



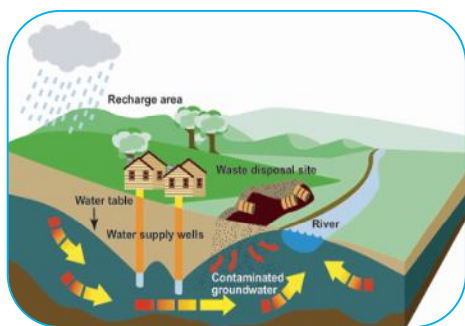
PHYSICO-CHEMICAL ANALYSIS OF SURFACE & GROUND WATER OF SELECTED SOURCE OF BALODABAZAR AREA

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ABSTRACT:

This paper present to study of Physico-chemical parameters of Balodabazar area Balodabaza-Bhatapara District Chhattisgarh. Monthly change in Physical and Chemical Parameters such as water Temperature, Turbidity, Electrical Conductivity, TS, Total Dissolved Solid, TSS, pH, Dissolved Oxygen, BOD, COD, Total Hardness, Chloride, Fluoride, Alkalinity. Were analyzed for a period of two month from April 2019 to May 2019. All parameters were within the permissible limits. The result indicate that the River is Non-

Polluted and can be used for domestic and irrigation purpose and drinking also.

KEYWORDS: Physical and Chemical Parameters, Monthly Variation Spectrophotometric analysis.

INTRODUCTION

A hydrosphere word is derived from the two different word Greek-hydor "Water" and sphaira "sphere". In physical geography describes the collective mass at water found on under and over the surface of a earth planet. The earth's hydrosphere consist of in all form's the ocean, other surface water including inland seas, lakes, and rivers, rain, underground water, ice and atmospheric water vapors. Approximately 70.8% of the earth surface is covered by the water bodies while rest 29% is land mass. Only 1% water is fresh occurring in underground ice caps and glaciers. Water is

most important resource for flora and fauna system. Among the planets, water is occurs only in earth as solid, liquid and gas. Chemically state from water is compound of hydrogen and oxygen in which two volume of hydrogen and one volume of oxygen. Water has peculiar character due to its high dielectric constant and greater degree of hydrogen bonding, therefore both class of compounds inorganic and organic dissolved in the water and commonly known as universal solvents.

Drinking water or potable water is water of the sufficiently high quality that can be consumed or used with households, commerce and industry is all of drinking water standard, even though only a very small proportion is actually consumed or used in food preparation.

Over large parts of the world, humans have inadequate access to potable water and use sources contaminated with disease vectors, pathogens or unacceptable levels of toxins or suspended solids. Such water is not potable, and drinking or using such water in food preparation leads to widespread acute and chronic illnesses and is a major cause of death and misery in many countries. Reduction of waterborne diseases is a major public health goal in developing countries. Typical water supply networks deliver potable water from the tap, whether it is to be used for drinking, washing or landscape irrigation. One counterexample is urban China, where drinking water can optionally be delivered by a separate tap, often in the form of distilled water or otherwise the regular tap water

needs to be boiled.

Water is our lifeline that bathes and feeds us. In ancient cultures water represented the very essence of life and it has played an imported role in the history of countries, religion, mythology, art and in many religions the soul cleanses through holy water. Water is a transparent, odorless, colorless fluid which forms the world's streams, lakes, oceans and rain, and is the major constituent of the fluids of organisms. At standard ambient temperature and pressure, water is a liquid but it also co-exists on earth with its solid (ice) and gaseous state (water vapor).

METHODS AND MATERIAL

Methodology:- Water samples from the selected spots were collected and analyzed by the standard protocol method mention below.

Selection of the sampling spots: Sampling spots for analysis mentioned in the location map. The selected sampling spots are there- Bilaigarh(GT1), Bhatgaon (GT2), Tenganakachhar(GW1), Chhuiha(GW2), Sivarinarayan (GR1), Surrounding the Bilaigarh block.

Sample Collection: Water samples were collected in one liter polythene bottle previously soaked with nitric acid and then cleaned with detergent followed by rinsing with distilled water.

Sample Preservation: Collected water sample, was brought in laboratory and stored in lie-cold chamber, them this chamber was kept in dark place.

