



TAPTI RIVER WATER QUALITY ESTIMATION IN THE RAINY SEASON AT MULTAI, DISTRICT BETUL (MP)

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ABSTRACT

The Tapti River plays an important role in the state of M.P. It is sometimes referred to as Madhya Pradesh's "backbone." It provides a major amount of crop water, water supply, and electricity. In the proposed investigation, water samples from the Tapti River were collected in August 2022 in Multai City, District Betul, Madhya Pradesh, to evaluate their suitability for drinking, domestic application, and irrigation. The recent study objective was to investigate the water quality of the Tapti River. Throughout the rainy season, a number more water quality indicators were measured, including calcium, magnesium, chloride, phosphate, nitrate, total hardness, dissolved oxygen, total suspended particles, biochemical oxygen demand, and chemical oxygen demand.

Keywords: Water Quality Estimation, Tapti River, Multai City, District Betul (M.P.), WHO, BIS.

INTRODUCTION: All living organisms depend on water to survive, but diverse anthropogenic activities like residential use, agricultural practices, power generation, and industrial production are endangering this essential element of life. Due to the growing human population and fast industrialisation, more high-quality water is needed. [1] causing water quality to decline, which has an immediate effect on aquatic ecosystems [2] Rivers are the most priceless freshwater resource on earth among all other types of water. In addition to these uses, rivers also serve a crucial role in removing garbage from municipal and industrial facilities and farmland run-off [3, 4]. River water is

also used for transportation, electricity generation, amusement, and the cultivation of agriculture.

The second-largest west-flowing and sixth-largest river system in the Indian peninsula are the Tapti River. In the Madhya Pradesh district of Betul, close to the Multai Reserve Forest, the Tapti River is born. The river is 724 km long overall, from source to outfall into the Arabian Sea [5]. The Tapi River flows through the states of Gujarat, Madhya Pradesh, and Maharashtra before emptying into the Arabian Sea in the Gulf of Khambhat. For residents of Surat city, only the Tapi River serves as a supply of drinking water. The Tapti River's freshwater zone is home to biological communities that are quite diverse. Rotifers are the most diverse group of tiny aquatic faunal zooplankton in all aquatic habitats' biological communities.

Material and Methods

The water samples were collected in August 2022 from the River Tapti in Multai City, District Betul (M.P.), at five (05) specially selected pollution-prone water sampling stations labelled S1, S2, S3, S4, and S5. The samples were collected between the hours of 7 and 10 in the morning. Following APHA's (2012) instructions, samples were collected in one-litre plastic acid-cleaned containers. Water samples were immediately delivered to the laboratory for analysis, and the APHA-recommended standard procedures were followed.

Results and Discussion

The summary of observations of studied physico-chemical parameters of all the water samples from five water sampling stations is presented in table1-

Table 1- Average Values of Studied Physico-Chemical Parameters of Tapti River in Aug. 2022.

S.No.	Water Quality Parameters	Unit	Average Values of Studied Physico-Chemical Parameters		
			Desirable Limit	Permissible limit	Average Value of studied parameters
1.	Temperature	^o C	-	-	23.5 ^o C
2.	Iron as Fe mg/ml	mg/l	1.0	1.0	0.20
3.	Fluoride as F mg/ml	mg/l	1.0	1.5	0.22
4.	Chloride as Cl mg/l	mg/l	250	1000	25.0
5.	Calcium as Ca ⁺⁺ mg/l	mg/l	75	200	41.6
6.	Magnesium as Mg ⁺⁺ mg/l	mg/l	30	100	17.28
7.	Dissolve oxygen mg/l	mg/l	-	-	7.4

8.	Chemical Oxygen Demand (COD) mg/l	mg/l	-	-	90.0
9.	Biological Oxygen Demand (BOD) mg/l	mg/l	-	-	15.0

Temperature: The temperature of the water has a significant impact on the physiological and metabolic processes that accompany the eating, reproducing, migrating, and dispersing of aquatic species. The surface temperature was a good indicator of the air temperature. In the present study, the average value of the Tapi River water temperature was recorded as 23.5°C.

Chlorides: It is determined by titrating a known volume of sample with a standardised silver nitrate solution while employing an indicator such as potassium chromate in water or eosin/fluorescein in alcohol. The former creates a red-coloured combination with silver as soon as the chlorides are precipitated out of the solution, whereas the latter indication is an adsorption indicator.

Calcium: It is determined using Patton's and Reeder's indicator in a complexometric titration with a standard EDTA solution when the pH is greater than 12.0. By adding a predetermined amount of 4N Sodium Hydroxide, these criteria are met. Calculating the calcium content in a sample involves comparing the volume of a titre (EDTA solution) to a known volume of the sample.

Magnesium: Similarly, it is assessed using a complexometric titration method with an EDTA standard solution and an Eriochrome black T indicator under buffering conditions of pH 10.0. Ammonium Chloride and Ammonium Hydroxide are used to create the buffer solution. During titration, the solution sustains pH changes.

Dissolve Oxygen: One of the most essential factors is DO. Its relationship to a body of water provides both direct and indirect information, such as bacterial activity, photosynthesis, nutrient availability, stratification, etc. During rainy seasons, oxygen concentrations tend to rise in most surface waters because rain saturates with oxygen as it falls. More sunlight and warmer temperatures also increase plant growth and animal activity, which may increase or decrease DO concentrations and increase diurnal fluctuation.

Chemical Oxygen Demand: COD, which is measured in mg/L, is another indicator of organic material contamination in water. The COD—or the concentration of dissolved oxygen—is what's necessary for the chemical oxidation of the organic stuff in the water. Key markers of a surface water supply's environmental health include BOD and COD. They are frequently employed in the treatment of sewage, but infrequently in the process of treating drinking water.

Biological Oxygen Demand: Water contamination is measured by BOD, which is expressed in mg/L. The amount

of dissolved oxygen necessary for the metabolic breakdown of organic molecules and the oxidation of some inorganic elements is known as BOD (e.g., iron, sulfites).

Conclusion:

The results of the current study give us useful information about water quality and indicate that the Tapi River's water can be utilized as a good ecosystem. Since carbon dioxide is dissolved in water, the pH value shows that the water is alkaline. The overall assessment of the Tapi River's water quality in Multai, District Betul (M.P.), reveals that the various physico-chemical parameters examined in August 2022 fall within the allowable range recommended by WHO and BIS:10500, trying to make the river water suitable for drinking and irrigation after proper treatment.

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