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TOTAL HARDNESS IN DURGHAM CHERUVU, HYDERABAD, TELANGANA, INDIA

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ABSTRACT

The present study deals with the physico-chemical nature of Durgham Cheruvu waters. Water samples from 3 sites were collected monthly for one year from August 2012 to July 2013 and analyzed for Total Hardness, Calcium and Magnesium.Total Hardness was 165.28mg/l; Calcium 44.47 mg/l and Magnesium 29.37 mg/l. Based on Total Hardness the water of Durgham Cheruvu were within the permissible limits given by IS : 2012 and WHO : 1985.But according to Glohmann, 1976, Durgham Cheruvu waters are HARD. There is need to protect the waters from becoming very HARD.

Keywords : Durgham Cheruvu, Total Hardness, Calcium and Magnesium.

I INTRODUCTION

Durgham Cheruvu is a fresh water lake located in Rayadurga village, Sherlingampally manadal, Ranga Reddy District of Telangana. It is located close to Shilparamam craft village, Jubilee hills, Kavuri Hills, Hitech city. The lake is popularly known as *'Secret Lake'* because there were no roads to reach the lake and it was kept secret for twenty years.

Limnological studies on lakes were done by many workers. Shailaja and Johnson, 2006 worked on certain plants growing around Osman Sagar Lake;.Devi and Johnson 2015 studied Total dissolved and Suspended solids of Ibrahimpatnam Lake, Telangana; Harini and Johnson 2016 chlorides in Durgham cheruvu, Hyderabad, Telangana; Devi and Johnson 2016 investigated Ionic composition of Ibrahimpatnam Lake, Telangana.

II 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 80 meters 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 analyzed as per the standard procedures recommended: APHA 1995; Trivedy, Goel and Trisal 1987.

III RESULTS AND DISCUSSION

Limnological survey of Durgham cheruvu was undertaken with a view to investigate various changes in parameters like Total Hardness, Calcium and Magnesium, Which are given in Table- 1 and seasonal variations in Table-2, Comparison of Durgham Cheruvu water with WHO 1985 and IS 10500:2012 in Table -3

Table – 1 Range,Average and Total Average of Total Hardness, Calcium and Magnesium in Durgham Cheruvu.

SL.NO	Parameter	Durgham Cheruvu	Range	Average	Total Average
1.	Total Hardness mg/l	Site - 1 Site - 2 Site - 3	120-240 100-210 98-210	174.5 164.17 157.17	165.28
2.	Calcium mg/l	Site - 1 Site - 2 Site - 3	20.44 – 72.10 30.27 – 68.2 20.32 – 74.6	44.80 44.15 44.45	44.47
3.	Magnesium mg/l	Site -1 Site -2 Site -3	17.75 – 4172 13.22 -37.79 13.49 – 41.26	31.56 29.19 27.36	29.37

Table – 2 Seasonal Variations of Total Hardness, Calcium, Magnesium in Durgham cheruvu.

SL NO	Parameter	Durgham Cheruvu	Monsoon	Winter	Summer
1	Total Hardness mg/l	Site - 1 Site - 2 Site - 3	18.5 170.5 175.5	201 186 172.5	137 136 123.5
		Average	177.0	186.5	132.17

2	Calcium mg/l	Site - 1 Site - 2 Site - 3	50.79 42.23 55.92	48.5 48.31 37.84	35.08 41.91 39.59
		Average	49.64	44.88	38.86
3	Magnesium mg/l	Site - 1 Site - 2 Site - 3	32.61 31.16 29.05	37.06 33.46 32.62	25.02 22.94 20.39
		Average	30.94	34.38	22.78

Table – 3 Comparison of Durgham Cheruvu waters with IS 10500 : 2012 and WHO : 1985

SL No	Parameter	Durgham Cheruvu	IS 10500: 2012	WHO 1985
1	Total Hardness mg/l	165.28	200	500
2.	Calcium mg/l	44.47	75	100
3.	Magnesium mg/l	29.37	30	150

3.1 Total Hardness : Total Hardness includes Sulphates Chlorides of Calcium and Magnesium. In the study area. Total Hardness of the water samples at site-1 ranged from 120 to 240 mg/l and averaged to 174.5 mg/l., at site -2 ranged from 100 to 210 mg/l and averaged to 164.17 mg/l and at site- 3 ranged from 98 to 210mg/l and averaged to 157.17 mg/l [Table – 1]. The total average at the 3 sites was 165.28 mg/l which is within the permissible limits according to IS : 2012 and WHO (1985) [Table – 3]. According to Glohmann's 1976 based on Total Hardness waters having 120 – 180 mg/l. of Hardness are classified as Hard.Hence Durgham Cheruvu waters are HARD.

In the seasonal variations of Total Hardness [Table – 2] the average value in Monsoon was 177mg/l, Winter was 186.5 mg/l and Summer was 132.17 mg/l. During winter the Total Hardness concentration was high.

3.2 Calcium : Calcium is found abundantly in all natural waters. In the present study calcium at Site – 1 ranged from 20.44 – 72.10 to mg/l and averaged to 44.80 mg/l, at site 2 ranged from 30.27 – 68.2 mg/l and

averaged to 44.15mg/l at site 3 ranged from 20.32 to 74.6 and averaged to 44.45 mg/l [Table – 1]. The total average at the 3 sites was 44.47 mg/l, Which was within the permissible limit, according to IS : 2012 and WHO 1985 [Table – 3

The Seasonal variations of Calcium are shown in Table – 2 .In Monsoon 49.64mg/l, Winter 44.88mg/l and Summer 38.86 mg/l were observed. High Calcium concentration was observed during the Monsoon season.

3.3 Magnesium: Magnesium is often associated with Calcium in all kinds of water, but its concentration remains generally lower than the Calcium. In the present study Magnesium at site-1 ranged from 17.75 – 41.72 and averaged to 31.56 mg/l, at site -2 ranged from 13.22 – 37.79 mg/l and averaged to 29.19 mg/l, at site 3 ranged from 13.49 to 41.26 and averaged to 27.36 mg/l. The total average at the 3 sites was 29.37 mg/l, which is within the permissible limit, according to IS : 2012 and WHO 1985 (Table – 3)

The Seasonal variations of Magnesium are shown in Table 2 . In Monsoon 30.94 mg/l , Winter 34.38 mg/l and Summer 22.78 mg/l. Low concentration of Mg content was observed during summer.

IV CONCLUSION

It is concluded from the present study that Total Hardness , Calcium and Magnesium were within the permissible limits given by IS: 2012 and WHO : 1985. According to Glohmann , 1976, Durgham Cheruvu waters are HARD. There is need to protect the waters of Durgham cheruvu from becoming VERY HARD.

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