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Assesment of Water Quality of Ashti Lake with the help of some Chemical Parameters

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ABSTRACT

Water is the prime need of almost all living organisms. It is essence of life; very human existence is totally dependant on water. Water quality is affecting day by day due to over pollution, industrialization, agricultural ingress etc. During present investigation few chemical parameters from water of Ashti lake, Solapur district, Maharashtra were assessed during the period of 1 year from July 2011 to June 2012.

All the parameters have shown seasonal fluctuations. All the parameters were within the desirable limits of tolerance as computed by WHO. The results were discussed with recent literature.

KEYWORDS Chemical Parameters, Water quality, Ashti Lake

INTRODUCTION

Water is an abiotic factor of ecosystem, is a crucial enfotity for very existence of all the living things aquatic as well as terrestrial. The ubiquity of water in biota as the fulcrum of biochemial metabolism rests on unique physical and chemical properties (Wetzel, 2001). Though the science has revealed the survival dependance on water, human, obliviously polluting the water by his activites. The main contributor to the water pollution is human activity including industralization, agricultural ingress, increased sold waste etc. taking this into consideration many workers like Kodarkar (1995), Ragothaman and Trivedi (2002), Sakhare (2002), Verma and Saksena (2010), Hosmani (2012), Patel (2012) etc had studied on different aspects of water quality assessment. In the present study we have attempted to assess the water quality of Ashti Lake by studying few chemicalparameters.

MATERIAL AND METHODS

In the present study few chemical parameters from the water of Ashti Lake were analyzed. The Ashti Lake is historical place where last Anglo-Maratha war was faught between Maratha and British. The lake is situated at the place where exactly that war was faught. The Ashti Lake is the huge lake situated 22 km northeast of Pandharpur city. The lake is spread over area about 1145 Hectare (2830 acres). The water of Ashti Lake is used for drinking and irrigation purpose. The Lake is present at $17^0 47'$ N to $17^0 48'$ N along latitude and $75^0 25'$ E to $75^0 26'$ E along longitude and about 458 m above mean sea level. It is constructed by British Government in 1881 to meet the need of water for drinking and irrigation purpose.

The assesment of water from 4 sites of Ashti Lake was carried out for 1 year from July 2011 to June 2012. The chemical parameters were analyzed by using standard methods prescribed by Kodarkar *et al.* (1998), Ragothaman and Trivedi (2002) and APHA (2012).

RESULTS AND DISCUSSION

During present investgation various chemical parameters were analyzed for 1 year from July 2011 to June 2012.The results are shown in table 1 while the correlation matrix is shown in table 2.

pH : The pH is a measure of acidity and alkalinity of water. During present investigation pH was found to fluctuate from 7 to 8.8. The maximum pH was observed in summer while minimum pH was observed in winter. The summer maxima of pH is due to decrased level of free CO_2 resulted from high photosynthetic activity. Simlar results were obtained by Kataria *et al.* (1996) and Harney *et al.* (2013).

Dissolved Oxygen: During present investigation the dissolved oxygen was found to range in 2.4 mg/L to 8.5 mg/L. Maximum dissolved oxygen was found in monsoon while minimum dissolved oxygen was found in summer. The minimum value of dissolved oxygen in summer may be attributed to the fact that increased temperature results into increased microbial activity which ultimately lead to decreased dissolved oxygen. Our findings are in good agreement with Bhalerao and Khan (2000) and Abdullah *et al.* (2010).

Free CO_2 : The free CO_2 in the water of Ashti Lake was found to fluctuate from 0 mg/L to 20 mg/L. The free CO_2 was maximum in winter while minimum in summer. In January, February and March the CO_2 in free form was absent in the water of Ashti Lake. The increased amount of free CO_2 in winter is attributed to increased decomposition of organic matter. Similar findings were recorded by Rao *et al.* (1981) and Makode (2012).

Total Hardness : Amount of salts present in water is reprsented by hardness. The hardness was found maximum in range fluctuating from 80 mg/L to 218 mg/L. Maximum total hardness was found in summer while minimum total hardness was found in winter. The summer maxima of total hardness is attributed to low water volume and increased density of salts. Our results are corroborating with Narayana *et al.* (2008) and Bade *et al.* (2009).

Total Alkalinity : In the present investigation total alkalinity was found to fluctuate from 104 mg/L to 209 mg/L. The total alkalinity was found maximum in monsoon which may be the result of increased rate of organic decomposition which liberate CO_2. The CO_2 liberated then converts to bicarbonates contributing to amount of alkalinity. Similar results were also obtained by Manjare *et al.* (2010) and Shinde *et al.* (2011).

