STUDY OF PHYSICOCHEMICAL PARAMETER OF SALIM ALI LAKE, DIST AURANAGABAD

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Abstract: Water is essential abiotic factor for any biota. Now a day’s lake are increasingy polluted and choked with excessive growth of algae. The present study was carried out from July 2015 to June 2016. During the study period water quality was studied. Various water quality parameters are measured which include pH, air temperature, water temperature, free CO₂, total hardness, calcium, DO, total alkalinity, magnesium. All water parameters were within the permissible limit and suitable for biodiversity.

Keywords: Parameter, Salim Ali Lake, Water Quality.

INTRODUCTION

Salim Ali Lake is located near Delhi gate opposite to the Himayat bagh of Aurangabad city 19°53'57.26"N 75°20'32.23"E. It is having a historical background during Mughal period it was known by Khiziri talab. Later it has been renamed by the great ornithologist, naturalist Salim Ali. Water is one of the most important components of the ecosystem. Better quality of water is described by its physical, chemical and biological characteristics. Due to increased human population, industrialization, and many man-made activities, the natural aquatic resources are causing heavy and varied pollution. Knowing the importance of water for sustenance of life, the need for conservation of water bodies especially the fresh water bodies is being realized everywhere in the world (Gupta P, et.,al 2011).

The rapid growth of urban areas has further affected groundwater quality due to overexploitation of resources and improper waste disposal practices. Hence, there is always a need and concern over the protection and management of surface water Patil P.R. et.,al 2001.

Hence we have taken the main purpose of our study to analyses physicochemical parameters of the water bodies and its impact on water quality.

MATERIAL AND METHODS

To study the water quality, which define as physical and chemical characteristics of water, from Salim Ali Lake, Aurangabad city. Water samples were collected monthly at 2 feet depth from the surface area of the water body from the two sampling points in between 7 to 11 am during the study period.

The parameters studied were pH, air temperature, water temperature free CO₂, total hardness, calcium, DO, total alkalinity, magnesium., Parameters like pH, air temperature and dissolved oxygen was measured at the site, and samples in 5 liter plastic cans were brought to the research laboratory for further estimation by using standard water analysis method described by APHA (1992), Kodarkar (1992), Trivedy and Goel (1986).

Study of Physical parameter

i) pH (Hydrogen ion concentration): -

pH of water was recorded by field pH Meter Hanna –Model during study period on sampling sites.

ii) Temperature

Water and air temperature of the Salim Ali Lake was recorded from July 2015 to June 2016. The temperature was recorded with a centigrade mercury thermometer (graduated from 0.0 °C to 110 °C) in the field.

Study of Chemical parameters

Water samples from the Salim Ali Lake during the study period July 2015 to June 2016 were collected monthly and brought to the research laboratory, Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, for analysis of various chemical parameters.
Chemical parameters like dissolved oxygen, free CO$_2$, total hardness, magnesium, calcium, total alkalinity, were determined by standard methods as described by APHA(1992) Trivedy and Goel (1986), Kodarkar (1992).

i) Total Alkalinity: Total alkalinity of water samples was estimated in laboratory by using standard method as described by Trivedy and Goel. (1986).

ii) Total Hardness: Total hardness of collected water samples was estimated by EDTA method in the laboratory as described by Trivedy and Goel. (1986).

iii) Magnesium (Mg$^{++}$) and Calcium (Ca$^{++}$): Calcium and Magnesium was determined in the laboratory by using titration method as described by Trivedy and Goel (1986). While magnesium was determined as the difference between the total titrant (Ca$^{++}$ + Mg$^{++}$) and the titrant for Ca$^{++}$.

iv) Dissolved Oxygen: Dissolved oxygen was estimated in the laboratory by using Winklers iodometric method as described by Trivedy and Goel (1986).

v) Free CO$_2$: Free CO$_2$ was estimated in the laboratory by using titration method as described by Trivedy and Goel (1986).

### Table 1: Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air temp. °C</td>
<td>29</td>
<td>28</td>
<td>26</td>
<td>24</td>
<td>22</td>
<td>20</td>
<td>19.5</td>
<td>22</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Water</td>
<td>28</td>
<td>27</td>
<td>25.5</td>
<td>23</td>
<td>21</td>
<td>19</td>
<td>18.0</td>
<td>21</td>
<td>24</td>
<td>29</td>
<td>34</td>
<td>29.5</td>
</tr>
<tr>
<td>pH</td>
<td>8.3</td>
<td>8.1</td>
<td>7.9</td>
<td>7.7</td>
<td>7.2</td>
<td>7.0</td>
<td>7.6</td>
<td>8.0</td>
<td>9.2</td>
<td>9.3</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>DO mg/l</td>
<td>7.6</td>
<td>8.5</td>
<td>9.2</td>
<td>9.4</td>
<td>10.0</td>
<td>10.2</td>
<td>9.4</td>
<td>8.7</td>
<td>8.1</td>
<td>7.0</td>
<td>6.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Free CO$_2$ mg/l</td>
<td>6.7</td>
<td>6.5</td>
<td>6.3</td>
<td>5.3</td>
<td>5.0</td>
<td>4.5</td>
<td>6.3</td>
<td>7.6</td>
<td>8.8</td>
<td>9.3</td>
<td>9.6</td>
<td>9.9</td>
</tr>
<tr>
<td>Ca. mg/l</td>
<td>22.4</td>
<td>25.3</td>
<td>29.4</td>
<td>28.2</td>
<td>29.7</td>
<td>27.2</td>
<td>25.3</td>
<td>24.6</td>
<td>27.4</td>
<td>26.3</td>
<td>23.7</td>
<td>21.5</td>
</tr>
<tr>
<td>Mg. mg/l</td>
<td>1.78</td>
<td>1.86</td>
<td>2.41</td>
<td>2.97</td>
<td>2.52</td>
<td>2.68</td>
<td>3.27</td>
<td>2.93</td>
<td>2.64</td>
<td>2.32</td>
<td>2.10</td>
<td>1.97</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>111</td>
<td>120</td>
<td>118</td>
<td>114</td>
<td>120</td>
<td>117</td>
<td>112</td>
<td>123</td>
<td>116</td>
<td>117</td>
<td>109</td>
</tr>
<tr>
<td>Alkanity mg/l</td>
<td>130</td>
<td>125</td>
<td>120</td>
<td>115</td>
<td>110</td>
<td>117</td>
<td>112</td>
<td>121</td>
<td>128</td>
<td>140</td>
<td>151</td>
<td>138</td>
</tr>
</tbody>
</table>

