STUDY OF WATER QUALITY OF BHIMA RIVER WATER AT DAUND. DIST. PUNE. MAHARASHTRA (INDIA)

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ABSTRACT

The current study evaluates the physicochemical seasonal fluctuations of the water quality parameters in the Bhima river near Daund. Dist. Pune.(MS). The study was conducted in three seasons from 2020 to 2021, with monthly water samples being taken from the sampling site for a full year. The river in the study location maintained the water's alkaline character well throughout the study period. A variety of parameters, including COD, BOD, conductivity, total hardness, pH, etc., were different. Additionally, run-off from agricultural areas containing pesticides and other agro-chemicals, as well as the disposal of burned and unburned human and animal carcasses, are contributing to the pollution of the river.

Key Words
Physicochemical, Water, COD, BOD, Seasonal Variations, Bhima River

INTRODUCTION

Water quality has declined as a result of the discharge of untreated industrial effluents and residential sewage into rivers. Additionally, run-off from agricultural areas containing pesticides and other agro-chemicals, as well as the disposal of burned and unburned human and animal carcasses, are contributing to the pollution of the river.

Drinking, irrigation, industrial activities, and residential processing units are the principal uses for the water, and it is contaminated by sewage from the nearby residential areas.

Materials and Method

3 sampling locations with the designations S-1 (part of the river before a band), S-2 (1 kilometer from band) and the S-3 (1 kilometer from station II) were created for sampling purposes.

Back in the lab, water samples were examined for a variety of physico-chemical parameters in accordance with the instructions provided by a standard method (APHA- 1985) and Trivedi and Goel (1988). All values other than temperature and PH were expressed in mg/L or ppm.

Results and Discussion

Seasonal differences were detected in the physicochemical parameters across the three stations. In January, the water's temperature was between

13.00°C and 32.5°C. Minimum wintertime temperatures ranged from 13.00°C to 17°C, with sample S-1 recording the highest water temperature of 32.5°C.

To summarize, the water temperature was generally higher in the summer and monsoon seasons compared to the winter months (13.00-32.51°C) in the present study.

The turbidity levels were greater during the start of the post-monsoon season, which typically sees a decline and reaches its lowest point in December, or the winter, for all the sites. The station S-1 displayed a value between 18 and 75 NTU, with 74 NTU recorded in August and 19 NTU recorded in December. In August, the stations S2 and S3 displayed turbidity values ranging from 16 to 80 NTU, while in December, 16 NTU was the minimum value. When it rains, water arrives from catchment regions, and turbidity is directly related to this.

The Bhima River's water had a pH of 7.3 to 8.1, which is neutral to turbidity alkaline. The mean pH varied between 7.5 and 8.2, indicating alkaline water response, which was thought to be extremely conducive to aquatic life. Additionally, it was discovered that the mean pH readings for every station were essentially the same and extremely close to within 7-8 seasonal variation in pH with high 8.2 and low at 7.38 was noted.

Table 1: Water Quality analysis of Bhima River

Sr. No	Parameter	Stations		
		S-1	**S-2**	**S-3**
1	**Temperature(°C)**	14.00-32.00	13.0-32.5	13.9-31.2
2	**Turbidity (NTU)**	18.0-75.0	16.0-80.0	16.0-82.0
3	**pH**	7.38-8.1	7.38-7.9	7.5-8.2
4	**Dissolved Oxygen(mg/L**	4.3-8.5	4.8-7.6	4.0-8.6
5	**Free CO_2 (mg/L)**	0.5-8.2	2.5-8.5	4.0-8.5
6	**Total Hardness (mg/L)**	43.0-81.0	39.0-61.0	57.0-73.0
7	**Calcium (mg/L)**	44.0-45.0	44.0-43.68	45.0-45.32
8	**Magnesium (mg/L)**	7.5-12.5	6.6-12.0	10.5-15.8
9	**Chloride (mg/L)**	35.0-70.0	32.3-64.8	40.52-70.09
10	**Salinity (mg/L)**	63.01-130	51.6-153.0	75.8-153.4
11	**Sulphate (mg/L)**	8.9-10.4	9.2-11.60	10.2-12.6

The Bhima River's mean dissolved oxygen content varied from 4.7 to 7.77 mg/L, and the dissolved oxygen content ranged from 4.3 to 8.5 mg/L. In general, winter and pre-summer saw higher concentrations of dissolved oxygen, while monsoon and summer saw lower levels.

The amount of free CO_2 in an aquatic ecosystem may be a sign of pollution. Free CO_2 levels in the Bhima River ranged from 0.5-8.2 mg/L, indicating that the water is hospitable to aquatic life. Organically enriched waters show free CO_2 in morning samples accumulated due to overnight community respiration. Water is generally CO_2 free during day time due to accelerated photosynthesis.

At three sites, the calcium hardness levels are very different. S-3 station recorded maximum calcium ion concentrations of 44–45 mg/L in January, 44.0 mg/L at S-3 station, and 43.0 mg/L at A-2 station. In August, the minimum calcium levels at S-1, S-2, and S-3 were 37.0 mg/L and 38.0 mg/L, respectively. As a result, the water is rich in calcium ions, and according to this location, the Bhima River's water is no exception.

At all three locations, the minimum and maximum magnesium values were basically within the same range. The highest value of chloride was found to be 70.0 mg/L in the month of January and the lowest was found to be 35.0 mg/L in August at station S-1, while station S-2 and station S-3 both showed high values of chloride of 63.71 mg/L

in December and January and lowest values of 28.0 mg/L in august. Station S-3 also showed the highest values of chlorides of 85.0 mg/L in January and the lowest as 42.5 mg/L in august.

According to the most recent observation of chloride concentration in Bhima River waters, it was highest in January and lowest in August. Salinity is one of the most crucial elements that regulates how organisms function and reproduce, which has an impact on floral and fungus populations. The constant evaporation of water, especially during the summer and pre-monsoon season, should be the cause of the higher salinity. Salinity levels during the monsoon may be low due to the Bhima River's constant salinity, which ranges from 51.6 to 153.0 mg/L at all sites. The estimated salinity values ranged from 51.6 mg/L in august at station S-2 to 153.0 mg/L at station S-3 in January. Natural waters contain sulphates. Whereas natural water generally had a high salt content, their concentration is highest in areas that are acidic and semi-acid.

CONCLUSION

In conclusion, it is determined from the Bhima River water quality data that it is necessary to control the input of garbage from residential areas. People's behaviors like bathing and washing should be prohibited. Such operations typically add phosphates, which are essential for promoting the rapid growth of a variety of aquatic weeds. By disintegrating their calls and structures, these weeds in turn contaminate the quality of the water. giving the water a bad smell and other unwanted qualities.

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