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Studies on Physico-Chemical Analysis of Water Bodies at Salim Ali Lake Aurangabad

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ABSTRACT

Now a day lakes are degraded by both natural and anthropogenic activities, which deteriorate their quality, and push them to the bank of extinction. In this process of unplanned human developmental activities initiated the need of suitable conservation strategies. Normally, lakes perform the functions directly related to their physical, chemical and biological integrity to decidequality status of water. The present piece of research work is initiated on pollution status at Salim Ali Lake by interference and increase in the population of phytoplankton and microbe. For the detection of level of pollution, physico chemical parameters analyses like, temperature, pH, BOD, alkalinity, carbonate in the water were undertaken.Water samples were taken from three collection stations at Salim Ali Lake. All the three sites of study were enriched with water bloomsof blue green algae.

KEYWORDS : Salim Ali Lake, pollution, water, physico-chemical parameters.

Introduction:

Salim Ali Lake is popularly known as Salim Ali Talab or Abari Houd and located near Delhi Gate Aurangabad.It is situated in the northern part of the city. During the Mughal period it was known as Khiziri Talab.Later on it has been renamed after the great ornithologist, naturalist Salim Ali and also known as birdman of India. Salim Ali Lake comprised a rare and rich biodiversity spot within the city that hosts almost 16 tree species, 11 shrub types, 8 climbers, 32 terrestrial herbaceous plants, 10 genera of algae, 12 species of aquatic herbs. The site is also enriched with 16 aquatic insects, molluscs and crustaceans, nine varieties of fish, 15 species reptiles, seven types of rodents and mammals and 102 types of insects.

The physico-chemical properties of freshwater bodies are characteristic of the geochemical, climatic, geomorphological and pollution conditions (largely) prevailing in the drainage basin and the underlying aquifer. The biota in the surface water is governed entirely by various environmental conditions that determine the selection of species as the physiological performance of the individual organisms. The primary production of organic matter, in the form of phytoplankton and macrophytes is more intense in lakes and reservoirs than in rivers. In contrast to the chemical quality of water bodies, which can be measured by suitable analytical methods, biological quality is a combination of both qualitative and quantitative characterization. The sample collected should be small in volume, enough to accurately represent the whole water body. The water sample tends to modify itself to the new environment. It is necessary to ensure that no significant changes occur in the sample and preserve its integrity till analysed (by retaining the same concentration of all the components as in the water body).There were number of lakes in the state of Maharashtra but only few of them are known. Out of them Salim Ali Lake is one of the important lake build by Malik Amber, situated in the heart of Aurangabad city. It is also called as s beauty of Aurangabad city, since lake is rich in biodiversity. Algae grow abundantly and especially blue-green algae shows variety of diversity in Salim Ali Lake. Salim Ali Lake, Eco biodiversity of blue - green algae and ponds and lakes has been carried out.

Material and method:

The lake consist of algae biomass to study the eco-biodiversity of blue-green algae, three stations of Salim Ali lake were selected for collection of algae and water samples at the monthly intervals for one year during 2013 – 2013. (Trivedi and Goel, 1986). Algae forms were identified with the help of standard literature on algae (Desikachary, 1959).Aline drawing of algae taxa with the help of camera Lucida was done. Algae flora of Cyanophyceae were identified with the help of monographs & recent literature (Desikachary, 1959).Water Analysis:- For study physico-chemical parameters like water temperature free CO_2, dissolved oxizen, BOD, carbonate, bicarbonate, total alkalinity, nitrate, phosphate, sulphate, hardness, chlorides, calcium, magnesium, and total solids.The physico-chemical parameters were analysed by standard methods of APHA(1985) for three stations of Salim Ali Lake during 2013-2014.

