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Conservation and Management of Nehru Lake at Aurangabad City (MH) India

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ABSTRACT

Contamination is a serious problem as 70% of India's surface water resources and as a growing number of its ground water reserves have been contaminated by biological, organic and inorganic pollutants. The freshwater bodies, viz., ponds, lakes, wells and hand pumps are the principal sources of drinking water in urban arenas. In India, around 80% of the surface water bodies are exposed to pollution due to of raw sewage. The freshwater bodies, viz., ponds, lakes, wells and hand pumps are the principal sources of drinking water in urban arenas. In India, around 80% of the surface water bodies are exposed to pollution due to of raw sewage. Aurangabad is a fastest growing city in Asia, which is the district of Maharashtra State .In Aurangabad Industrialization and urbanization has taken place very rapidly. Nehru Lake is situated in Aurangabad. But now days, due to religious customs, the lake water was being polluted by depositing of domestic waste material, by the run off in the catchment area. During monsoon large amount of organic matter is bring through the runoff and the disposal of Nirmalya and idol immersion. Waste is also thrown into water by garden visitors like paper, polythenes and these are found floating on water of lakes.
In present investigation, water samples from Nehru lake were collected and physicochemical parameters were analyzed to check the pollution load into the Nehru lake for conservation and management of lake.

Keywords: Water quality, pollution, physico-chemical parameters, analysis.

I. INTRODUCTION

In India near about 70% of the water has become polluted due to the discharge of domestic sewage and industrial effluents into the natural water sources, such as, rivers, streams, as well as lakes. The improper management of water systems may cause serious problems in availability and quality of water. The water quality and human health are closely related; therefore, water quality analysis before its usage is of prime importance. (Sangu R.P.S. and Sharma S.K. 1987). Shrivastava *et. al.* (1992) have indicated that urbanization is the root cause of their contamination. The underground water is also becoming unfit for human use because of several factors.
Water is a resource, which has many uses, as domestic, industrial, commercial, etc., including recreation transportation and hydroelectric power. Water also supports all forms of life and affects on our health, lifestyle and economic well-being. More than three quarters of earth's surface is occupied by water and only 2.8 % of

the earth's water is available for human consumption. Fresh water is a finite resource essential for agriculture, industry and even human existence, without fresh water of adequate quality and quantity, sustainable development will not be possible with rapid development in agriculture, mining, urbanization and industrialization activities. The lake water contamination with hazardous waste and wastewater is becoming a common problem throughout India.

At present approximately one third of worlds people live in countries with moderate to high water stress and the world wide fresh water consumption raised six folds between the years 1900 and 1995 more than twice the rate of population growth. Thus the many parts of the world facing water scarcity problem due to the limitations of the water resources coinciding with the growing population. (UNEP 2000).

India is confronting a severe problem of natural resource scarcity, especially that of water in view of population development and economic growth. Water is a prime natural resource, a basic human need and a precious national asset and so its use requires appropriate preparation, growth and management. Referable to the tremendous development of manufacture and agriculture, the water ecosystem has become perceptibly altered in several respects in recent years and as such they are divulged to all local disturbances regardless of where they occur (Venkatesan, 2007). The increasing industrialization, urbanization and developmental activities, to cope up the population explosion have brought the inevitable water crisis. The health of lakes and their biological diversity are directly related to health of almost every element of the ecosystem (Ramesh *et. al.*, 2007).

Aurangabad is a fastest growing city in Asia, headquarter of Marathwada region and one of the district in Maharashtra State .In Aurangabad; industrialization and urbanization has taken place very rapidly. Aurangabad is located at the latitude of 19.53^0 north and longitude 75.23^o east. Topographically it is located in the valley region between the Chauka Hills on the north and Satara Hills on the south. The total area of the city is about 138.5 sq.km. Containing about 9 lacks population as per the 2001 census. (Padme and Khobragade 2019).

Nehru Lake is situated in Nehru Udyan of N-8 CIDCO area, which is one of the oldest lakes in this historical city. The side of this lake such as Nehru Udyan situates a small garden.

In present investigation, water samples from Nehru lake were collected and physicochemical parameters were analyzed to check the pollution load into the Nehru lake for conservation and management of lake.

