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**ESTIMATION OF WATER QUALITY PHYSICOCHEMICAL AND BIOLOGICAL
PARAMETER OF SHIVNATH RIVER IN DURG DISTRICT (CHHATTISGARH)**

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ABSTRACT

Water is one of the most important components of living organism. Water quality of Shivrath River has become heavily polluted due to the disposal of Industrial effluents and several developmental activities. As research conducted by State Pollution Control Board, it is evident that human activities have contributed immensely in increasing the level of pollutants in the river. In the present study, samples from Durg District were analyzed for various parameters indicative of pollution level. Parameters like Physico-chemical properties like Temperature, Turbidity, colour, and Chemical property like BOD, COD, DO, Total Hardness, PH, Total solids (TDS, TSS) were analyzed. Biological analysis of was performed by (MFM).

KEYWORDS BOD ,DO, COD,TDS,MPN

INTRODUCTION

Water is the most important Natural and Vital source for the survival of life on the earth. 70.90% of the Earth is covered by Water. 96.5% of the planet's water is occupied in oceans. 1.7% of water is present in the form of ground Water, 1.7% in glaciers and the ice caps of Antarctica and Greenland 0.001%in the form of clouds and in the air as vapor and precipitation. Only 2.5% of the earth's water is fresh water. and 98.8%of the water is in ice and ground water(2) All the forms of water are essential for living organism so that it is necessary that they should be free from contamination and pollutions (2, 3).

River water is important for the surrounding living World. It is a major source of Drinking, Industrial, Agriculture and Domestic Purpose. The quality of river water is getting deteriorated due to various human activities like discharge of industrial effluents. (7,13). According to the World commission on water more than half of the World's majors rivers are polluted that they effect on human health and surrounding Ecosystems(9). The universal Reason of shortage of drinking water is because of increase of the population and the industrial development (11, 12). Due to contamination of fresh water one fifth of the Worlds' population has no access to safe water (WHO 2009). River water morphology are getting change due to the Man made activities and causing problems.

In Chhattisgarh rivers of various lengths are present in which Mahanadi river is known as a life line of Chhattisgarh and Shivrath river is one of the main Tributary of Mahanadi River (10). Length of Shivrath River in Chhattisgarh is 290km. It flows from Panabaras range situated at the height of 625 meters, at Ambagarh tehsil of Rajnandgaon district. Rajnandgaon, Durg, and Janjgir Champa district are the main station at the bank of Shivrath River. Lilagar, Arpa, Abar, Surahi ,Maniyari, Kharoon, Tandula etc. are the main tributaries of Shivrath River (10). Due to the discharge of Industrial and Domestic wastes Shivrath River is facing serious threat of pollution.

India is a large country of river and there are so many large and small rivers are present which play important role in the settlement of village and cities, culture and deli needs for human. Water quality of rivers are highly deteriorated due to the human activities the important studies are of river Ganga (19), river Ganga (15), Ganga(18) river Ganga at Varanasi(17), Ganga at Ghazipur(20) River Narmada(16) Yamuna at Agra (21) The Physico-Chemical Property of River has been investigated in India. the Important studies in River in India are those of Khan River at Indore (22), Hasdeo River at Korea, Chhattisgarh (23), Hasdeo River at Korba, Chhattisgarh(19), Shivnath River at Durg, Chhattisgarh (2) Shivnath River at Durg in Chhattisgarh (10). Present study was designed to determine the Quality of Shivnath river in Durg region by analyzing various Physico chemical parameters.

STUDY AREA

Durg District is occupies Southwestern part of the Chhattisgarh and Durg is located between – 20-23' and 22-02'N and 80-46' and 81-58'E
 Sea level-317.00 Meter
 Geographical Area-8537 km²
 Forest Area-764.46 km²

COLLECTION OF WATER SAMPLE

Grab sampling process is used for sample collection. 1000ml capacity of Plastic bottle were used for water sample collection. The bottles were rinsed with sampling station water and after this they were filled and sealed. During testing procedure sample were kept in room temperature. (2, 14)

