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Research Article

STUDY OF PHYSICO-CHEMICAL PARAMETERS OF ALISAGAR AND ASHOK SAGAR LAKES OF NIZAMABAD DISTRICT, TELANGANA

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ABSTRACT

The present study was undertaken to study the physico-Chemical parameters of water. Alisagar and Ashok sagar lakes are the well known lakes of Nizamabad District. They have gained importance as point of tourism. To assess the quality of water and algal growth of these lakes Physico-chemical Parameters like temperature, pH, total alkalinity, Dissolved Oxygen, free CO_2 total hardness, phosphate were carried out seasonally from 2014 to 2015. Data obtained in this study has shown the Co-relation between physico-chemical parameters and occurrence of algae. It was revealed that status of water is oligotrophic and it is suitable for human consumption.

INTRODUCTION

Fresh water lakes are the wealth of a nation being a source of water for both irrigation and drinking. The Lakes are considered important for fresh water bio-diversity conservation. Industrialization and rapid development of human settlements are constant threat to lakes as more and more water is being used for drinking, domestic use and irrigation. Lakes and rivers are most important water resources in India. Lakes are precious to all life on the earth, we must make renewed efforts to conserve and restore lake environment. The Amount of fresh water on earth is very small compared to sea water of which 69.6% is locked up in continental ice, 30% in underground aquifers and 0.26% in rivers and lakes. Lakes in particular occupy less than 0.07% of the world's fresh water. As a result of water pollution the less amount of fresh water to be polluted and harmful to human being and aquatic fauna. Hence we have to assess the quality of water considering Physical and Biological Parameters. Much more research work has been done in regard of the limnological aspects and limnology of the lake providence. In the present work an attempt has been made to assess the quality of water in two lakes of Nizamabad district in Telangana state.

MATERIAL & METHODS

Study Area

Ashok Sagar

Ashok Sagar is a major irrigation lake situated about 7 km from Nizamabad (fig-1). It is situated in the route of famous Saraswathi temple at Basar from Hyderabad. The 15 feet marble statue of Goddess Saraswathi is located in the middle of the lake.

Fig 1 View of Ashok Sagar Lake

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Alisagar

Alisagar reservoir is irrigation project, Park, Tourist attraction which is 13 Km from Nizamabad (Fig-2). The park was opened by the Nizam of Hyderabad in 1928. The forest spread along with summer house, well laid out gardens.

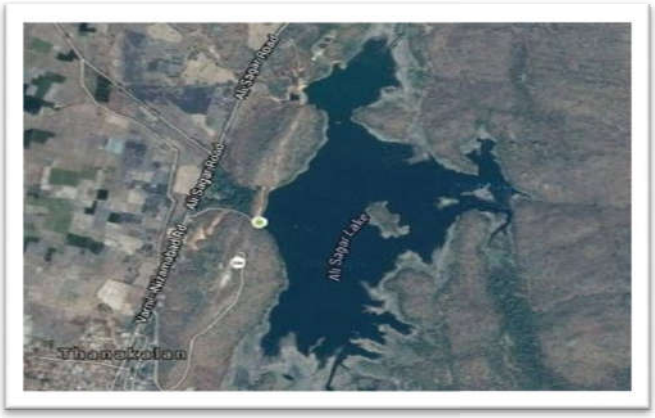

Fig 2 View of Alisagar Lake

Physcio-Chemical Parameters

The following Physico-chemical parameters were observed using standard methods (APHA, 2005). Water temperature, pH, free CO_2, Total alkalinity, Total Hardness, Calcium, Chlorides, Magnesium, Nitrates, Sulphates and Total Dissolved Solids.

Collection of Water Sample:- The water samples and algal samples were collected at monthly intervals from October 2014 to September 2015. The water samples were collected in Plastic Carboys of 2 Liter Capacity. Analysis was done for three seasons-rainy, winter and summer seasons.

RESULTS AND DISCUSSION

The Results of various Physico-Chemical parameters obtained were presented in Table-1 and Table-2.

Table 1 Showing Physico-Chemcial Parameters of Alisagar Lake All values are expressed in mg/l except pH and Temp (^{0}C).

Sl. No.	Parameters	Rainy Season	Winter Season	Summer Season
01.	Water Temperature	23.4	22.6	26.5
02.	Ph	8.1	7.6	8.3
03.	Alkalinity	268	256	274
04.	Calcium	43.6	55.23	47.4
05.	Chlorides	74.2	89.1	99.23
06.	Magnesium	26.4	25.5	27.3
07.	Nitrates	0.72	0.81	0.93
08.	Sulphates	26.4	29.1	32.32
09.	Total Hardness	193	142	180
10.	Dissolved Oxygen	8.32	9.21	9.95
11.	Total Dissolved Solids	356	320	386

Table 2 Showing Physico-Chemcial Parameters of Ashoksagar Lake All values are expressed in mg/l except pH and Temp (^{0}C).

