



EVALUATION OF PHYSICAL AND CHEMICAL PARAMETERS OF RIVER TAPTI AT DEEPNAGAR (M. S.) INDIA.

Botany

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ABSTRACT

Water samples were collected from Tapti River at Deepnagar Thermal power station. Analyzed for Temperature, PH, Free Co₂, Dissolved O₂, COD, Nitrate, Phosphate, Chloride, Hardness, Magnesium, Total alkalinity and solid. The finding revealed that, the values obtained are within the range prescribed by BIS.

KEYWORDS

Evaluation, Physico-chemical Parameters, Tapti River, Deepnagar.

Water is most essential commodity for human consumption and is one of the most important renewable resources, which must be conserved and prevented from deterioration in quality.

Various physio-chemical parameters like PH, Temperature, Dissolved O₂, COD, Nitrate, Phosphate, Chloride, Total Hardness, Magnesium, Total alkalinity and Total dissolved solid have a significant role in determining the portability of drinking water.

Water served to consumer must be free from disease carrying bacteria, toxic substances, and excessive amount of mineral and Organic matter (Gadi et. al. 2003). Tapti River is an important means of water supply to Deepnagar Thermal power station (M.S.) Due to various regions the river passes heavy and varied pollutants which leads to deterioration of water quality and depletion of aquatic biota. During the present investigation the physico-chemical parameters of water of Tapti during summer months were studied. Four stations were selected for collection of water sample once in a month, from January 2013 to June 2013.

In the present work attempt was made to examine quality of drinking

water of river Tapti at Deepnagar. The output of these studies will helpful for suggestions to responsible authority, regarding objectionable findings of water parameter.

METHODOLOGY:

Water samples were collected from Deepnagar Thermal power station of river Tapti. From this source, the water lifted by municipality and supplied to Thermal power station. Moreover, the water is pumped and supplied. Samples were collected in clean plastic can 1.5 lit capacities. Air temperature and water temperature was recorded immediately by using mercury centigrade thermometer at depth of 4cm. to 6 cm. from the surface layer of water. PH of water was examined using universal PH meter. Also checked by using digital PH meter. For estimation of dissolved oxygen separate sample was collected in 250ml. BOD glass bottle and fixed at the collection site only. Free Co₂, COD, Nitrate, Phosphate, Chloride, Hardness, Magnesium, Total alkalinity and Total dissolved solid were measured in the laboratory following A.P.H.A. (2005) and Trivedy and Goel (1998). The data were statistically analyzed following Mungikar (2003). The values of these parameters were compared with standard values given by BIS: 10500 (2004).

Monthly variations in physico-chemical Parameters of water collected at Deepnagar Thermal power station. (Table-1).

Sr.No	Parameters	Jan.	Feb.	Mar.	Apr.	May	Jun.	Range	Mean standard Deviation	BIS
1	Air temp	27	26	30	33	44	29	26-44	33±	-
2	Water temp	18	18	22	20	28	18	18-28	20.6±	-
3	PH	6.7	6.9	6.7	6.9	5.9	7.1	5.9-7.1	6.70±	6.5-8.5
4	T.D.S.	315.0	475.0	390.0	340.0	413.0	452.0	315.0-475.0	397.5±	-
5	Free Co ₂	5.2	5.1	5.3	5.2	5.1	5.1	5.1-5.3	-	45-100
6	Alkalinity	90.0	101.0	90.0	105.0	75.0	98.0	75.0-105.0	93.16±	500-
7	Dissolved O ₂	5.4	3.9	4.1	5.4	6.0	5.6	3.9-6.0	5.5±	-
8	COD	24.0	20.0	16.0	10.0	7.0	9.01	7.0-24.0	15.83±	50mg/lit
9	Chloride	43.0	51.0	40.0	88.0	60.0	59.0	40.0-88.0	87.6±	300-600
10	Nitrate	6.0	5.0	7.0	11.0	4.2	4.5	4.2-11.0	6.28±	-
11	Phosphate	0.689	0.598	0.460	0.553	0.800	0.856	0.460-0.856	0.659±	250-
12	Magnesium	4.38	2.92	1.60	4.38	5.30	5.85	1.60-5.85	3.91±	200-600
13	Hardness	60.0	50.0	46.0	60.0	75.0	80.0	46.0-80.0	57.4±	30-100

Values of parameters are presented in mg/lit. Except- temperature and PH. (in °C)

RESULTS AND DISCUSSION:

In Summer season (2013) monthly variation of physico-chemical parameters is presented in the table no 1.

The air temperature maximum in Summer. In May 44°C and minimum during the winter in February 26°C. Whereas compare to **water temperature** is low, it is in a range of 18-28°C.

The PH was recorded in the range from 5.9 to 7.1 which shows slight alkalinity in the river water in the month of May 2013 i.e. in the Summer Season. PH of water is important for the biotic component because most of the plants and animal species can survive a narrow range of PH from slightly acidic to slightly alkaline condition. The **total dissolved solids** ranged from 315-475 mg/lit and mean average

solids of sample analyzed is 397.5 mg/lit. During the course of study solids values found below the range prescribed by BIS.

Free Co₂ was very low throw out the investigation period; it is in a range of 5.1-5.3 mg/lit. Free Co₂ dissolved in water is the only source of carbon that can be used in photosynthetic activity of aquatic autotrophs. Decomposition of organic matter and the respiration by aquatic animals contribute to the free Co₂ present in water. (Patil et. al., 2011). In absence of free Co₂, the bicarbonates are converted in to 2 carbonates releasing Co₂ which is utilized by autotrophs thus making the water alkaline.

The alkalinity values fluctuated in between 75-105 mg/lit. Mean average alkalinity of samples analyzed is 93.16 mg/ lit. During the course of investigation. Alkalinity values found below the range prescribed by BIS.

The dissolved oxygen was varied from 3.9 to 6.0 mg/lit. The dissolved oxygen was found to be maximum in the month of May and minimum in the month of February. Dissolved oxygen in water depends on water temperature. As water temperature increases it decreases the dissolved oxygen in water. All most all plants and animals need dissolved oxygen for respiration (Trivedi and Goel, 1984.)

COD is a measure of any kind of oxidisable impurities present in the sewage. In the present study COD was recorded between 7 to 24 mg/lit. This is maximum in month of January and February.

The chloride values fluctuated in between 40-88 mg/lit. Chloride of this river water was not-high. The amount found in the sample did not exceed minimum permissible limit for drinking water prescribed by BIS.

The nitrate values fluctuated in between 4.2-11 mg/lit. Mean average nitrate concentration of samples analyzed is 6.28 mg/lit. In all months values are found very less than the range of BIS phosphate is a nutrient that triggers eutrophication and is required by algae and other hydrophyte plants, animals in small quantities (satyanarayan, et. al 2008).

The **phosphate** values fluctuate between 0.460-0.856 mg/lit in all month's phosphate values are found very less than the range BIS. The mean average phosphate concentration of sample analyzed is 0.659 mg/lit.

Hardness is the property of water which prevents the lather formation with soap and increases boiling point of water (Trivedi and Goel, 1984) hardness of water mainly depends upon the amount of calcium or magnesium salts or both (Murhekar,2011) mean average hardness value of sample analyzed is 57.4 mg/lit. The hardness values fluctuated in between 46-80 mg/lit in all month's hardness values found below the range prescribed by BIS conclusion.

CONCLUSION:

The present study revealed that water of Tapti at Deepnagar Thermal power station, Bhusawal is of the better quality although there is need in continuous monitoring to maintain the quality of drinking water. The results showed that water at this station is suitable source for drinking.

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