Table: Method Of Different Water Quality Parameters

S.N.	Parameters	Unit	Methods Of Analysis	Instruments/Apparatus
1	TEMPERATURE	°C	Electrometric	Water Analyser Kit
2	pH	-	Electrometric	Water Analyser Kit
3	ELECTRICAL CONDUCTIVITY(EC)	µmhos/cm	Electrometric	Water Analyser Kit
4	TURBIDITY	NTU	Turbidity metric	Water Analyser Kit
5	TOTAL DISSOLVED SOLID(TDS)	mg/L	Gravimetric	Crucible & heating unit/Muffle furnance
6	TOTAL SOLIDS (TS)	mg/L	Gravimetric	Crucible & heating unit/Muffle furnance
7	TOTAL SUSPENDED SOLID(TSS)	mg/L	Mathematical	-
8	TOTAL HARDNESS(TH)	mg/L	EDTA Titrimetric Method	Titration Unit
9	ALKALINITY	mg/L	Titrimetric Method	Titration Unit
10	DISSOLVED OXYGEN(DO)	mg/L	Electrometric	Water Analyser Kit
11	BIOLOGICAL OXYGEN DEMAND(BOD)	mg/L	Incubation Method	Titration Unit
12	CHEMICAL OXYGEN DEMAND(COD)	mg/L	Digestion Method	Refluxing Unit
13	CHLORIDE(Cl ⁻)	mg/L	Argentometric Method	Titration Unit
14	FLUORIDE(F ⁻)	mg/L	SPADNS Method	Digital Spectrophotometer

OBSERVATION TABLE-1

S.NO.	PARAMETERS	UNIT	Water Standard		Quality	
			BIS	WHO	Bilaigarh-GT1	
					Apr-19	May-19
1	TEMPERATURE	°C		27-28	22.24	23.51
2	pH	-	6.5-8.5	6.5-8.5	7.23	7.12
3	EC	µmhos/cm	750-2250	400-2000	710.32	705.25
4	TURBIDITY	NTU	5.0-8.0	5.0-10.0	4.7	4.5
5	TS	mg/L	520-2050	500-1500	451.23	455.11
6	TDS	mg/L	500-2000	500-1500	439.09	443.89
7	TSS	mg/L	20-50	100-600	12.14	11.22
8	TH	mg/L	300-600	100-500	287	295
9	ALKALINITY	mg/L	300-600	200-600	290	284
10	DO	mg/L	5	5.0-6.0	5.4	5.4
11	BOD	mg/L	5	5	1.2	0.9
12	COD	mg/L	10	10	1.8	1.5
13	CHLORIDE(Cl ⁻)	mg/L	200-1000	200-1000	212.02	211.22
14	FLUORIDE(F ⁻)	mg/L	1-1.2	1-1.5	0.9	0.5

OBSERVATION TABLE-2

S.NO.	PARAMETERS	UNIT	Water Standard		Quality	
			BIS	WHO	Bhatgaon (GT2)	
					Apr-19	May-19
1	TEMPERATURE	°C		27-28	21.32	22.75
2	pH	-	6.5-8.5	6.5-8.5	7.65	7.52
3	EC	µmhos/cm	750-2250	400-2000	723.54	712.56
4	TURBIDITY	NTU	5.0-8.0	5.0-10.0	4.5	4.3
5	TS	mg/L	520-2050	500-1500	450.32	452.17
6	TDS	mg/L	500-2000	500-1500	439.16	438.94
7	TSS	mg/L	20-50	100-600	11.16	13.23
8	TH	mg/L	300-600	100-500	298	278
9	ALKALINITY	mg/L	300-600	200-600	245	265
10	DO	mg/L	5	5.0-6.0	5.5	5.5
11	BOD	mg/L	5	5	1.3	1
12	COD	mg/L	10	10	2	1.2
13	CHLORIDE(Cl ⁻)	mg/L	200-1000	200-1000	241.54	245.41
14	FLUORIDE(F ⁻)	mg/L	1-1.2	1-1.5	0.7	0.6

OBSERVATION TABLE-3

S.NO.	PARAMETERS	UNIT	Water Standard Quality		Tenganakachhar-GW1	
			BIS	WHO	Apr-19	May-19
1	TEMPERATURE	°C		27-28	23.25	23.32
2	pH	-	6.5-8.5	6.5-8.5	7.85	7.21
3	EC	µmhos/cm	750-2250	400-2000	712.76	710.87
4	TURBIDITY	NTU	5.0-8.0	5.0-10.0	5.08	4.06
5	TS	mg/L	520-2050	500-1500	455.46	455.87
6	TDS	mg/L	500-2000	500-1500	445.72	446.05
7	TSS	mg/L	20-50	100-600	9.74	9.82
8	TH	mg/L	300-600	100-500	287	295
9	ALKALINITY	mg/L	300-600	200-600	290	284
10	DO	mg/L	5	5.0-6.0	5.4	5.4
11	BOD	mg/L	5	5	0.9	1.3
12	COD	mg/L	10	10	2	1.9
13	CHLORIDE(Cl ⁻)	mg/L	200-1000	200-1000	204.23	205.45
14	FLUORIDE(F ⁻)	mg/L	1-1.2	1-1.5	1	0.6

