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Studies on Bacillariophyceae of Shahpura Lake, Bhopal

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Abstract: ***The present investigation deals with the studies of Bacillariophyceae or Diatoms population in Shahpura lake of Bhopal and its effect on water quality. Samples were collected monthly from December 2008 to November 2010 from two sampling stations (Manisha Market Park and Dhobi Ghat area) at different depth : epilimnion and hypolimnion layer. During the study period 12 genera of Bacillariophyceae were identified, they are Amphora, Cyclotella, Cymbella, Diatoma, Fragilaria, Gomphonema, Melosira, Navicula, Nitzschia, Pinnularia, Synedra, Tabellaria. The maximum density of Bacillariophyceae was recorded during summer, while minimum was recorded during winter.***
Keywords: Bacillariophyceae, Epilimnion, Hypolimnion

I. INTRODUCTION

Bacillariophyceae (Diatoms) are useful in pollution studies because they are relatively more selective than other algal groups. They are unicellular algae characterized by having cell wall of silica. The wall consists of two valves that have more or less flat surface, held together by a band or girdle.

They are found in freshwater and marine habitats, and also on moist soil surfaces. Shahpura lake is located at the South-East end of Bhopal. This is sewage polluted lake. The distribution of diatoms was closely related to lake water, pH and related factors (Saxena 1998)[7], so they are good indicators of water quality. Diatoms can be used as indicators of past and present environment conditions in aquatic ecosystem.

This is because many diatom species have clearly defined, and frequently narrow, preferences for particular habitats and water quality conditions. In addition, diatoms are abundant and secrete a siliceous cell wall which can preserve in sediment, and which can be used to hind-cast some important aspects of water quality and habitat condition. Changes in diatoms species composition along dated sediment cores can thus be highly valuable for determining whether the contemporary conditions of an aquatic water body within the range of natural variability (Kumar et. al., 2014)[2]. Analysis of diatom species assemblages has also led to substantial advances in the understanding of human impact on aquatic habitats and water quality on timescales ranging from sub decadal to millennial.

II. MATERIAL AND METHOD

The study of Shahpura lake was carried out for a period of 24 months between December 2008 and November 2010. Samples were collected on monthly intervals from all two sites were selected. One site was Manisha market park and the other near the Dhobi ghat region. The monitoring was usually carried out between 10 AM to 4 PM. For the monitoring of bottom layer, depth sampler (Ruttner's water sampler) was used.

A. Qualitative and Quantitative Enumeration of Phytoplankton

1) *Qualitative Analysis:* Qualitative analysis of phytoplankton was done by hauling plankton net horizontally several times in lake to get a random sample, then sample were taken in to plankton bottles and 1 ml lugol was added to them.
2) *Quantitative Analysis:* Quantitative enumeration of phytoplankton was carried out by passing 40 litre of lake water through a plankton net from surface and 12 litre of lake water through a plankton net from bottom (hypolimnion).

The filtered sample was collected in plankton bottles of 50 ml after adding 1 ml Lugol's iodine solution. For the Quantitative estimation of phytoplankton, drop count method is preferred using a standard calibrated dropper. The identification of phytoplankton was done with the help of standard works viz., Ward and Whipple (1966)[10], Phillipose (1967)[6], Adoni (1975)[1], Palmer (1980)[5] etc.

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III. RESULT AND DISCUSSION

A. *Qualitative Analysis*

In Shahpura lake during the study period 12 genera of Bacillariophyceae were identified at Manisha Market Park area.
The following genera were found
Amphora, Cyclotella, Cymbella, Diatoma, Fragilaria, Gomphonema, Melosira, Navicula, Nitzschia, Pinnularia, Synedra, Tabellaria.
The higher density of phytoplankton was observed during summer season while the lower density was observed during winter season.

B. *Quantitative Analysis*

In the epilimnion layer the maximum density of Bacillariophyceae was recorded as 2625 units/lit during summer (June'2010) while minimum was recorded during winter. In the hypolimnion layer the maximum density was recorded as 4730 units/lit during summer (June'2010), while minimum was recorded during winter. The dominant species of this group was *Navicula*.
In the present study, the higher growth of diatoms was found to be markedly influenced by the duration of sunshine with high values of pH. The observations are in similarity with other previous findings reported by other researchers; diatoms are usually abundant in the alkaline water (Phillipose, 1967)[6]. The distribution of diatoms was closely related to lake water, pH and related factors (Saxena 1998)[7]. It required higher temperature, more turbidity, silicates, free CO_2, alkaline water and dissolved organic matter as has been reported earlier by Mahajan and Mahajan (1988)[3], Saxena (1990)[8], Nawange (1993)[4] and Tamot (1996)[9]. The present study was confirmed with earlier findings.

