ANALYSIS OF PHYSIOLOGICAL AND CHEMICAL PARAMETERS TO EVALUATE THE WATER QUALITY OF NARMADA RIVER OF HOSHANGABAD DISTRICT

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Abstract: The present study deals with the investigation of suspected parts of Narmada river to ensure the water quality. In this regard due to discharge of harmful substances water quality (biological, chemical, physical characteristics) have been changed to a considerable extent. At three different sampling stations physiological and chemical characteristics like Dissolved oxygen, chloride, phosphates, etc. were studied and analysed using standard procedures. A thorough study was done on the basis of prevailing seasons. Domestic wastes, industrial effluents from security paper mill (SPM), agricultural run off, municipal sewage, etc. raised the physiological and chemical parameters which indicate the deterioration in water quality. The result of present study indicate that physico-chemical parameters of Narmada river are below or within WHO limits.

Keywords: Narmada river, water pollution, physico-chemical parameters, water quality.

Introduction

Water is a universal solvent and is one of the prime needs of life. Since time immemorial freshwater has always been of vital importance for man, as his early habituation were within easy reach of tanks, rivers, ponds, lakes, dams, etc. Due to industrialization and increase in population the demand of fresh water increases in the last decades. River pollution is a global problem. For human life and agriculture purposes this demand of water is fulfilled by the river. The river water quality is deteriorated due to industrial as well as human activities. Water quality indices can be determined by various physicochemical parameters.

Narmada river is also known as Rewa, is the third holy, and fifth largest West flowing river of India. Narmada river rises from Maikala range near Amarkantak. Narmada river drains into the Arabian sea through the Gulf of Khambat. Narmada river has 41 tributaries. Hoshangabad city is famous for beautiful "Ghats" along river Narmada. Huge quantity of municipal sewage, domestic waste, SPM cheaper mode of waste disposal dumped daily in Narmada river. During Ganesh Visargan in September, and Diwali in December most heavy metals seeps into the Narmada river. With the help of various physicochemical parameters Narmada river water quality were studied.

Material & Method

A total three different sample stations were selected from Narmada river basin and then samples are collected for water quality estimation by various physicochemical parameters such as DO, Chloride, Nitrate, Phosphate. Titration method is used for estimation of these parameters. These parameters helps us to study the water quality from different time & stations. From these stations we measured the dissolved chemicals like nitrate, phosphates, chloride and also measured the DO of water sample.

SS1:- Sethani ghat, **SS2:-** Budhni ghat, **SS3:-** Bandrabhandh ghat. **SS1** sampling station is Sethani ghat. Dissolved oxygen at this station was high as water at this region is comparatively clean. In this station idol Ganesh visargan or goddess visargan took place. The most damage perhaps arises in Narmada river out of the idols made of Plaster of paris (PoP). **SS2** sampling station is Budhni ghat. Due to agricultural areas it contains high content of minerals, organic and inorganic compounds. **SS3** sampling station is Bandrabhandh ghat, also contains high level of mineral, organic and inorganic compound due to agricultural area situated near by.

Result and Discussion

Dissolved oxygen- With the help of DO test we measure the current oxygen level in the water. Variation arises in DO level with the temperature. At Sethani ghat and Bandrabhandh ghat DO level is high and at Budhni ghat DO level is low. In present study the value of DO level at station 1 is 11.5mg/l, at station 2 is 11.0mg/l, and at station 3 it's 10.5mg/l (Table 1).

Chloride content- At those places where sewage water is more, the chloride content is higher. In present study the value of chloride content at station 1 is 10.1mg/l, at station 2 is 12.0mg/l, and at station 3 is 13.2mg/l (Table 2).

Nitrate- In the present study the value of nitrate content at station 1 is 0.073mg/l, at station 2 is 0.083mg/l, and at station 3 is 0.092mg/l (Table 3).

Phosphate- Phosphorous level rises in water due to the increased application of fertilisers, use of detergents, and domestic sewage. In the present study the value of phosphate content at station 1 is 0.14mg/l, at station 2 is 0.17mg/l, and at station 3 is 0.19mg/l (Table 4).

Table 1:- Value of Dissolve Oxygen in mg/l at different stations:-

Sampling date	Station 1 (mg/l)	Station 2 (mg/l)	Station 3 (mg/l)	Median (mg/l)
15 September	11.5	11.0	10.5	11.0
30 September	12.0	10.2	9.2	10.2
15 October	12.2	10.0	9.5	10.0
30 October	12.0	10.2	10.0	10.2

Table 2:- Value of chloride in mg/l at different stations:-

Sampling date	Station 1 (mg/l)	Station 2 (mg/l)	Station 3 (mg/l)	Median (mg/l)
15 September	10.1	12.0	13.2	12.0
30 September	9.9	11.8	13.1	11.8
15 October	9.2	11.9	12.9	11.9
30 October	10.0	12.0	13.6	12.0

Table 3:- Value of nitrate in mg/l at different stations:-

Sampling date	Station 1 (mg/l)	Station 2 (mg/l)	Station 3 (mg/l)	Median (mg/l)
15 September	0.073	0.083	0.092	0.083
30 September	0.072	0.078	0.080	0.078
15 October	0.086	0.090	0.091	0.090
30 October	0.089	0.098	0.093	0.098

Table 4:- Value of phosphate in mg/l at different stations:-

Sampling date	Station 1 (mg/l)	Station 2 (mg/l)	Station 3 (mg/l)	Median (mg/l)
15 September	0.14	0.17	0.19	0.17
30 September	0.16	0.18	0.14	0.18
15 October	0.15	0.17	0.18	0.17
30 October	0.15	0.19	0.19	0.19

Conclusion

Different physico-chemical parameters are considered for water quality determination of Narmada river at 3 stations using 4 parameters as- DO, Chloride, Nitrate, & Phosphate. The present study was concluded that the water quality of Narmada river is suitable for human consumption in specific seasons, but during rainy season the water quality is deteriorating containing some heavy metals too. It was also studied that the physico-chemical characteristics of a few of the river samples during September - October crossed the maximum permissible limit, due to heavy mixing of effluents.

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