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STUDENT RESEARCH PROJECT

A BRIEF REPORT

Submitted through

Internal Quality Assurance Cell, J. M. Patel College, Bhandara

Study of Physico-chemical Parameters of Khamb-Talao, Bhandara, in relation to Eutrophication Status

By

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A RESEARCH PROJECT

FUNDED BY

PRINCIPAL

J. M. Patel Arts, Commerce & Science College, Bhandara

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CERTIFICATE

I hereby certify that the **Student Research Project** entitled **"*Study of Physico-chemical Parameters of Khamb Talao, Bhandara In relation to Eutrophication Status.*"** submitted to (**Through Internal Quality Assurance Cell**) J.M. Patel Arts, Commerce & Science College, Bhandara for inculcating a research temperament among the Science Students embodies the result of bonafide research work carried out by **Ms. Komal A. Jangale and Mr. Manojkumar D. Zalke** (B.Sc.Sem-VI ,CBZ) under the Mentorship of Dr. Veena M.Mahajan, Asst. Professor, Department of Zoology.

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We are thankful to Dr. S.G. Kalbande, Head, Department of Zoology, for providing Laboratory facilities

We are grateful to our Mentor Dr. Veena M. Mahajan for her guidance and encouragement.

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Study of Physico-chemical Parameters of Khamb-Talao, Bhandara In relation to Eutrophication Status.

A Research Project carried out under the initiative of IQAC, J. M. Patel College, Bhandara

We carried out this Research Project - ***Study of Physico-chemical Parameters of Khamb Talao, Bhandara In relation to Eutrophication Status*** - under the Mentorship of Dr. Veena M. Mahajan, Assistant Professor, Department of Zoology. The project was started in the month of April 2019 and completed in the month of June 2019.

Introduction

Freshwater is an important resource and essential for life. Some major problems that humanity is facing in the twenty-first century are related to water quantity and water quality. "Eutrophication" is the excessive enrichment of surface water with nutrients corresponded by high production of autotrophs, especially algae and Cyanobacteria. The high productivity leads to high respiration rates, resulting in hypoxia or anoxia in poorly mixed waters. Low Dissolved Oxygen (DO) causes the loss of aquatic organisms. The undesirable overgrowth of phytoplankton and their subsequent death forms a greenish slime layer over the surface of water body, which restricts the light penetration. The present study was under taken on the Khamb–Talao, a fresh-water lake of Bhandara town which is supposed to be over 300 years old. But due to regular dumping of domestic sewage, the pond has become highly eutrophic and polluted.

Material and Methods

In the present study an attempt was made to assess the degradation of the water of Khamb –Talao for checking the pollution status. During the present study, water samples were collected from sampling points in a sampling bottle, to assess their physical and chemical qualities. pH, temperature, turbidity, DO, CO_2, BOD, COD, Hardness, Chloride, Phosphates, Nitrates were analyzed according to the standard methods described in (APHA, AWWA WPCF - 1989) Kodarkar. The samples were analyzed by Winkler's method with azide modification.

Results and Discussion

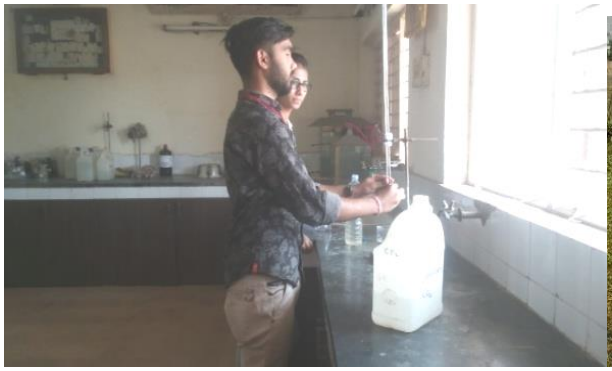
Macrophytes were surveyed and collected from the littoral zones of this tank. The macrophytes were observed throughout the period of investigation. Different species were recorded belonging to four group i.e. Free – floating, Rooted – floating, Submerged species and Emergent species.

Four Free floating species belonging to the Araceae, Lythraceae, Potederaceae, Onagraceae families were found. They mainly include tiny and delicate plants and covered practically entire surface of water. Free floating species such as *Pistia stratiotes*, *Lemna minor*, *Trap*a *natans*, *Eichhorni*a *crassipes etc.* were found to be present in the water of the lake. Rooted floating species belonging to 3 families i.e., Typhaceae, Convolvulaceae, Poaceae. Rooted-floating macrophytes are represented by 3 species. They are rooted in mud along the margins of the lake and send out long creeping and floating stems. Rooted floating species such as *Typha angustata*, *Ipomoea aquatica* etc. were found in the lake.Submerged species belonging to 1 family i.e., Ceratophyllaceae, Submerged species recorded such as *Certatophyllum demersum* were also found. They are deeper in the littoral zone of tank and are fragile thin stemmed water weeds rooted but totally submerged. Emergent species belonging to family i.e. Cladophoraceae were seen and their presence recorded. Emergent macrophytes represented by 1 species –Pithophora- were detected in the water body. They remain firmly lower in the substratum of the lake.

Plate I

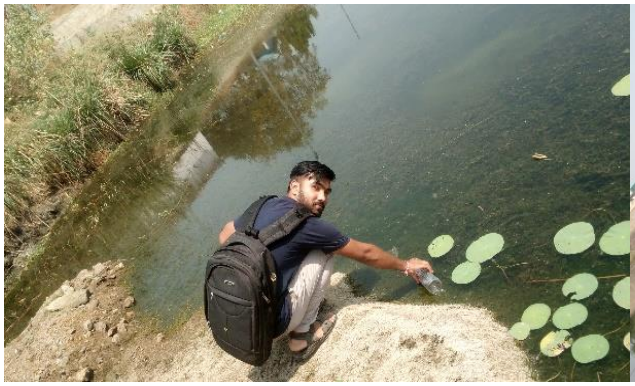
Khamb-Talav, Shiva Temple side

Eutrophication of the lake



Testing of samples

Aquatic macro flora



Sample Collection

Sample Collection

Plate I Eutrophication status of Khamb-Talao, Bhandara.

Conclusion

The value of alkalinity and hardness was found to be very high in concentration, ultimately affecting the flora and fauna of the lake. It has been found that the eutrophication is a result of water pollution. The water gets polluted due to the dumping of domestic and other waste in to the lake by the local people. The illegal colonies that have come along the periphery of the lake discharge the sewage water in to the lake. This affects the growth of fish species and day by day the production rate of fish has decreased because of human interference.

Macrophytes are also involved in ecosystem processes such as bio mineralization, transpiration, sedimentation element cycling, materials, transformations and release of biogenic trace gases into the atmosphere. The fishes which are commonly found in the reservoir are Catla, Rohu, Mrigal but eutrophication has brought down the quantity of the fish in the reservoir. Excess macrophytes has reduced the variety and quantity of aquatic flora and fauna.

Recommendations

i) A retention wall should be constructed to protect the water body.

ii) Immediate steps need to be taken to divert the sewage water currently let into the tank.

iii) Fish breeding project could be started there. Besides keeping it clean, these would also help to generate revenue.

iv) Lake water quality analysis should be carried out from time to time to monitor the rate and kind of contamination.

v) A regular environmental monitoring programme must be conducted in nearby colonies to create awareness towards the importance of the lake for environmental protection and ground water table.

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