

# Metaphorical Studies of Millponds Aquapura encompassing Coimbatore

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## ABSTRACT

Mill pond water is a most fertile, diverse, interactive and productive ecosystem in the world. For the present research work five sampling sites were identified and the mill pond water quality was analyzed for physio chemical & acoustical characteristics on the monthly basis. The analysis was carried out for the parameters like Temperature, Color, Turbidity, Electrical Conductivity, Total Dissolved Solids, pH, Total Hardness, Calcium, Magnesium, Alkalinity, Sulphate, Nitrate, Chloride, Phosphate, Fluoride, Dissolved Oxygen (DO) and ultrasonic studies. This study discusses some of the physio chemical parameters to analyze the mill pond water quality encompassing Coimbatore.

**KEY WORDS:** Lakes, Water pollution, physio-Chemical analysis, Ultrasonic studies.

## 1. INTRODUCTION

The lakes and rivers which are the lifelines of our culture and economy, are dying because of severe pollution. Lakes that have a high water quality possess properties that make it a high valued resource to society and nature. Lakes often contain high pollution levels relative to the surrounding landscapes and environment. Rivers and streams drain pollutants from the landscape where they concentrate in lakes and other water bodies. Water quality is assessed through the use of many different parameters and methods ranging from simple test kits measuring parameters such as pH to much more complex electronic sensor platforms that can measure a wide variety of parameters over a long time at a high frequency. Therefore the present study was taken to ascertain the quality of lakes in Coimbatore city which the storage for river Noyal the tributary of Cauvery.

## 2. MATERIALS AND METHODS

Present study was carried out by collecting water samples from five different lakes from to the Coimbatore city for the period of five months from January 2015 May 2015. These include Perur Lake, Muthannan Lake, Sengulam Lake, Periakulam Lake and Selvapuram Lake and were denoted as L-1, L-2, L-3, L-4 and L-5. Water samples were collected from the surface layers in the morning on the monthly basis in plastic containers of 5 litre capacity and subjected to physico chemical analysis. The results of the parameters are presented in the form of the graphs and tables. The parameters include Hardness, Dissolved oxygen, pH, Conductivity, Alkalinity, Sulphate, Nitrate, Calcium, Magnesium, Sodium, Potassium, turbidity, Total dissolved solids. The viscosity measurement was also done using an Ostwald's viscometer. The density for the lake waters have been measured using specific gravity bottle of 10ml. Ultrasonic velocities for the lake waters have been measured using the ultrasonic liquid interferometer of frequency 2 MHz manufactured from Mittal enterprises at room temperature 303K with accuracy of ultrasonic velocity of  $\pm 0.02\%$ . Using the above mentioned equipments Ultrasonic velocity  $U$ , Density  $\rho$ , viscosity  $\eta$  for lake waters for various months are measured. From these measured data, the adiabatic compressibility ( $\beta$ ), free length ( $L_f$ ), were calculated using the relations as follows as being used in literature.

$$\beta = 1 / (U^2 \rho) \quad L_f = K_T \beta^{1/2} \text{ Where } K_T \text{ is the temperature dependence constant.}$$

## 3. RESULTS AND DISCUSSION

In the present study, detailed account on lake water parameters have been done in lakes 1 to 5. All the lakes show appreciable pH range (6.5 to 7) which the aquatic creatures prefer to live except the Selvapuram Lake which shows a low level of pH at the bottom level could be due to the accumulated organic matter due to decay and decomposition of vegetation which on biological oxidation given off carbon dioxide which ultimately reduces the pH level (Shobha, 1996). Low value of pH was reported during the monsoon (Koushik and Saksena, 1999; Shastree, 1991).

