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RESEARCH ARTICLE

CHLORIDES IN DURGHAM CHERUVU, HYDERABAD TELANGANA, INDIA

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ABSTRACT

The present analysis deals with the study of physico-Chemical nature of water from Durgham Cheruvu. Water from 3 sites were collected monthly for one year from August,2012 to July,2013 analyzed for parameters like chlorides, pH, Atmospheric Temperature, Water temperature and Humidity. Throughout the study period Chlorides in water were 21 folds higher than normal value 8.3mg/l according to Livingstone 1963. The Atmospheric and Water temperatures are directly proportional to chloride concentration and the Humidity is inversely proportional to Chloride concentration in lake water. Therefore, the high levels of Cl was influenced by domestic sewage into the lake water in monsoon and evaporation in summer. Thereby there is an urgent need to evolve plan to protect the lake.

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INTRODUCTION

Hyderabad is the land of lakes, among them Durgham Chervu is a fresh water lake located close to Shilparamam Craft Village, Jubliee Hills, Kaavuri Hills, Hitech City. It is 400 years old with an area about 150acres. The lake is popularly known as 'Secret Lake" because it is surrounded on 3 sides by hills with beautiful rock formations all around. These rocks were declared as 'Heritage Rocks" by HUDA due to its natural location. The Hyderabad city is spreading rapidly and its population is increasing. The Telangana Tourism Department is very active and the lake is beautified and developed as tourist spot for boating and others. Recreational activities take place along the borders of the lake. Water spread area is 67 hectares and old ayacut area is around 173 hectares, but presently effective water spread area is 17 hectares and ayacut area is 20 acres only.

Due to population growth and unplanned urbanization and industrialization large quantities of industrial and domestic waste water from colonies located on the fore shore of the lake is directly discharged into the lake for the past 2 decades. So, the present investigation was carried out to study various physio-chemical parameters of Durgham Cheruvu as there is an urgent need to discuss the issue in all its dimensions and evolve national plan for protecting and conserving the available fresh water resources limnological studies on chlorides was done by many workers. Cynthia 1980 worked on Banjara and Nadimi lakes; Johnson 2004 worked on the chlorides of Banjara and Nadimi Lakes. Johnson 2012 worked on the Lakes of Hyderabad. Khan et.al. 2014 Limnological study of Dal Lake Srinagar, J and K.

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MATERIALS AND METHODS

In the present study, water samples were collected from 3 sites i.e., S1- Near the Bund, S2- Middle of the Lake and S3- Towards the Housing Colonies of the Durgham Cheruvu, monthly for a period of one year (August 2012 to July 2013) and water samples were analysed as per the standard procedures recommended: Temperature- Thermometer, pH - Universal Indicator, Humidity – Hygrometer, Cl- Wilcox and Hatcher method (1950).

RESULTS AND DISCUSSION

Limnological survey of Durgham Cheruvu was undertaken with a view to investigate various changes in physico- chemical parameters which are given in Table – I and seasonal variations of chlorides in Table-II.

1) **Chlorides:-** The ecological significance of Cl– lies in its potentiality to regulate osmotic and salinity balance of water. Fresh water normally contain about 8.3mg/l of Cl-

according to Livingstone (1963), but here it may vary greatly under the influence of sewage inputs. At site1 the range was 177.29-276.56 and averaged to 238.83mg/l, at site2 the range was 212.74-312.02 and averaged to 239.33 mg/l, at site3 the range was 248.20-319.1 and averaged to 282.18 mg/l. The total average at the 3 sites was 253.45 mg/l (Table-I).

Morphometry of DurghamCheruvu, Hyderabad, Telangana

Catchment area (Sq.km)	16.5
Capacity at storage level (Cubic Mm)	8.12
Maximum water spread (Sq.Km)	1.7
Maximum depth (m)	13.41
Maximum Length (Km)	2.44
Mean width(km)	1.63

In the seasonal variations of chloride (table-II) the average value in Monsoon was 269.48mg/l winter was 239.97mg/l and summer was 267.10mg/l. So here we noticed that 21 folds (253.45mg/l) of higher concentration of Cl- can be seen in water of Durgham Cheruvu, according to Livingstone 1963 (8.3mg/l). The seasonal variations were in monsoon, the high value -269.48mg/l this may be due to large quantities of domestic sewage into the lake. During summer the concentration of Cl- was 267.10mg/l this may be due to the high rate of evaporation than rainfall.

2) **pH:-** The pH indicates the acidic or the alkaline nature of water quality. At Site1 the range was 7.5-8.5 and averaged to 7.83. At Site 2 the range was 7.0-8.5 and averaged to 7.83 and at Site 3 the range was 7.0-8.5 and averaged to 7.66 (Table 1). The total average at the 3 sites was 7.77.