Result and Discussion:

During the present investigation minimum and maximum along with average values of physico-chemical parameters of the water temperature plays important role in controlling the occurrence and abundance of blue-green algae. The dissolved oxygen content was the highest during water at all 03 stations of lake as agreed with earlier workers. In present study, BOD fluctuated directly with water temperature and PHof all 03 stations lake (Table 1). Present investigation all 03 stations of lake showed alkaline in nature. The concentrations of nitrate and phosphate were greater at all 03 stations of lake. The concentration of nitrate, phosphate and sulphate indicated the higher concern of pollution at all 03 stations of lake. The abundance of blue-green algae during winter and summer confirmed the earlier observations Moore, et, al 1980.

Table 1. The range and averages values of Physico-chemical parameters at three stations of Salim Ali Lake

Sr.No.	Parameters	Sampling Stations					
		S1		S2		S3	
		Range	Average	Range	Average	Range	Average
01	Water Temperature	18^0-36^0	21.5^0	18-35.3^{0}C	22^0C	18-5^0-36^0C	22^0C
02	PH	7.1-8.5	7.5	7.2-8.4	7.6	7.3-8.6	7.7
03	Free CO_2	00-62	40.5	00-66	35	00-60	30
04	Dissolved Oxygen	3.2-8.9	-4.1	4.2-8.5	4.2	6.5-8.8	5.2
05	BOD	1.63-14.2	8.3	2.50-P4.5	9.4	2.40-16	11.2
06	Carbonate	00-70	30.5	00-100	40.2	00-120	42
07	Bicarbonate	80-240	110	90-300	105	100-340	120
08	Total Alkalinity	150-410	150	120-420	160	150-440	165
09	Chloride	18.60-61.5	22	17-55	23.5	18-86	245
10	Hardness	110-230	130-5	120-250	140.7	126-270	145.5
11	Calcium	20-70.8	30-5	22-80.2	33-7	21.75.5	34.4
12	Magnesium	7-40.5	20.5	8.42-5	21.5	10-45.5	23.2
13	Nitrate	0.02-0.9	0.25	0.03-.85	0.32	0.01-0.92	0.34
14	Phosphate	0.60-0.85	0.73	0.62-.82	0.74	0.7-0.85	0.76
15	Sulphate	0.4-0.75	0.55	0.5-.80	0.62	0.45-0.85	0.63
16	Total Solids	350-820	410.5	420-1100	910	230-8.70	477.5

* All parameters are expressed in mg/l except water temperature and PH

Table 2:Pollutions tolerant species of Blue-green algae 3 stations of Salim Ali Lake

Sr. No.	Genus	Total Points	Stations		
			S1	S2	S3
1	Oscillatoria tenuis	40	-	+	+
2	Oscillatoria princeps	24	+	+	+
3	Oscillatoria formosa	19	+	+	-
4	Oscillatoria brevis	11	+	+	-

Table 3: Pollution tolerant genera of Blue-green algae from 3 stations of Salim- Ali Lake

Sr. No.	Genus	Total Points	Stations		
			S1	S2	S3
1	Oscillatoria	161	+	+	+
2	Phormidium	52	+	+	+
3	Microcystis	42	+	+	+
4	Anabaena	36	+	+	+
5	Lyngbya	28	+	+	+
6	Spirulina	25	+	+	+

*-or + absent/present

During the investigation46 taxa of blue-green algae were recorded at 03 stations of Salim Ali Lake. The 14 species of Oscillatoria was observed in present study indicating to dominant species of Blue-green algae.According to Palmer (1969) six pollution genera were observed at 03 stations of lake. Forth Pollutions tolerant species were observed at 03 stations of lake (Table, 3). The present investigation was studied for one year (2013-14). It deals with physico-chemical parameters of 03 stations and alongwith ecodiversity of blue- green algae.The concentrations of Nitrate, phosphate & sulphate were greater at all 3 stations of lake, so it showed the confirmed organic pollution.4.
Four pollution tolerant species of blue green algae were observed at 3 stations of lake and six pollution tolerant genera were recorded at 3 stations of lake.

Conclusion:
By considering the data it was concluded that, physico-chemical parameters and pollutions tolerant genera and some species of blue green algae confirmed in Salim Ali Lake that the presently lake is organically polluted. It isnecessity to control the pollution of lake and lake is useful to citizens of Aurangabad.

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