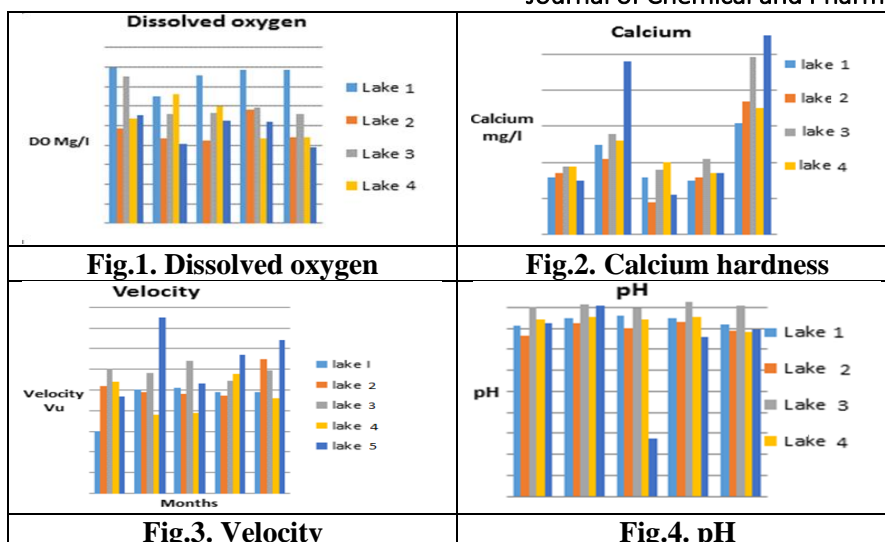
**Table.1. Physicochemical parameters of Millpond Aquapura**

Month	pH	DO (Mg/l)	Sulphate mg/l	Nitrate Mg/l	Calcium Mg/l	Magnesium Mg/l	Chloride Mg/l	Conductivity mho
Jan	8.110	8.000	631.160	1.390	80.000	35.000	7.090	0.280
Feb	8.460	6.500	782.600	5.370	125.000	80.000	5.310	0.760
Mar	8.570	7.600	783.400	2.780	80.000	170.000	8.860	1.640
April	8.500	7.840	710.080	3.320	75.000	165.000	18.610	2.350
May	8.180	7.840	534.000	5.750	155.000	45.000	15.950	0.410
Jan	7.630	4.880	554.840	1.440	85.000	45.000	1.770	0.370

Feb	8.250	4.320	645.160	2.490	105.000	120.000	6.380	1.110
Mar	8.020	4.240	467.960	0.000	45.000	70.000	1.240	0.290
April	8.280	5.840	625.920	2.130	80.000	120.000	21.270	2.590
May	7.880	4.400	926.400	5.610	185.000	135.000	28.360	3.500
Jan	9.000	7.520	676.080	1.490	95.000	15.000	3.190	0.220
Feb	9.110	5.600	854.920	1.250	140.000	145.000	9.040	0.620
Mar	8.960	5.680	698.760	1.250	90.000	35.000	2.480	0.210
April	9.240	5.920	693.200	2.390	105.000	145.000	25.170	1.510
May	9.060	5.600	1,193.280	1.330	245.000	555.000	36.700	1.650
Jan	8.440	5.360	966.840	0.000	95.000	84.000	3.010	0.290
Feb	8.520	6.640	891.860	0.370	130.000	109.000	7.970	0.870
Mar	8.410	6.000	942.960	1.830	100.000	86.000	1.060	0.270
April	8.530	4.320	907.560	0.410	85.000	68.000	32.090	2.220
May	7.820	4.400	892.600	7.380	175.000	148.000	32.090	2.180
Jan	8.260	5.520	1,100.000	0.050	75.000	100.000	3.190	0.280
Feb	9.060	4.080	1,344.000	0.600	240.000	200.000	9.750	1.200
Mar	2.750	5.280	1,202.000	1.260	55.000	215.000	3.010	0.640
April	7.610	5.200	1,183.000	0.570	85.000	175.000	18.790	3.110
May	7.960	3.920	1,606.000	0.580	275.000	485.000	27.480	2.480

