

**DISSOLVED OXYGEN AND OXIDISABLE ORGANIC MATTER IN MIR-ALAM LAKE
HYDERABAD, INDIA**

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ABSTRACT:- The present study deals with the analysis of water parameters such as Dissolved Oxygen and Oxidisable Organic Matter in Mir-Alam Lake. Water from three sampling stations (S1, S2 & S3) were collected monthly for a period of one year from August 2011 to July 2012. The Dissolved Oxygen total average value was observed as 4.35 mg/l. Low values of Dissolved Oxygen causes threat to the Flora & Fauna of the lake. The Oxidisable Organic Matter total average was 4.52 mg/l. The analysis of Dissolved Oxygen and Oxidisable Organic Matter clearly indicates the pollution level in Mir-Alam Lake due to inlet of sewage water and also due to the luxuriant growth of Eicchornia Sps. Hence, proper monitoring and Management Techniques are to be implemented to conserve the Lake.

KEY WORDS: Dissolved Oxygen, Oxidisable Organic Matter, Mir Alam Lake.

INTRODUCTION:- Mir Alam Lake is a reservoir lake with an inflow and out flow of Musi River. It is present adjacent to Nehru Zoological Park, Hyderabad, India. It lies in the coordinates of 17° 21'N, 78° 26'E. It is a single basin lake with some rock eminencies. It was constructed in 1806 and served as a source of drinking water in earlier years. The bund is buttressed type and consists of a series of 21 semi- circular arches and covers a total length of 1024m.

Table 1. Morphometry of Mir-Alam Lake

Catchment Area (km ²)	16.5
Capacity at Storage Level (Mm ³)	8.12
Maximum Water Spread (km ²)	1.70
Maximum Depth (m)	13.41
Maximum Length (km)	2.44
Mean Width	1.63

Limnological studies on lakes were done by Srinivasan et.al (1965) on lakes in and around Hyderabad, Seenayya and Zafar (1979) on Mir Alam lake, Hyderabad. Cynthia (1980) worked out extensively on Banjara & Nadimi Lakes, Mohan (1980) worked on Osman Sagar and Mir Alam Lakes, Mohan and Reddy (1986) studied on Cyanophyceae of two fresh water lakes of Hyderabad. Sudha (1998) worked on two fresh water lakes of Hyderabad and Ruth & Johnson (2012) studied water quality in Nadimi Lake. Johnson and Ruth (2013) carried studies on Banjara Lake.

MATERIALS & METHODS:- Three sampling stations (S1, S2 & S3) were selected to study the parameters in Mir Alam lake. Surface water samples were collected in polythene cans at monthly intervals from August 2011 to July 2012. The water samples were analysed on the same day of collection for Dissolved Oxygen and Oxidisable Organic Matter using standard methods. Dissolved Oxygen – Trivedy, Goel and Trisal (1987) and Oxidisable Organic Matter – Thresh, Beale and Suckling (1949).

Table 2. Range, Average and Total Average of Dissolved Oxygen and Oxidisable Organic Matter in Mir Alam Lake (August 2011 – July 2012)

S.No	Parameter	Station - 1		Station - 2		Station - 3		Total Avg.
		Range	Avg.	Range	Avg.	Range	Avg.	
1.	Dissolved Oxygen (mg/l)	1-10.8	4.85	1-12	4.58	0.8-5.44	3.63	4.35
2.	Oxidisable Organic Matter (mg/l)	2.5-7.2	4.20	2.77-12.14	4.88	2.75-6.18	4.5	4.52

Table 3. Seasonal Variations of Dissolved Oxygen and Oxidisable Organic Matter in Mir Alam Lake (August 2011 – July 2012)

S N	Parameters	Monsoon				Winter				Summer			
		S1	S2	S3	Avg	S1	S2	S3	Avg	S1	S2	S3	Avg
1	Dissolved Oxygen (mg/l)	3.89	4.24	4.54	4.22	4.28	4.07	3.21	3.85	6.39	5.42	3.15	4.98
2	Oxidisable Organic Matter (mg/l)	2.96	4.04	3.79	3.59	4.59	4.51	5.18	4.76	5.05	12.21	4.53	7.26

RESULTS AND DISCUSSION:- The physio-chemical characters of the lake were studied to assess the status of the lake. The present study was conducted to analyse the Dissolved Oxygen and Oxidisable Organic Matter and also to study their Seasonal Variations in the Mir-Alam Lake.