### RESULT AND DISCUSSION

During the study period from July 2015 to June 2016 it was observed that air temperature ranging between 19.5°C to 35°C. The average minimum air temperature was 19.5°C in Jan 2016 and maximum was 35°C in May 2016 (Table 1). Watkar A.M. and Barbate M.P.(2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Shivaji Ubarhande and Jywant dole(2017) similar result from Jeevrekha dam Jalna In the present investigation it was observed that air temperature is minimum in winter season and maximum in summer season. This change in temperature may be related to the photoperiod.

During the study period from July 2015 to June 2016 it was observed that Water temperature ranging between 18.0°C to 34°C. The average minimum water temperature was 18.0°C in Jan 2016 and maximum was 34°C in May 2016 (Table 1). Watkar A.M. and Barbate M.P.(2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar Shivaji Ubarhande and Jywant Dole(2017) similar result from Jeevrekha dam Jalna. In the present investigation it was observed that water temperature is minimum in winter season and maximum in summer season. This change in temperature may be related to the photoperiod.

During the study period from July 2015 to June 2016 it was observed that pH ranging between 7.0 to 9.3 The average minimum pH was 7.0 in Dec 2015 and maximum was 9.3 May 2016 (Table 1).
Concentration of dissolved oxygen July 2015 to June 2016 was between 6.0 mg/L and 10.2 mg/L. The average minimum DO was 6.0 mg/L in June 2016 and maximum was 10.2 mg/L in December 2016 (Table 1).

These results are identical to those reported by Ajit M. et.,al (2012) reported DO is maximum in winter season and maximum in summer season from Deoli Bhorus Dam water. Ubarhande and Jywant Dole(2017) similar result from Jeevrekha dam Jalsa.

Concentration of Free CO2 July 2015 to June 2016 was between 4.5 mg/L and 9.9 mg/L. The average minimum Free CO2 was 4.5 mg/L in Dec 2015 and maximum was 9.9 mg/L in June 2016 (Table 1). Ajit M. et.,al (2012) reported DO is maximum in winter season and maximum in summer season from Deoli Bhorus Dam water, Shahnawas et al., (2009) from Bhadra river of western Ghats (India), shivaji Ubarhande and Jywant dole(2017) reported similar result from Jeevrekha dam Jalsa. Free CO2 concentration was minimum in winter, this might be due to high photosynthesis activity and maximum in summer which may be due to less photosynthetic activity because of low phytoplankton population.

Concentration of Calcium from July 2015 to June 2016 was between 21.5 mg/L and 29.7 mg/L. The average minimum Calcium was 21.5 mg/L in June 2016 and maximum was 29.7 mg/L in Nov 2016 (Table 1). The desirable limits of calcium and magnesium for drinking water are 75 mg/L and 30 mg/L respectively (BIS, 1991). Calcium is helpful for the shell construction and bone building of aquatic organism Rajana et al., (2002).

Concentration of Magnesium July 2015 to June 2016 was between 1.78 mg/L and 3.27 mg/L. The average minimum Magnesium was 1.78 mg/L in July 2015 and maximum was 3.27 mg/L in Jan 2016 (Table 1). Similar result were reported by Arun Kumar(2015) from Chilar Dam, Sajapur Town M.P. india.

Magnesium occur in all kinds of natural water with calcium but its concentration remains generally lower than calcium because dissolution of magnesium reach minerals is a slow process and calcium is more abundant in earth’s crust, Dakshinini and Soni, (1997).

Concentration of Total Alkaneity July 2015 to June 2016 was between 105 mg/L and 123 mg/L. The average minimum Total Alkaneity was 105 mg/L in July 2016 and maximum was 123 mg/L in March 2016 (Table 1) Watkar A.M and Barbate M.P.(2015) reported similar results from Chandrabhaga River in Dhapewada, Dist. Kalmeshwar, Ajit M. et.,al (2012) reported from Deoli Bhorus Dam water.

Concentration of Total Hardness July 2015 to June 2016 was between 110 mg/L and 151 mg/L. The average minimum Total Hardness was 110 mg/L in Nov 2015 and maximum was 151 mg/L in May 2016 (Table 1)Ajit M. et.,al (2012) reported the range of 110.75 mg/L to 120.91 mg/L. from Deoli Bhorus Dam water. Similar result were reported by Bodane Arun Kumar(2015) from Chilar Dam, Sajapur Town M.P. India were Hardness of samples of dam water is in the range of 111.05 to 117.90 mg/L the result shows that, this water is moderately soft.

The total hardness is a contribution of calcium and magnesium salts dissolved in water. Normally these ions are not problematic but at higher concentration increases hardness. The high value of hardness in summer and low value in monsoon show that the water may be suitable for the growth of the aquatic fauna.

Conclusions: An adequate filter system is used before the use, which will remove suspended solids. The results indicate the moderate level of pollutant in water and consumption by humans, wild animals, cattle’s and birds after proper treatment of water.

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