



## Environmental assessment of Tapti river water quality in Betul district, M.P. India

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### Abstract

Tapti river water is the main source for drinking, irrigation, fish culture and other important activities in Central India. Hence the present investigation has been done to observe the chemical and physical constituents of Tapti river water flow. The quality of water with the view to being out a transparence image of the water pollution and its effect and bringing forth suggestions for improvement. Samples were collected from different monitoring points of the Tapti water flow on bimonthly basis. The sample collection, preservation and pre-treatment has been done according to standard methods. Prior to this a survey was conducted to know about probable pollution sources and other relevant features.

**Keywords:** Dissolve oxygen, BOD, COD, Turbidity, Total hardness

### Introduction

The Tapti river originates in the Betul district from place called Multai. It is one of the major rivers of peninsular India with a length of around 724 km. It is one of the three river, others being Narmada and Mahi river that runs from east to west.

The Tapti river basin extends over an area of 65, 145 km<sup>2</sup> which is nearly two percent of the total area of India. The basin lies in the states of Maharashtra (51,504 km<sup>2</sup>), Madhya Pradesh (9,804 km<sup>2</sup>) and Gujarat (3,837 km<sup>2</sup>). It covers Betul, Burhanpur district of M. P., rest of Maharashtra and Gujarat.

### Materials and Method

The Tapti river has been surveyed throughout the year, covering a distance of about 20 km. Three sampling sites were selected. Site I<sup>st</sup> is situated at Multai where river originates, here people take bath and wash their clothes daily. Site II<sup>nd</sup> is situated at Kerpani and Site III<sup>rd</sup> Kolgoan where continuous discharge of chemicals and sewage take place. Physical and biological parameters were studied as per method suggested by APHA, (1995) and Trivedi and Goel (1986), Manivaskam (2002) and Khanna and Bhutiani (2004). pH and dissolved oxygen were recorded immediately after collection of samples on the site.

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### Results and Discussion

The survey of the river water resources includes the identification and characterization of three sites (Table-1). Colour of sewage at Kolgaon site is brown and all the sites have fairly bad smell. Values of pH (7.3 – 8.4) have been observed at the polluted site throughout the year. Low dissolved oxygen values (1.33) was recorded at Multai site. The value of D.O. ranged from 13.3 to 18.90. The low D.O value may be due to oxygen demand of microorganism. The values of chloride is more in pre monsoon (173.48 -253.51) compared to post monsoon (110.0-143) the value of C.O.D (53.83-790.67) and the values of BOD ranged from 2.27-29.40 recorded at all the sites. High values (56 ppm) of free CO<sub>2</sub> were recorded at Kolgaon site. High values (308.67) of bicarbonate alkalinity were observed at Multai but low value (37.33) of carbonate alkalinity was observed at polluted site in monsoon season. The chemical analysis showed that polluted site II<sup>nd</sup> and III<sup>rd</sup> contains high value of chloride, total hardness and bicarbonate alkalinity and exhibited a high biochemical oxygen demand, but dissolved oxygen was recorded in low range, which indicated a high pollution load. The high COD show the presence of accumulated organic matter, which reflects its incomplete oxidation. The cause of high BOD may be due to excessive growth (eutrophication) of aquatic fauna (Hasan and Pande, 1983). Total viabal counts, *E-coli* counts were highest in post monsoon season.

**Table 1: Mean value of physio-chemical parameters sampled at different sites of River Tapti, Multai, Distt. Betul**

S. No.	Parameters	Pre Monsoon			Monsoon			Post Monsoon		
		Multai	Kerpani	Kolgaon	Multai	Kerpani	Kolgaon	Multai	Kerpani	Kolgaon
1	TDS	533.33	366.67	366.67	580.00	533.33	583.33	266.67	366.67	323.33
2	pH	7.17	7.83	8.40	6.63	7.33	7.40	6.70	6.80	7.30
2	EC	0.62	0.63	0.50	0.51	0.33	0.26	0.79	0.77	0.60
4	Turbidity	0.00	10.33	3.33	6.67	5.00	7.33	0.00	0.00	0.00
5	Ca hardness	186.67	165.33	93.33	392.00	360.00	354.67	600.00	480.00	197.33
6	Mg hardness	229.33	173.33	234.67	162.67	130.67	157.33	269.33	293.33	160.00
7	Total hardness	426.67	366.67	328.00	458.67	389.33	432.00	357.33	293.33	176.00
8	Carbonate alkalinity	1.33	4.00	9.33	0.00	1.33	34.67	5.33	7.33	0.00
9	Bi-carbonate alkalinity	308.67	289.33	264.67	49.33	37.33	166.67	188.00	110.00	74.67
10	Total alkalinity	310.00	293.33	271.33	134.67	246.67	233.33	245.33	325.33	114.67
11	D.O.	11.37	15.60	16.27	18.00	18.90	7.20	1.33	9.00	7.83
12	BOD	2.70	9.60	7.60	14.80	15.93	29.40	2.27	2.40	0.20
13	COD	210.67	88.00	53.33	456.00	356.00	504.00	762.67	790.67	766.67
14	Free CO <sub>2</sub>	16.00	17.33	10.67	41.33	28.00	56.00	2.00	4.33	0.00
15	Chloride	173.48	210.17	253.51	104.00	164.67	147.33	146.67	133.33	110.00
16	Residual chloride	0.00	0.00	0.00	2.12	2.60	1.95	2.99	2.88	2.18
17	Acidity	356.67	290.00	136.67	30.00	2.67	4.00	0.00	0.00	0.00
18	Ammonium nitrate	0.90	1.87	0.70	0.53	1.33	1.03	1.33	2.67	1.33
19	Total iron	1.17	1.47	1.53	0.08	0.08	0.08	1.50	1.40	1.37
20	Phosphate	0.10	0.13	0.17	0.50	0.60	0.73	0.50	0.20	0.33
21	Sulphide	0.00	0.00	0.00	44.80	38.40	36.67	18.67	32.00	22.40
22	Zinc	0.18	0.04	0.06	0.10	0.12	0.13	0.13	0.12	0.10
23	Copper	0.13	0.05	0.04	0.07	0.06	0.37	0.30	0.05	0.06
24	Magnesium	0.13	0.07	0.08	0.07	0.11	0.10	0.24	0.20	0.09
25	<i>E. coli</i>	60000	128000	96667	97000	20833	53467	720000	171333	46667

All data are in mg/l except pH and *E. coli*= unit/l

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