Chlorides : During present investigation chlorides were found in range from 57.65 mg/L to 132.32 mg/L. Maximum chlorides were found in summer while minimum in winter. The high amount of chlorides in summer is attributed to evaporation effects. Similar results were obtained by Swarnalatha and

Rao (1998) and Makode (2012).

The correlational study of chemical parameters is carried out by using statistical method. The correlation between all the parameters is shown in the correlation matrix (table 2). All the parameters are correlated with each other. The pH is negatively correlated with dissolved oxygen and free CO_2. The dissolved oxygen is negatively correlated with the total hardness and total alkalinity. The free CO_2 is negatively correlated with pH and total hardness. Total hardness is positively correlated with the pH and chlorides. Alkalinity is negatively correlated with the dissolved oxygen. Chlorides are positively correlated with the total hardness and negatively correlated with freeCO_2.

Table: 1- Monthly variation in few chemical parameters of Ashti Lake during July 2011 to June 2012.

Months	Site	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun
pH	I	7.9	7.5	7.4	7.2	7.3	7.3	8.4	8.2	8.5	8.4	8.6	8.0
	II	7.8	7.4	7.4	7.4	7.1	7.2	8.4	8.3	8.1	8.2	8.8	7.9
	III	7.8	7.6	7.3	7.2	7.2	7.1	8.4	8.1	8.4	8.2	8.6	8.1
	IV	7.6	7.2	7.1	7.0	7.1	7.0	8.1	8.2	8.0	8.1	8.3	8.0
D.O.	I	5.5	7.8	8.4	6.2	5.8	4.0	4.1	5.3	3.4	3.9	2.8	5.3
	II	5.4	7.5	8.3	6.5	5.7	4.1	4.2	5.4	3.2	3.8	2.7	5.6
	III	5.3	7.4	8.5	6.3	5.4	4.1	4.0	5.5	3.8	3.6	2.5	5.4
	IV	5.0	7.2	8.1	6.4	5.2	4.0	4.1	5.2	3.5	3.5	2.4	5.5
Free CO_2	I	4.2	3.8	10.4	8.9	16.7	2.4	0.0	0.0	0.0	2.1	3.4	6.8
	II	4.3	3.9	10.5	8.6	16.8	2.6	0.0	0.0	0.0	2.4	3.6	6.9
	III	4.2	3.6	10.1	8.7	16.0	2.8	0.0	0.0	0.0	2.8	3.8	7.1
	IV	4.6	4.0	10.8	8.9	16.8	3.1	0.0	0.0	0.0	2.9	3.9	7.3
Total Hardness	I	143	151	161	160	89	121	139	180	204	214	218	170
	II	142	155	160	162	88	119	135	181	205	210	215	176
	III	140	154	163	164	84	122	136	184	209	209	210	175
	IV	138	159	162	161	80	120	132	180	200	210	208	170
Total Alkalinity	I	130	104	121	119	135	165	160	104	123	189	205	120
	II	128	106	124	119	136	166	162	105	124	189	209	120
	III	129	104	123	120	139	166	163	106	125	190	208	118
	IV	126	101	120	115	135	165	160	103	122	185	205	116
Chlorides	I	94.3	101.6	121.3	105.3	91.3	58.1	61.9	75.1	115.1	125.2	131.4	99.8
	II	98.4	104.8	118.14	103.9	93.32	59.44	66.66	77.8	117.1	123.3	132.3	96.9
	III	99.12	106.3	120.4	101.34	94.15	59.35	63.4	75.1	119.3	124.8	130.1	99.3
	IV	96.35	102.72	119.34	100.3	92.35	57.65	60.06	73.1	114.7	122.2	129.8	95.1

Table: 2- The Correlation Matrix between Chemical Parameters of Ashti Lake during July 2011- June 2012

	pH	D. O.	Free CO_2	Total Hardness	Total Alkalinity	Chlorides
pH	1.00	-0.70	-0.80	0.72	0.44	0.23
D. O.		1.00	0.29	-0.40	-0.70	0.06
Free CO_2			1.00	-0.59	0.02	-0.22
Hardness.				1.00	0.30	0.66
Alkalinity					1.00	0.19
Chlorides						1.00

CONCLUSION

The chemical analysis of water of Ashti Lake during present investigation has revealed that all the parameters studied are in the desirable range for potability, prescribed by the WHO. All the parameters have shown the seasonal variation.The pH, chlorides and total hardness were found maximum in the summer, dissolved oxygen and total alkalinity were found maximum in monsoon while the free CO_2 was maximum in winter. All the parameters are correlated with each other.

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