**Table.2. Ultrasonic parameters of millpond aquapura**

Perur Lake						
sample	Ultrasonic velocity Vu	Density $\rho$	Viscosity $\eta$	Compressibility $\beta$	Free length Lf	Impedance Z
Jan 2015	1500.00	999.80	9.07439E-04	4.445E-10	4.217E-11	1.522E+06
Feb 2015	1521.80	996.00	9.01676E-04	4.335E-10	4.164E-11	1.516E+06
Mar 2015	1530.20	993.00	9.14830E-04	4.301E-10	4.148E-11	1.519E+06
April 2015	1524.00	997.00	9.18240E-04	4.319E-10	4.156E-11	1.519E+06
May 2015	1517.00	1000.80	9.21324E-04	4.342E-10	4.167E-11	1.518E+06
Muthannan Lake						
Jan 2015	1520.00	999.19	9.48223E-04	4.332E-10	4.163E-11	1.522E+06
Feb 2015	1519.00	999.29	9.48636E-04	4.337E-10	4.165E-11	1.518E+06
Mar 2015	1528.00	998.04	9.71731E-04	4.291E-10	4.143E-11	1.525E+06
April 2015	1508.00	1000.73	9.61724E-04	4.394E-10	4.192E-11	1.509E+06
May 2015	1555.00	998.44	9.97531E-04	4.142E-10	4.070E-11	1.553E+06
Sengulam Lake						
Jan 2015	1521.10	996.85	8.87439E-04	4.336E-10	4.164E-11	1.522E+06
Feb 2015	1518.00	997.92	9.11676E-04	4.349E-10	4.171E-11	1.515E+06
Mar 2015	1534.00	996.33	9.34830E-04	4.265E-10	4.130E-11	1.528E+06
April 2015	1509.00	998.71	9.12405E-04	4.397E-10	4.194E-11	1.507E+06
May 2015	1523.00	997.53	9.11324E-04	4.322E-10	4.158E-11	1.519E+06
Periakulam Lake						
Jan 2015	1518.80	996.85	8.87439E-04	4.349E-10	4.171E-11	1.522E+06
Feb 2015	1517.20	997.92	9.11676E-04	4.353E-10	4.173E-11	1.514E+06
Mar 2015	1524.40	996.33	9.34830E-04	4.319E-10	4.157E-11	1.519E+06
April 2015	1527.60	998.71	9.12405E-04	4.291E-10	4.143E-11	1.526E+06
May 2015	1536.80	997.53	9.11324E-04	4.245E-10	4.120E-11	1.533E+06
Selvapuram Lake						
Jan 2015	1519.00	1001.00	9.88744E-04	4.330E-10	4.162E-11	1.522E+06
Feb 2015	1534.80	999.00	8.91676E-04	4.249E-10	4.123E-11	1.533E+06
Mar 2015	1529.50	999.90	9.44830E-04	4.275E-10	4.135E-11	1.529E+06
April 2015	1516.00	1000.20	9.18405E-04	4.350E-10	4.171E-11	1.516E+06
May 2015	1544.20	998.53	9.19132E-04	4.200E-10	4.099E-11	1.542E+06



The conductivities of all the lakes are within the permissible limit indicating the presence of low concentration of ions and the water is not polluted with respect to conductivity. The low value of DO in the Selvapuram Lake shows the increase in the aerobic bacteria. The exceeding value of the Perur Lake indicated the pollution of water from organic wastes. The calcium and magnesium ions indicates the toxic effect of poisonous elements (Tiwari 2001). High value of hardness in the Sengulam Lake due to the addition of large quantities of detergents and sewage from residential localities (Kaur, 1996). The increase in the chloride content in the Periakulam Lake increases due to the increase in the eutrophication process (Goel, 1980). The tolerance limit for the chloride is 250 mg/L. The chloride content in the water is well within the limits.

#### 4. CONCLUSION

The statistics obtained from the physico-chemical analysis of the water quality in the lakes, clearly indicates that most of the important quantities such as turbidity, total dissolved solids, pH, hardness, alkalinity and sulphate contents in the lake water are in fluctuation of the W.H.O guidelines. This present situation may drastically affect the aquatic and terrestrial organism growth in the water repository and significant pollutants emerge from domestic sections pose an additional threat to the water quality in the near future. Bio remedial measures now can no longer be effective to restore the lake equilibrium. Checking of soil erosion, desilting the lake and creating awareness can be some of the constructive efforts for millpond restoration. To sustain the ecology and aquatic life in the lake, certain measures and planning must be taken by the civic body to combat the pollution rate in the lake.

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