Sl. No.	Parameters	Rainy Season	Winter Season	Summer Season
01.	Water Temperature	22.4	21.2	26.3
02.	pH	7.6	8.1	8.4
03.	Alkalinity	216	221	232
04.	Calcium	48	50	52
05.	Chlorides	62.3	98.2	74.4
06.	Magnesium	23.2	25	29.4
07.	Nitrates	1.2	1.32	1.6
08.	Sulphates	40	42	44
09.	Total Hardness	123	131	160.2
10.	Dissolved Oxygen	7.42	8.4	9.21
11.	Total Dissolved Solids	346	366	410

Water Temperature plays an important role in the solubility of salts and gases. It is one of the significant parameters which control inborn physical quality of water. In this study water temperature fluctuated between 22.2 to 26.4 in both lakes. In both Alisagar and Ashok Sagar lakes temperature of water was measured at +0.1 C accuracy by thermometer at the spot.

The Dissolved Oxygen was fixed before taking to laboratory and analysed by modified wrinkler Azide method. Dissolved Oxygen showed a direct co-relation with bicarbonates, chlorides, calcium, carbonates and Magnesium showed direct correlation with pH. Maintenance of dissolved Oxygen level depends on Oxygen content of water which is of great limnological significance.During summer dissolved Oxygen is higher and lower in rainy season, because of increase of D.O. increase of Phytoplankton and Photosynthetic activity and such an inverse relationship supported by the findings of Ganapathi (1943), Zafar (1964-66), George et al., (1966), Venkateswarlu (1969a), Rao (1972), Seenayya (1971), Sampath Kumar (1977), Khanum (1980), Khan (1983) and Swarnalatha (1994).

pH was estimated by using pocket pH meter at the spot in both lakes. PH value remains alkaline throughout the study period in all seasons. The Physico-chemcial parameters indicate high dissolved oxygen, low nitrate concentrations, indicates the oligotrophic nature of the water body. The lower concentration of chlorides and sulphates indicate water is useful for domestic purpose in Alisagar and Ashok Sagar Lakes. It is one of the significant parameters which control inborn physical qualities of water. The results obtained are in coincidence with the earlier reports *Philipose* 1960, *Saha*i and *Sinha* 1969, *Varma* 1969, *Sharma et al.,* 1981, *Swarnalatha* 1990, *Appa Rao*, 1992 and *Dhere* and *Gaikwad*, 2006.

In Alisagar Total Hardness ranges highest value is 180.00 mg/l, whereas in Ashok Sagar 160.20 mg/l. The increase in hardness can be attributed to the decrease in water volume and increase in threat of evaporation at high temperature, high loading Organic substance, detergents, chlorides and other pollutants.

Total dissolved solids recorded in alisagar is maximum i.e. 386 mg/l. And in Ashok Sagar is 410.00 mg/l in Summer Season and minimum in rainy season. The maximum limit for TDS as suggested by W.H.O. is 500 mg/l (W.H.O. 1998) which indicated that the recorded TDS signifies the polluted lake water. The contamination of domestic Waste Water, garbage and other related wastes in the surface water body can be one among the reasons for increasing in TOS measure. The results obtained are in coincidence with earlier workers. Manikya Reddy P. and Chandra Shekar P., 2008, Srinivas, L., Seeta, Y., Manikya Reddy.P. 2016.

CONCLUSION

On the basis of both physic-chemical characteristics Alisagar and Ashok Sagar Lakes are Oligotrophic in nature. Hence it is

useful for drinking, agriculture and domestic purposes. They were well below the permissible limits of fresh Water standards prescribed by various International Organizations. These both Lakes were alkaline throughout the period of Investigation. During One year of monitoring we came to the conclusion that as day by day different results obtained suggests that both lakes are moderately polluted and it was favorable for growth of phytoplankton. Most of the dominant species of Phytoplankton were not considered as harmful and dangerous for human health. It is recommended that the proper maintenance of water bodies is necessary. Proper sanitation measures and environmental education to public care are essential to keep these water bodies clean and safe. A few efforts like diversion of sewage, presentation of leaching of nutrients from catchment area through plantations would definitely yield healthy and hygienic and sustainable environment.

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