MATERIALS AND METHODS

APHA norms are used for analysis of existing water of Shivnath River. and water quality is also compared with WHO, BIS, CPCB, NEW Delhi, The Result of Physico-Chemical and Biological properties are given in table 1(1,2,6)

S.N O.	Parameters	Method used	Unit of Measurement	BIS	WHO	Sample1	Sample2	Sample3
Physical Properties								
1	Temperature	Thermometer	0C	-	-	22	25	24
2	Turbidity	Turbido meter	N.T.U	1	5	6.3	5.6	6.8
3	Color	Visual observation	-	-	-	Colorless	Colorless	Colorless
Chemical Properties								
1	BOD	Dilution Method	Mg/l	3	2	8	14	12
2	COD	Titrimetric Method	Mg/l	-	-	10	15	17
3	DO	Titrimetric Method	Mg/l	4-6 ppm	4-6 ppm	4.6	4.9	5.3
4	Total hardness	Titrimetric Method	Mg/l	200	500	130	150	148
5	Total alkalinity	Titrimetric Method	Mg/l	200	75	120	150	165
6	pH	PH Meter	PH Scale	6.5-8.5	6.5-8.5	7.1	7.8	9
Bacteriological Properties								
1	Fecal Coliforms	Membrane Filter Method	CFU/100 ml	nil	nil	75	67	83
2	Pathogen							

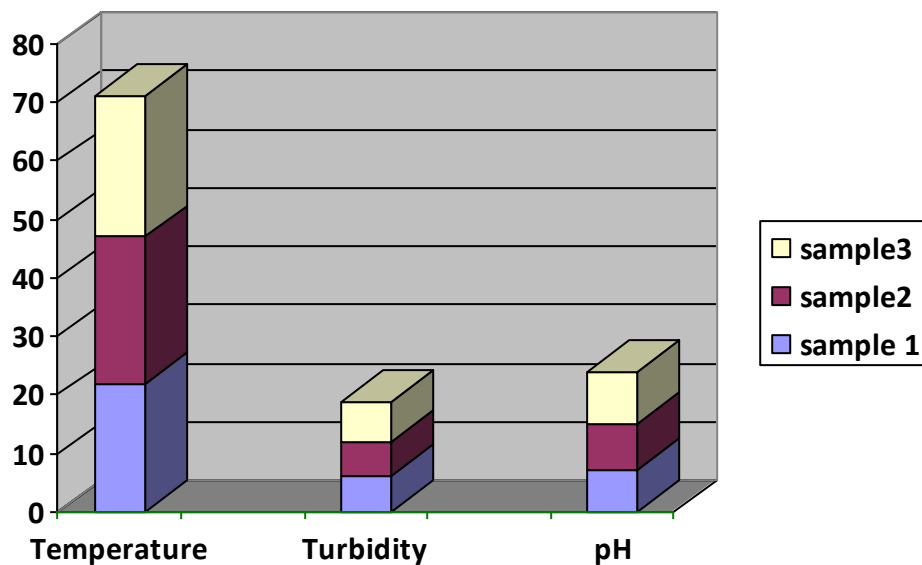
	ic bacteria Vibrio cholera	Culture plate method		nil	nil	Present	present	Present
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Table 1: Comparison of Water sample from BIS and WHO limits

RESULTS AND DISCUSSION

Physical Analysis:

Figure 1 : comparison of Temperature, Turbidity& color and pH of water samples.



CHEMICAL ANALYSIS:

BOD, COD, DO

The BOD values for all samples were observed to be quite high than the BIS limits that indicating that organic matter content present in Shivnath river water sample COD value is also higher than the WHO and BSI limits(4,6)DO value was found to be within limits.