OBSERVATION TABLE-4

S.NO.	PARAMETERS	UNIT	Water Standard Quality		Chhuiha-GW2	
			BIS	WHO	Apr-14	May-14
1	TEMPERATURE	°C		27-28	21.11	22.14
2	pH	-	6.5-8.5	6.5-8.5	7.56	7.25
3	EC	µmhos/cm	750-2250	400-2000	711.76	723.87
4	TURBIDITY	NTU	5.0-8.0	5.0-10.0	5.06	5.04
5	TS	mg/L	520-2050	500-1500	455.87	457.97
6	TDS	mg/L	500-2000	500-1500	444.2	445.99
7	TSS	mg/L	20-50	100-600	11.67	11.98
8	TH	mg/L	300-600	100-500	289	278
9	ALKALINITY	mg/L	300-600	200-600	351	352
10	DO	mg/L	5	5.0-6.0	5.5	5.5
11	BOD	mg/L	5	5	1	1
12	COD	mg/L	10	10	2.1	2
13	CHLORIDE(Cl ⁻)	mg/L	200-1000	200-1000	210.25	205.45
14	FLUORIDE(F ⁻)	mg/L	1-1.2	1-1.5	0.5	0.6

OBSERVATION TABLE-5

S.NO.	PARAMETERS	UNIT	Water Quality Standard		Sivarinarayan GR1	
			BIS	WHO	Apr-19	May-19
1	TEMPERATURE	°C		27-28	23.25	23.32
2	pH	-	6.5-8.5	6.5-8.5	7.85	7.21
3	EC	µmhos/cm	750-2250	400-2000	712.76	710.87
4	TURBIDITY	NTU	5.0-8.0	5.0-10.0	5.08	4.06
5	TS	mg/L	520-2050	500-1500	455.46	455.87
6	TDS	mg/L	500-2000	500-1500	445.72	446.05
7	TSS	mg/L	20-50	100-600	9.74	9.82
8	TH	mg/L	300-600	100-500	287	295
9	ALKALINITY	mg/L	300-600	200-600	290	284
10	DO	mg/L	5	5.0-6.0	5.4	5.4
11	BOD	mg/L	5	5	0.9	1.3
12	COD	mg/L	10	10	2	1.9
13	CHLORIDE(Cl ⁻)	mg/L	200-1000	200-1000	204.23	205.45
14	FLUORIDE(F ⁻)	mg/L	1-1.2	1-1.5	1	0.6

RESULT AND DISCUSSION: After analysis of all selected parameters results were obtained. In this project we have taken surface and ground water for the monitoring and determined the extent of Pollutant. The selected spots are Bilaigarh(GT1), Bhatgaon (GT2), Tenganakachhar(GW1), Chhuiha(GW2), Sivarinarayan (GR1). In this chapter only discussed the value of temp., pH, EC, TDS, TS, TSS, acidity, alkalinity, total, permanent, temporary hardness, demand analysis, DO, BOD, COD and same selected anions such as fluoride, chloride sulphate etc. and the results were compared with the desirable and permissible limit recommended.

Temperature, PH & EC:- Temperature of the various water were found in the range from 20°C to 30°C. The maximum temp. was recorded at sampling point GR1, GW1 23.32°C pH was obtained from 7.21 to 7.85 as low and high value, The data of pH of different sampling stations clear indicated the mostly water sources were alkaline in nature. This value was above the permissible limit. Electrical conductivity of different water systems were noted from 705.25 µmhos/cm to 723.87 µmhos/cm. as the minimum and maximum value. The large value of EC value was due to dissolved of high magnitude of organic and inorganic salts.

TS, TDS, TSS:- There parameters of water quality were determined the soluble ions; cations and anions and also confirmed the extent of their ions. Gravimetric method was used for the calculation of these parameters. Total solids was obtained in the range of 451.23 mg/L to 455.87 mg/L as the minimum and maximum value, GT1 spot was showed low value while GW1 sampling point was noted high value, both datas were the permissible limit 2000 mg/L recommended. Total dissolved solids are another parameters, which is also used for the determination of soluble ions. The result of the parameter was obtained from 438.94 mg/L to 445.99 mg/L in the from of min. and max. value. Sampling spot GT2 was responsible for the low value while GW2 water sample was got high value of TDS, TSS, was calculated out by the theoretical with using formula $TSS = TS - TDS$. Almost all water solids of the Balodabazar were effected by the high value of TDS and TS than desirable and permissible limitation.