DISSOLVED OXYGEN:- The Dissolved Oxygen refers to the level of free non-compound oxygen present in water or other liquids. It is an important parameter in assessing water quality because of its influence on the flora & fauna of the water bodies. Dissolved Oxygen concentrations are constantly affected by diffusion, aeration, photosynthesis, respiration and decomposition. Dissolved oxygen levels fluctuate with Temperature, Salinity and Pressure changes. The D.O. ranged from 1 – 10.8 mg/l at S1, 1 – 12 mg/l at S2 and 0.8 – 5.44 mg/l at S3. The average values of D.O. were 4.85, 4.58 and 3.63 mg/l at S1, S2 & S3 respectively. The total average of Dissolved Oxygen in Mir Alam was observed to be 4.35 mg/l (Table 2). The seasonal variations were observed with 4.22 mg/l in Monsoon, 3.85 mg/l in Winter and 4.98mg/l in Summer (Table 3).

The phytoplanktons and the macrophytes consume the dissolved oxygen and their decay processes results in the lower levels of Dissolved Oxygen.

OXIDISABLE ORGANIC MATTER:- Oxidisable Organic Matter regulates the growth and multiplication of planktonic organisms. The oxidisable organic value in Mir Alam Lake ranged from 2.5 – 7.2 mg/l at S1, 2.77 – 12.14 mg/l at S2 and 2.75 – 6.18 mg/l at S3. The average values observed were 4.20, 4.88 and 4.52 mg/l at S1, S2 and S3 respectively with a total average of 4.52 mg/l (Table 2). The seasonal variations were observed and the values recorded in Monsoon was 3.59 mg/l, in Winter it was 4.76 mg/l and in Summer it was 7.26 mg/l (Table 3).

CONCLUSION:- The Dissolved Oxygen values alters with the climatic conditions, the pollutants and organic matter in the water bodies. The cloudy conditions, rain and release of wastes from naalas into the lake lead to increased consumption of oxygen which resulted in the lower level of Dissolved Oxygen. The low Dissolved Oxygen values are harmful for the flora & fauna of the

lake. Oxidisable Organic Matter depicts the organic matter which settles down and gets decayed, provides nutrients and promotes the growth of phytoplanktons, microbes and plants leading to eutrophic status of the lake. Therefore there is an urge to conserve the lake with proper Management Strategies.

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REFERENCES:-

- Cynthia M. E. C. 1980 Ecological investigations on phytoplankton of two small lakes situated in Hyderabad development area, Ph. D Thesis, Osmania University, Hyderabad.
- Johnson M. E. C. and Ruth O. K. 2013, Is Lake Banjara on the verge of Death, Asian Journal of Science and Technology, Vol 4, Issue 8, pp 026 – 030.
- Mohan K. S. 1980 Limnology of Osman Sagar and Mir Alam Lake, Hyderabad, Ph. D Thesis Osmania University.
- Mohan K. S. and Reddy N. S. 1986 Cyanophyceae of two fresh water lakes of Hyderabad, proc. Indian Natn.Sci.Acad. B52.5, pp 649 – 656.
- Ruth O. K. and Mary Esther Cynthia Johnson 2012, Water Quality of Nadimi Lake, Hyderabad. J.Aqua, Biol., Vol 27, 48 -50.
- Srinivasan T. K., K. Srinivasan, G. K. Sett P. M. Rao 1965, studies on the raw water characteristics of the lakes in and around Hyderabad. Indian J.Envn.Hlth, 8:177 – 187.
- Seenayya and Zafar 1979, on Ecological study of the Mir Alam Lake, Hyderabad, India. Indian J.Bot, 2:214 – 220.
- Sudha J. G. 1998 Impact of man on the ecology of two fresh water lakes of Hyderabad. Ph. D Thesis, Osmania University, Hyderabad.
- Thresh J. C, Beale J. F, and Suckling E. V. 1949. The Examination of Water and Water Supplies. Ed by Taylor E. W. pp 891.
- Trivedy R.K., Goel P. K. and Trishal C. L. 1987, practical methods in Ecology and Environmental Science. Environmental Publications, Karad, India.

