

ANALYSIS OF WATER OF RAIGARH AREA WITH SPECIAL REFERENCE TO HEAVY METALS

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ABSTRACT- The quality of any body of surface or ground water is a function of either both natural influences and human influences. Without human influences water quality would be determined by the weathering of bedrock minerals, by the atmospheric processes of evaporation, transpiration and the deposition of dust and salt by wind, by the natural leaching of organic matter and nutrients from soil, by hydrological factors that lead to runoff, and by biological processes within the aquatic environment that can alter the physical and chemical composition of water. Declining water quality has become a global issue of concern as human populations grow, industrial and agricultural activities expand, and climate change threatens to cause major alterations to the hydrological cycle.

KEYWORDS: Hardness, water analysis, T.D.S, Kondatarai, Heavy metals.

I. INTRODUCTION

Raigarh is thickly populated city, many small & big industries here. Such big industries like JSPL, Nalwa, monet etc. industrial influence, treated and untreated discharge in dam & canal. Our indispensable water resources have proven themselves to be greatly resilient, but they are increasingly vulnerable and threatened. Our growing population's need for water for food, raw materials and energy is increasingly competing with nature's own demands for water to sustain already imperilled ecosystems and the services on which we depend. Day after day, we pour millions of tons of untreated sewage and industrial and agricultural wastes into the world's water systems. Clean water has become scarce and will become even scarcer with the onset of climate change. Although the surface of our planet is nearly 71% water, only 3% of it is fresh. Of these 3% about 75% is tied up in glaciers and polar icebergs, 24% in groundwater and 1% is available in the form of fresh water in rivers, lakes and ponds suitable for human consumption (Dugan, 1972). Due to increasing industrialization on one hand and exploding population on the other, the demands of water supply have been increasing tremendously. Moreover considerable part of this limited quality of water is polluted by sewage, industrial waste and a wide range of synthetic chemicals. Fresh water which is a precious and limited vital resource needs to be protected, conserved and used wisely by man.

Unfortunately such has not been the case, as the polluted lakes, rivers and streams throughout the world testify. According to the scientists of National Environmental

Engineering Research Institute, Nagpur, India, about 70 % of the available water in India is polluted (Pani, 1986)

II. THE STUDY AREA

The present study is centralized to Raigarh and its surrounding coalmining located on Coordinates: 22°07'40" N : 83°31'16" E. Six locations covering residential area, industrial area and municipal waste dumpsites, sample were collected from river, Pond, nallah in each location. It aims to weigh up the suitability of water for various human activities and for the protection of aquatic life

Water quality index calculates all the parameters and gives an easy decision making output to analyze the quality of water. Change in water temperature, pH, T.D.S., conductivity, total hardness, Ca hardness, Mg hardness, chloride, turbidity, Alkalinity, COD, DO & some heavy metal's were used for the calculation of the index. From the listed data the quality of water was concluded.

III. MATERIALS AND METHOD

White plastic bottle of one liter capacity were used for collecting the samples. Analysis of the water sample has done by according to the standard analytical procedure.

A. Parameters measured in field

For monitoring purpose, six Area were selected in Raigarh district Chhattisgarh viz, Taraimal, lara, chiraipani, kondatarai, kunjedabri & around tamnar area. In each area monitored at least five locations covering residential areas, Industrial areas and municipal waste dumpsites, samples were collected from tube wells, hand pumps and open wells in each locations. At each sampling station analysed the samples for temperature, pH, and conductivity. The same samples were taken to the Water testing laboratory P.H.E. department raigarh (C.G.) for analyzing the physico-chemical parameters i.e., TDS, Hardness, Chloride, Turbidity, alkalinity, COD, DO and Heavy metals. The ranges of values for major parameters are as given at the results and discussion. During the visit the following common points were observed.

Hardness COD, DO, Chlorides Hardness Ca, Mg as were analysed by titrimetric method and the others are by following:

SN	PARAMETERS	APPARATUS	MODEL NO.
1	pH	Digital pH meter	EuTech instruments S/N781686 Pin-54X002606C
2	Conductivity	Conductivity meter305	EuTech instruments Con 510
3.	Turbidity	turbidity meter	EuTech instruments TN-100
4.	T.D.S.		ECTN100IR 01X35730/ serial no. 869188
5.	Heavy metals(Fe,Cu,Cd)	Spectrophotometer/ colorimeter	HACH DR- 2800

IV. RESULTS AND DISCUSSION

A. General parameters

6 water samples taken from Raigarh city were collected during march 2015 from various surface water sources. Collected two samples each in residential, industrial area and near municipal solid waste dumpsites in each city. The details of sampling locations, type of sources and its depth are given at Table 1 to 5. pH, temperature, conductivity and alkalinity was analyzed in the field itself and preserved the samples for general parameters and heavy metals analysis as per the norms. The samples were analyzed in water testing laboratory

P.H.E. Department Raigarh (C.G.) The physico-chemical analysis data and heavy metal analysis data has been given in the table

B. Selection of Water Monitoring Stations

The water quality monitoring stations were selected with a view to represent the surface water bodies in around coalmining area Tamnar raigarh area. There are number of seasonal nallas, Ponds and some perennial streams in the area. Total of 6 surface water sampling stations were monitored.

SN	parameters	Units	IS : 10500		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
			Desirable	Permissible						
1	Temperature	°C	-	-	30	30	30	27	27	27
2	Colour	Hazen	5	25	CL	CL	CL	CL	CL	CL
3.	Turbidity	N.T.U.	5	10	5.52	4.4	26.7	61.8	24.3	56.6
4	Alkalinity	Mg/l	200	600	46.0	61.0	53.2	57.1	63.1	54.2
5	pH	pH scale	6.5 – 8.5	NR	8.31	8.29	8.06	6.92	7.29	7.63
6	conductivity	Micro mohs/cm	-	--	187	1006	243	240	127	490
7	Chlorides	g/l	250	1000	200	1300	200	400	200	500
8	Total hardness	Mg/l	200	600	100	220	80	80	80	180
9	Hardness Calcium(as Ca)	Mg/l	75	200	44	76	24	40	40	44
10	Hardness Magnesium (as Mg) Mg/l	Mg/l	30	100	56	144	56	40	40	136
11	T.D.S.	Mg/l	500	1500	93	502	121	120	63.6	243
12.	C.O.D.	Mg/l	--	--	56.0	27.0	29.6	35.2	23.8	26.5
13	D.O.	Mg/l	1.5(4 to 6ppm)	----	4.9	4.4	4.1	5.1	4.2	3.9
14	Iron	Mg/l	0.1	1.0	0.01	0.03	0.02	0.01	0.02	0.06
15	Copper	Mg/l	0.05	0.05	0.03	0.03	0.02	0.03	0.04	0.03
16	chromium	Mg/l	0.05	0.05	0.02	0.03	0.02	0.02	0.03	0.03

C. Locations Direction

Table 1.1 is a descriptive listing of the water sampling stations

SAMPLE NO.	SURFACE WATER SAMPLING STATIONS
SW-1	Kelo River Main city
SW-2	Pond at village Kondatarai
SW-3	Pond at village kunjedabri
SW-4	Pond at village taraimal near Nalwa plant
SW-5	Chiraipani Nallah near Tamnar area
SW-6	lakha pond

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