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HALALI RESERVOIR RESTUDY THE SEASONAL VARIATIONS IN PHYSICO-CHEMICAL CHARACTERISTICS OF WATER

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ABSTRACTS

Various physico-chemical characteristics of the Halali reservoir located near Bhopal were studied in the three season summer, rainy and winter of 2015-2016. Ecological parameters like dissolved oxygen (DO), pH, nitrate, phosphate and other physico-chemical parameter were analyzed and compared with the water quality standard of Bureau of Indian Standard (BIS) and Central and the State Pollution Control Board (PCB) limits to assess the best designated use. Attempts were made to study and analyze the physico-chemical characteristics of the water. All physico- chemical parameters give a picture of the quality parameter in pond water of the Halali. By observing the results, it can be concluded that the parameters which were taken for study the water quality are below the pollution level for ground water, which satisfy the requirement for the use of various purposes like domestic, agricultural, industrial, aquaculture etc.

KEYWORDS: Dissolved Oxygen, Nitrate, Physico-Chemical and Pollution etc.

INTRODUCTION

Our environment has witnessed a continuous and rapid deterioration which cause pollution in all its abiotic and biotic components. Nowadays, water pollution is burning issue all over the world. Like other developing countries water pollution in India also reaches in alarming situation. Lakes and rivers are deed and dying in India with no plan for recovery and revival. Although the government has not sat idle, all its money seems to be lost in technical solutions that fail. Bhopal is situated in the heart of India felicitated with large numbers of water bodies in and around it. But most of the water bodies are subjected to severe pollution due to stagnant nature and numerous anthropogenic activities around them. In Bhopal, where

population is approximately 18 lakhs, total waste supply is 417.94 MLD per day and total sewage is 334.5 MLD per day.

Sewage from approximately 27 nallahs around the city is released into water bodies, results in deterioration of water quality of these water bodies.[1] Efforts to manage the lake have been implemented since long time. State government initiated many programs and projects for conservation and management of lakes in and around the city such as "Sarovar Hamari Dharohar" program (Public awareness generation program of manual weed removal) and Bhoj wetland project (A project sponsored by Japanese Bank of international cooperation, JBIC, Japan, to restrict the flow of waste directly into Lakes). Even though the situation is not too worst but it is alarming. Bhopal and its surrounding areas are facing the problem of decline of water bodies and water crisis, so there is need of a serious thought to this issue. Due to pollution the quality and quantity of utilizable lake water decreases which ultimately results in water crisis. So there is need for continuous evaluation of water quality and pollution level in order to promote better living condition around the reservoirs and to save the reservoirs before there extreme worst condition of eutrophication.[1] Many research workers carried out a similar type of studies on different reservoirs of Bhopal and surrounding area in order to formulate strategies for conservation and management of various water resources. Present study is focused on assessment and comparison of water quality of Halali Reaservoir was selected on the basis of their different uses. Halali Dam is located in rural area so there catchment area is different. Halali Dam are mainly used for recreational and secondary purposes.[2]

MATERIALS AND METHODS

Sampling Sites

The Halali Reservoir Was subjected to physico-chemical analysis. The main criteria for the selection of reservoir were, it should be approachable and water quality should be best for aquaculture, drinking and irrigation.[3] These sampling stations are located in the center of Halali dam. The dam site is located both in the Raisen and Vidisha districts of Madhya Pradesh, 40 km away from Bhopal on Bhopal vidisha road.

Morphometric Feature of Halali Reservoir

Year of construction: 1976

- **Type:** Earthen

- **River:** Halali
- **Basin:** Betwa
- **Location:** Raisen / Vidisha District
- **Latitude:** 23 30’ N
- **Longitude:** 77 30’ E
- **Shore line:** 65 km
- **Maximum depth:** 29.5 m
- **Mean depth:** 5.3 m
- **Water spread area:** 5959 ha

Sample Collection

Samples were collected in three different seasons like summer, rainy and winter from 2015-2061. 125ml glass bottles were used to collect and fix samples for estimation of dissolved oxygen (DO) content. Samples were collected in triplicate from for analysis of water parameters.

Analysis

The samples thus collected were analysed for a number of physico-chemical parameters employing standard methods (APHA, 1998). The parameters include, temperature, pH, Dissolved Oxygen (DO), Conductivity, Free CO2, Total Hardness, Total Solids (TS), Total Dissolved Solids (TDS), Transparency, Ammonia, nitrate, phosphate etc.[6]

RESULTS AND DISCUSSION

The physico-chemical analysis carried out from the Halali Reservoir during different season has been presented in Table. Temperature is the most important factor, which influences chemical, physical and biological characteristics of water bodies. A study revealed that temperature varied from 23 to 33. A similar pattern was observed for Electric Conductivity. The pH values did not show remarkable differences between sampling site and ranged 7.4 to 9.2. The value of DO is remarkable in determining the water quality criteria of an aquatic system. In the system where the rates of respiration and organic decomposition are high, the DO values usually remain lower than those of the system, where the rate of photosynthesis is high. The mean value of the dissolved oxygen ranged between 1.9 to 6 mg/L. The nitrate concentration was ranging from 0.01 to 0.02 mg/L. Same pattern was also observed for phosphate. PO4 values in Halali Resrvior ranged between 0.04 to 1 mg/L. The conductivity

of water was ranging between 350-545 µs. On the basis of the present study the water of Halali reservoir is most suitable for aquaculture and irrigation.

CONCLUSION

The present investigation shows that all physico-chemical parameters were found suitable for aquaculture and irrigation purpose. This present situation may drastically affect the aquatic and terrestrial organism growth in the water repository and significant pollutants emerge from agriculture sections pose an additional threat to the water quality in the near future. To sustain the ecology and aquatic life in the lake, certain measures and planning must be taken by the civic body to combat the pollution rate in the lake.

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