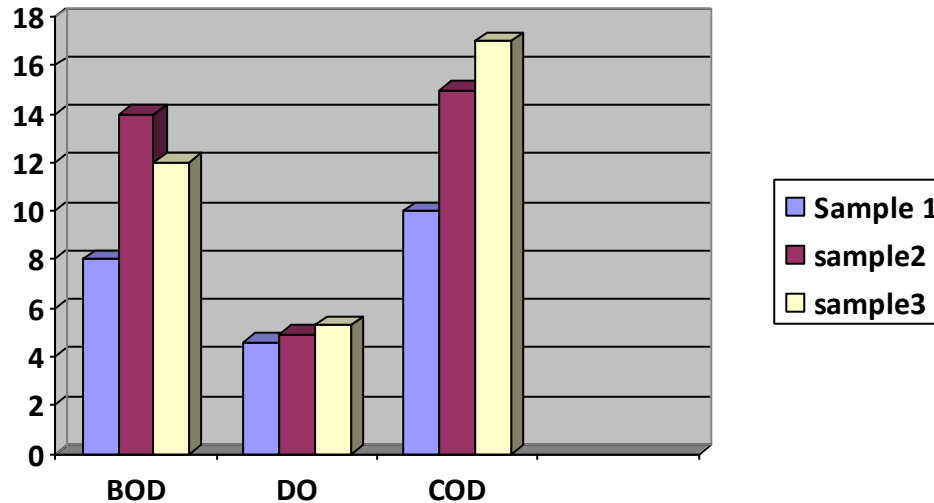


Figure 2 Comparison of DO, BOD, COD value of all samples.

Total Hardness and Total Alkalinity:

According to BIS and WHO limits the value of Total Hardness and Total Alkalinity are reaching near the upper limits (4, 6)

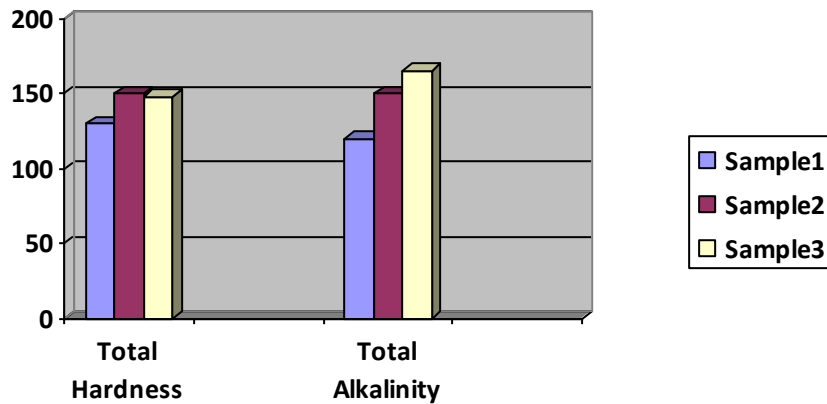


Figure 3: comparison of Total Alkalinity & Total Hardness value of all samples.

Fecal coliforms:

Fecal coliforms were found in all samples which can't be use as a drinking purpose

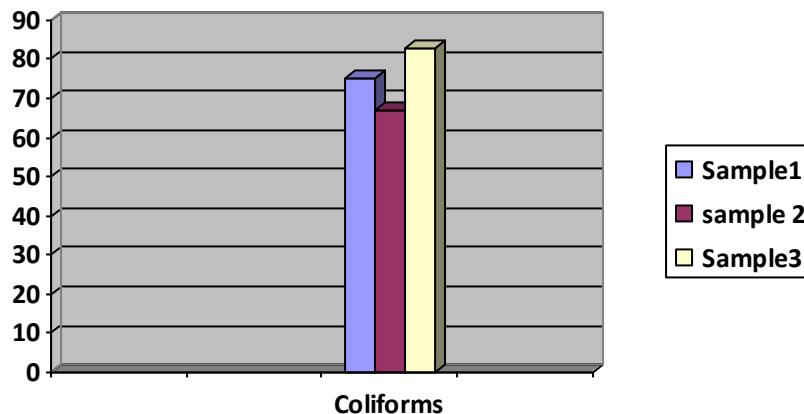


Figure 4 Comparison of Fecal Coliforms value for water samples.

CONCLUSION

The present study shows the Physico chemical status of water of Shivnath River. Results obtained in the present study; show that most of the parameters were not under permitted limits of BIS and WHO. Fecal coliforms exceeded the BIS limits, which makes the water unsuitable for use. This shows that water quality of Shivnath River is below the standards limits as it is unsuitable for domestic and drinking purpose.

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