may be due to dilution factor. Similar study was shown by Sanjeev (1991). Value of sulphate range between 1 mg/l to 2.62 mg/l. The maximum value was recorded in month of Dec 06 at site S<sub>2</sub> and minimum was recorded at site S<sub>1</sub> in month of Aug 06. In present study total alkalinity range between 158 mg/l to 219 mg/l. The maximum value was recorded at site S<sub>2</sub> in month of Dec 06 and minimum was at site S<sub>1</sub> in month of Sept 06. The values are within the permissible limit as suggested by WHO.

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