Demand analysis:- In this analysis we have taken three different water quality-dissolved oxygen (DO), Biology Oxygen demand (BOD), Chemical Oxygen Demand (COD). There parameters were determined the amount and extent of dissolved oxygen DO was found 5.4 mg/L to 5.5 mg/L as the min, and maximum value for the sampling spot GW1 and GW2 respectively.

The low value of DO showed high degree of pollutant. Were present 0.9 and 1.3 mg/L of BOD was detected in two sampling location GW1 and GR1. Rest water samples were also expressed the amount of BOD in low amount which were the permissible value; 5.0 mg/L recommended. The COD was observed by the titrimetric method from 1.9 mg/L to 2.1 mg/L on the spot GW1 as well GW2 as low and high value then there datas were compared with the standard data.

Anion parameter:- Fluoride, chloride and sulphate ion was consideration as the anion parameters. F ion was detected by spectrophotometric method and its range was recorded 0.5 mg/L to 1.0 mg/L as the low and high value on sampling spot GW2 and GW1 respectively. Chloride ion was absorbed in the range of 204.23 mg/L to 210.25 mg/L as minimum and maximum value. Except sample of GR1, GW2 were showed the amount of chloride ion high the permissible value.

Hardness parameter:- These parameter contain, we was determined the permanent, temporary and total hardness was detected from 284 mg/L to 298 mg/L as low and high value on sampling spot GW1 and GT2. Permanent hardness was observed in the range of 4.17 mg/L to 497 mg/L as the minimum and maximum value. The maximum value was compared to the standard value. Temporary hardness are generally measured of fresh collected water. Its value was found from 506 mg/L to 778 mg/L as low and high value n the water collection spot GW1 and GT2

CONCLUSION

Environment is provided favorable conditions for surviving animals. Plants and men. Air, water and soils are basic parts of environment. Now owing to huge commercialisation, anthropogenic activity acid rain, unscientifically using of fertilizers, deforestation and over human population, the component of the planet become gradually changes. As a result creating global warming and alteration of climate cycle. Air has been lost the own properties whereas water has become extreme contaminated so unfit for the human, inomitralization and agricultural consumption. The fertility of soil has also been deteriorated, resulting crops yielding regularly decreases. Ultimately we can say the earth planet is going to destroying.

In present study, we have undertaken to determine the water quality status of Balodabazar and this study was categorized in following five chapters.

In chapter first we have discussed the elementary part of environment, ecosystem and cause of pollution we have already mentioned the occurrence of water as well the physical and chemical properties. Past work review, actual plane and list of references were described in last of chapter.

Experimental portion of the study was detailed discussion in the chapter two. In thus part of the dissertation required, concise procedure, formula and table of result were fully described. At the end of the chapter listed short references.

Chapter 3 included the result and discussion of the experimental data.

pH of the study field clear indicated the nature of different water bodies is from neutrals to alkaline in nature. The maximum value of pH was detected 7.85 on the sampling spot TW1, which was below of range from the standard value.

Electrical conductivity was measurement by the digitals temp. compensation conductometric method. Its value is depend upon the quantitative of dissolved ions. The higher value was reported at sampling spot GW2 723.87 $\mu\text{mho/cm}$ due to presence of inorganic and organic ions.

Total solids and total dissolved solids were observed in the high value of spot GW1, GW2, GW2. These datas were below from the permissible-limits owing to the presence of soluble and suspended dust particles these parameters were occurring in maximum amount.

Hardness was determined in terms of permanent, total and temporary. These water quality was fixed by the volumetric means. Total hardness was obtained as maximum value 298 mg/L on the sampling spot TG2. The hardness and chloride of Ca^{++} , Mg^{++} , Fe^{++} , Sn^{++} ions etc. Temporary hardness may be removed by the boiling of water sample.

In demand analysis we was preferred dissolved oxygen, chemical oxygen demand and biological oxygen demand. The standard value for these parameter was 5, 10, 5 gm/L as per recommended. The

minimum value of DO was 5.5 mg/L for spot GW2 and maximum value of BOD and COD for sampling spot GR1, GW2 were reported in this investigation.

Anion was analyzed only fluoride, chloride as per our lab facilities fluoride and was determined by the spectrophotometer while chloride was calculated by titrimetric method. Fluoride was detected 1.0 mg/L as the high value on sampling spot TW1, whereas chloride was noted 210.25 mg/L as maximum value on the sampling spot GW2. Which was below the permissible value from the analytical data of these sampling station supported in reaching at that point of conclusion, where pollution of water bodies are permissible.

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