II. MATERIAL AND METHODS

Water samples were collected from four different sites (Site A, B. C and D) of Nehru Lake in 5L plastic cans. The parameters like Temperature, pH were analyzed at the sampling sites and DO was fixed by adding Winkler's solution at the site and the samples were transferred to the laboratory for the analysis of other parameters and were preserved by adding preservative agent. The parameters were analyzed by Standard methods prescribed by Trivedy and Goel (1984) , APHA (1998) and Kodarkar (2006).

Fig. No. 1: Discharge of wastewater in Nehru Lake

Fig. No. 2: Solid waste dumping at Nehru Lake

III. RESULTS AND DISCUSSION

Table No.1: Average physico-chemical analysis of water samples Nehru Lake

Sr. no.	Parameters	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	Temp	22	31	33	34	23.3	32	30	29	27	25	23.1	22
2	Turbidity (NTU)	32	35	36	37	39.5	44	42.5	45	40	42	39.7	37
3	TS(mg/l)	260	275	256.5	284.75	300	336.25	367	367.75	355	358.5	359	275
4	TDS (mg/l)	175.5	195.7	192.5	198.75	227	245	261.25	251.5	258.5	267.25	273.25	255.5
5	TSS(mg/l)	92.33	88.33	85	72.666	70.33	81.66	91.25	93.32	95.25	70.55	75.75	72.52
6	E C (μmh^{-1})	286.2	299	385.25	390.5	388	385.25	383.25	386.25	384.5	381.5	391.75	396.25
7	pH	8.2	8.3	8.1	7.5	8.2	8.5	8.5	7.5	7.5	7.1	7.3	8.2
8	DO (ppm)	5.2	5.3	4.8	4.8	4.5	5.4	6.5	6.5	7.5	7.4	7.1	8.5

9	**BOD (ppm)**	**11.1**	**11.3**	**13**	**14.2**	**15.3**	**15.3**	**14**	**13**	**12**	**11**	**10**	**10.4**
10	**COD (ppm)**	**15.2**	**18.3**	**20.3**	**30.4**	**23.4**	**20.3**	**22.05**	**24**	**23.3**	**25.5**	**29**	**30**
11	**Alkalinity (mg/l)**	**283.3**	**322.3**	**332**	**324.33**	**318.666**	**310.666**	**287.5**	**269.25**	**275**	**285.75**	**225.25**	175
12	**Total Hardness**	208	219.6	230	257.67	257.66	235.4	185	205.75	195	125	104.5	122.2
13	**Nitrate (mg/l)**	2.23	2.3	2.5	2.3	2.53	2.3	3.5	3.8	3.6	3.4	3.1	3
14	**Phosphate (mg/l)**	0.29	0.29	0.32	0.35	0.2	0.25	0.65	0.75	0.73	0.65	0.67	0.59
15	**Sulphate (mg/l)**	62.26	65.13	61.5	61.5	51.233	48.6	43.15	37.1	46.15	51.75	54.525	68.625
16	**Chlorides (mg/l)**	175.8	178.6	178.8	179.8	174.6	175.1	177.75	178.55	179.25	188.85	191.57	210.3

All the sites water samples had moderate temperature and Turbidity was found above the permissible limit of BIS, IS and WHO. The parameters like pH, Nitrate was found within permissible limit of BIS, IS and WHO in all water samples. Dissolved Oxygen was observed more than their permissible limits, which indicate good quality of water. Higher electrical conductivity was found as compared to water quality standards. The maximum value was recorded as **396.25 μmh^{-1}** in the month of December. It may be due to the discharge of domestic and industrial sewage. The highest BOD observed **15.3 ppm,** which indicates polluted water due to the mixing of domestic high organic load. The highest values of COD was observed as **30.4 ppm** which is more than permissible limits of BIS, IS and WHO as compared to the other sites. It indicates untreated domestic sewage into it. The total alkalinity were observed more in all the water samples as compared to the WHO and

IS standards, but as compared to the BIS standards all were within permissible limit. The highest value of alkalinity was observed **332 mg/l** It indicates the mixing of untreated sewage into it.

IV. CONCLUSION

Some parameters were above the permissible limits prescribed by BIS, IS, WHO and CPCB standard. The huge garbage dumping nearby residential area and the mixing of atmospheric runoff were the major reason behind this. The various anthropogenic activities had been carried out around the lake. It was observed that, the wastewater coming out from public lavatory constructed nearby the lake was directly mixed into the lake. Thereby this oligotrophic water body now turned into mesotrophic; which will be dangerous in future. This indicates lake water was not suitable for drinking purpose as well as unfit for human activities.

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