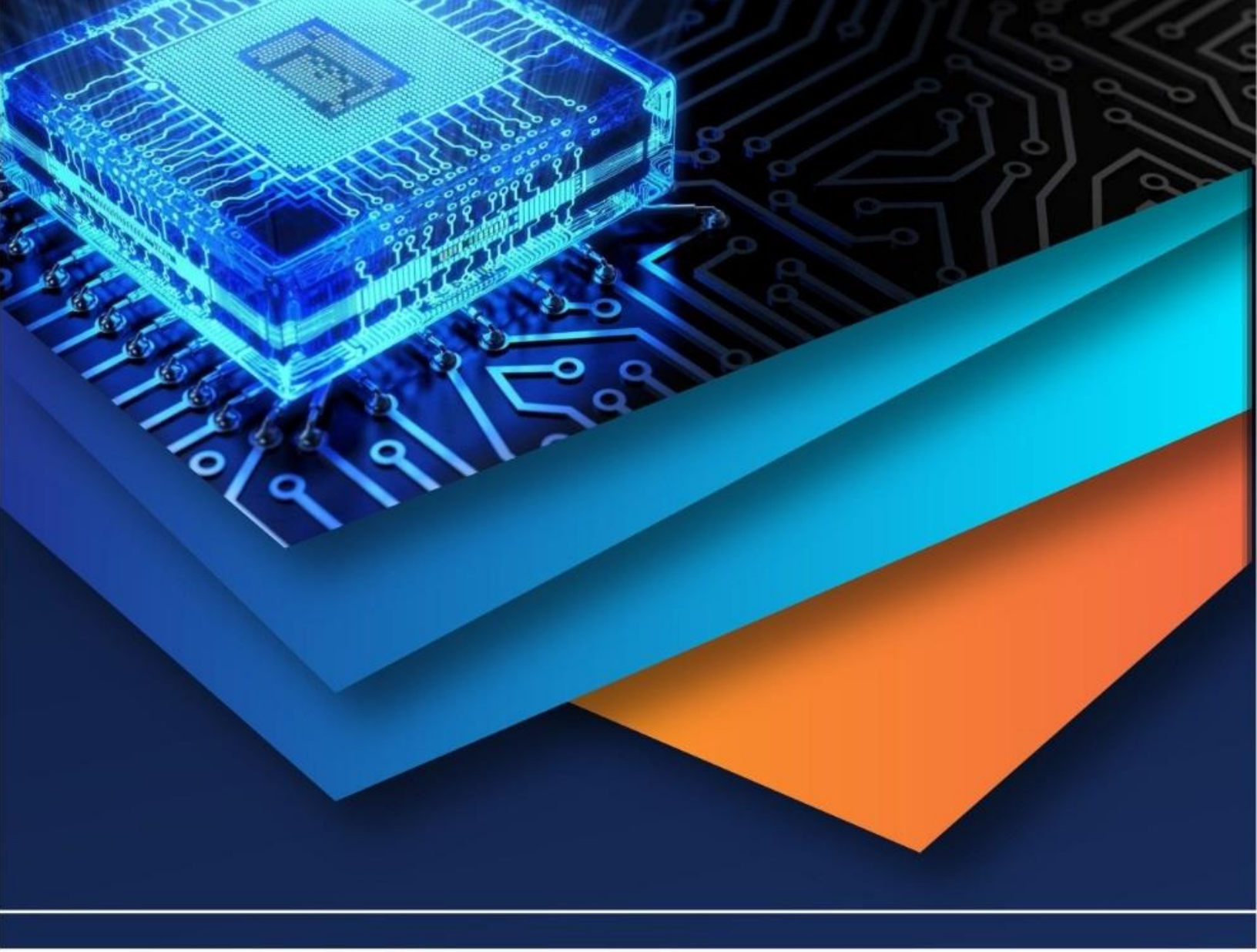
IV. SUMMARY AND CONCLUSION

Shahpua lake, Bhopal is highly polluted lake, this sewage polluted lake requires a very good and strict maintenance policy. In the study period all the pollution indicator species of Diatoms were identified. The dominant species of this group was *Navicula*, which is known as sewage pollution indicator diatom.

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