In the seasonal variations of pH. (Table-II), the total averages during monsoon, winter and summer were 7.8, 8.04 and 7.5. Therefore the water of Durgham Cheruvu was alkaline in nature.

3) **Atmospheric Temperature:-** Temperature is one of the most important parameter for aquatic environment, almost all physical, chemical and biochemical properties are maintained by it. The atmospheric temperature at site1 range was 25-36 ºC and averaged to 29.9 ºC , at site 2 range was 25-35 ºC and averaged to 30 ºC,at site3 range was 25-35 ºC and averaged to 29.9 ºC (Table 1).The total average at the 3 sites was 29.93 ºC.

Table 1. Range and average of chlorides in Durgham Cheruvu

S.no.	Parameter	Site	Range	Average	Total Average
1	Chlorides mg/l	Site1	177.29-276.56	238.83	253.45
		Site2	212.74-312.02	239.33	
		Site3	248.20-319.11	282.18	
2	pH*	Site1	7.5-8.5	7.83	7.77
		Site2	7.0-8.5	7.83	
		Site3	7.0-8.5	7.66	
3	Atmospheric Temperature ^{o}C	Site1	25-36	29.9	29.93
		Site2	25-35	30.0	
		Site3	25-35	29.9	
4	Water Temperature ^{o}C	Site1	23-30	27.33	26.72
		Site2	23-30	26.5	
		Site3	22-31	26.33	
5	Humidity %	Site1	37-59	51.83	51.36
		Site2	35-58	51.0	
		Site3	36-58	51.25	

^{o}pH = no. unit

Table 2. Seasonsal Variations of Chlorides in Durgham Cheruvu

S.no.	Parameter	Site	Monsoon	Winter	Summer
1	Chlorides mgl	Site1	236.68	213.63	248.20
		Site2	278.34	237.56	268.57
		Site3	293.41	268.59	284.54
		Average	269.48	239.97	267.10
2	pH*	Site1	7.64	8.12	7.75
		Site2	7.88	8.13	7.5
		Site3	7.88	7.87	7.25
		Average	7.8	8.04	7.5
3	Atmospheric Temperature ^{o}C	Site1	30.5	27.25	32
		Site2	31.0	27.5	31.5
		Site3	30	27.5	32.25
		Average	30.5	27.42	31.92
4	Water Temperature ^{o}C	Site1	28	24.75	29.25
		Site2	27	24.5	28.25
		Site3	27	23.75	22.6
		Average	27.3	24.33	26.7
5	Humidity %	Site1	57	53.5	45
		Site2	56.25	53	43.75
		Site3	56.25	53	44.25
		Average	56.50	53.16	44.33

* indicates no unit

In the seasonal variations of Atmospheric temperature (Table-2) the total averages during monsoon, winter and summer were 30.5 ºC, 27.42 ºC and 31.92 ºC respectively. The atmospheric temperature was directly proportional to chlorides, as the temperature increased the rate of concentration of chloride also increased in lake water, this may be due to evaporation of lake water.

4) **Water Temperature: -** The water temperature followed Air Temperature rather closely as it is common for small Lakes. The water Temperature at Site1, the range was 23-30 ºC and averaged to 27.33 ºC, at site 2 the range was 23-30 ºC and averaged to 26.5 ºC and at site3 the range was 22-31ºC and averaged to 26.33 ºC (Table-I).The total average at the 3 sites was 26.72 ºC.

In the seasonal variations of the water Temperature (table-II) the total averages during monsoon, winter and summer were 27.3^0C, 24.33^0C and 26.7^0C. Therefore the water temperature was also directly proportional to Chloride concentration as the water temperature increase the chloride concentration also increased.

5. **Humidity:-** It is also one of the major parameter that influences the aquatic environment. It is the amount of water vapor present in the atmosphere and measured by hygrometer. The humidity at site1 range was 37-59% and averaged to 51.83%, at site2 range was 35-58% and averaged to 51.0% and at site3 range was 36-58% and averaged to 51.25%. The total average at the 3 sites was 51.36% (Table 1).

*According t*he seasonal variations (Table 2) the total averages during monsoon, winter and summer are 56.5%, 53.16% and 44.33%, respectively, therefore the humidity is inversely proportional to chloride concentration as the humidity increased the rate of chloride concentration decreased in lake water.

Conclusion

It is concluded from the present study that, the water of Durgham Cheruvu has higher concentrations of chloride. The Atmospheric and water temperatures are directly proportional to chloride concentration and the humidity is inversely proportional to chloride concentration in lake water. Therefore, the high levels of Cl were influenced by domestic sewage into the lake water in monsoon and evaporation in summer. As water quality plays an important role in influencing aquatic phytoplankton and other environmental factors, thereby there is an urgent need to evolve a plan for protecting the lake.

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