

Research Paper

PHYSICO - CHEMICAL STUDIES OF SHEONATH RIVER WATER IN DURG AREA

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ABSTRACT:

The river Sheonath is a lifeline for the people of Durg and Bhilai as it satisfies the water requirements of the two cities. With the increase in population, development of new colonies and industries, Sheonath has to bear the pressure of untreated sewage & industrial effluents being directly discharged into it. River water samples were collected from 3 Locations viz (1) The Pulgaon bridge (2) At Village Kotni (3) At Village Chikhli. Samples were taken to the laboratory and analyzed for parameters like Turbidity, pH, T.D.S, T.S.S, Hardness, EC, etc. Poor quality of drinking water has potential health risks for the consumers.

KEYWORDS: Sheonath river, water quality, Physico- Chemical parameters.

INTRODUCTION

The Sheonath River originates from village Chauki of Rajnandgaon district with its co-ordinates being 80° 37.5' E longitude and 20° 5' N latitude. It travels around 40 km before touching the boundaries of Durg city. During its travel it is joined by different streams in Rajnandgaon. Sheonath covers a distance of nearly 200 km before joining River Mahanadi.

It is the main source for the supply of drinking water to Durg and the outer township areas of Bhilai. A new water supply project is also going to be operative soon. It is therefore very important to study the Physico-Chemical parameters to assess the water

quality. Its quality gets affected due to the discharge of waste water at different locations.

The sampling locations are therefore selected accordingly as:

- a. Near Pulgaon bridge (marked as Rajnandgaon Road)
- b. Village Kotni
- c. Village Chikhli

Study Area: The study area ranges from Pulgaon bridge (marked as Rajnandgaon road on the map) to village Chikhli. Sites are selected on the basis of observation that some streams join the river nearby, so, water quality is likely to change at these locations.



Fig: 1 Course of river Sheonath showing the 3 sites in Durg area.

Sample Collection

Water samples were collected during the months of April-May-June 2015 from selected sites in pre cleaned polythene bottles. Parameters like pH,

temperature, color, Odor and dissolved oxygen were estimated on the spot whereas others tested in the laboratory.

Table 1. Results of Physico- Chemical parameters

S.No	Parameters	Sampling Points									IS Specificati on
		S1			S2			S3			
		April	May	June	April	May	June	April	May	June	
1	Temp	29	32	31	285	315	31	29	31	31	
2	pH	7.6	7.8	7.9	8.3	8.4	8.3	7.1	7.9	7.2	6.5 - 8.5
3	Color	Cl	Cl	Cl	Cl	Cl	Cl	Brownish	Brownish	Brownish	-
4	Odor.	Ol	Ol	Ol	Slp	Slp	Slp	Pungent	Pungent	Pungent	-
5	Turbidity	11	10	11	21	28	20	23	15	40	10
6	E.C.	134	152	214	148	168	182	234	250	451	-
7	TDS	332	306	214	376	359	381	856	1885	1650	500
8	TSS	93	104	108	151	162	186	1628	1590	550	-
9	Total AlK	141	144	132	246	250	251	224	211	226	200
10	Total Hardness	130	120	121	204	241	271	245	372	357	300
11	Ca	33	32	34	29	36.2	34	22	36.2	35.2	75
12	Mg	32	34	34.1	51	55	48	61.2	62.8	67.5	30
13	DO	6.4	7.0	6.5	5.1	3.7	4.1	3.4	3.2	4.0	-

All parameters are in mg/l except pH, EC, Temperature, Turbidity. EC in μ mhos/cm, temperature in $^{\circ}$ C turbidity in NTU.

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RESULT AND DISCUSSION

The results of physico-chemical parameters for water samples are presented in **Table -I**.

pH

It measures the concentration of hydrogen ions and is scale of intensity of acidity or alkalinity of water. It ranges from 7.1 to 8.2. The sample is slightly alkaline and is found to be within limits of range prescribed by BIS.

Color

The Color of water is "clear" in site-1 & site-2. In site-3 it gets brownish. It's due to the waste water being discharged into the river.

Odor

The water of site-1 is odorless because of sufficient water availability but it gives a slightly pungent smell at site-2 and pungent at site-3.

Turbidity

This is due to dissolution of materials like sand, silt, clay, including some micro-organism or organic materials which may also be present in suspended form. It ranges between 10 NTU to 40 NTU which is crossing the limits as prescribed by BIS at site-2 and site-3.

Electrical Conductivity (EC)

Electrical Conductivity is the measure of capacity of a substance or solution to conduct electricity. Electric current is passed through water. The range of Electrical conductivity is 134 μ mhos to 451 μ mhos. The range is not too high, this indicates good amount of dissolved inorganic substances in water in ionized form.

Total Dissolved Solids (TDS)

This is indicative of salinity of water. If it is high, it may cause scaling on the inner faces of cooking utensils. The TDS value ranged from 214 mg/l to 1885 mg/l.

Total Suspended Solids (TSS)

Indicates the solids present in the water, in suspension. Basically they are solids but light in weight and don't dissolve. It varies from 93 mg/l at site-1 to 1628 mg/l at site-3.

Total Alkalinity

The acidity of water gets neutralized by total alkalinity. The presence of dissolved carbonates and bicarbonates increase the alkalinity of water sample. The values range from 132 mg/l to 251 mg/l.

Total Hardness

Excess amount of carbonate, chloride and dissolved sulphates cause water to become hard. In this study it ranges from 130 mg/l to 372 mg/l. This states that the water from site-3 is hard whereas site-1 and site-2 are within the limits.

Calcium and Magnesium

The Ca and Mg concentrations range from 32 mg/l to 67.5 mg/l. The range of Ca is within the limits but Mg exceeds the permissible value. This increased value may act as laxative to human beings.

Dissolved Oxygen (DO)

DO varies from 3.2 mg/l site-3 to 7.0 mg/l site-1. It is quite obvious that during summer months the quantity of Oxygen dissolved may be less due to high temperature and that too in site-3 because of inflow of sewage with lesser quantity of river water available to dilute it. This is definitely an alarming result. At site-1 there is no inflows from nallahs therefore comparatively better water quality.

CONCLUSION

The Physico - Chemical Parameters of river Sheonath is studied at 3 locations viz near Pulgaon Bridge, Village Kotni and Village Chikhli of Durg. The test was conducted over a period of three months, April-June, because water quantity reduces during these months and pollution level is likely to increase because of joining of streams at these locations. The parameters like pH, temperature, color, Odor, Turbidity, EC, TDS, TSS, TA, TH, Ca, Mg, DO where studied and it is found that the site-2 and site-3 are at polluted levels except for Ca in both sites and TH at site-2. The water of Sheonath is therefore unsafe for direct human use during sampling months at site-2 an

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