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Comparative Study of Drinking Water Quality Assessment at Raipur Karchulian in Rewa district, and Municipal Corporation Area in Singrauli district (M. P.) India

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ABSTRACT: Fresh water is a critical, finite, vulnerable, renewable natural resource on the earth and plays an important role in our living environment without it life is impossible. In this paper we are analyzed to monthly variation and comparative physico-chemical study of Raipur Karchulian in Rewa district, and Municipal Corporation Area in Singrauli district (M. P.). Monthly variation in physical and chemical parameters like Temperature, pH, total solids, total dissolved solids, total hardness, chlorides, calcium, magnesium, biological oxygen demand and chemical oxygen demand etc.

KEYWORDS: Water, Physico-Chemical Parameters and Rainy session.

I. INTRODUCTION

In recent years the global energy demand has increased with the advances in industrialization and this has been largely met by fossil fuels. Coal meets 29.6% of global primary energy needs and its share in the world's electricity generation is about 42%. Coal combustion in thermal power plant contributes to 52.32% of total electricity generation in India. (1) Conventional generation of electricity from fossil fuel based sources like coal results in serious environmental problems reaching local and global implications.

Groundwater quality depends on the quality of recharged water, atmospheric precipitation, inland surface water and sub-surface geochemical processes. Temporal changes in the origin and constitution of the cause periodic changes in groundwater quality. Water pollution not only affects water quality but also threatens human health, economic development and social prosperity. (2)

In the present study samples have been collected over a period of one year i.e. 2017 during rainy seasons from the area nearby to the ash pond. The ground water quality is being collected from the tube wells and wells available there by used for drinking as well as industrial and agricultural applications.

II. MATERIALS AND METHOD

Singrauli District is a reflection of proud history of the state of Madhya Pradesh; it makes the North-eastern boundary of the state. Singrauli district is a repository of natural, historical and cultural history. This district is known for luxuriant natural resources. Singrauli district is located on the Northeastern Boundary of the state between 23.49 and

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24.42 Degree North Latitude and 81.18 and 82.48 Degree East longitude. The district is also known as the northeastern frontier of the state. Rewa district is located on latitude 24.30 to 24.35 and longitude 81.20 to 81.30.

Water samples have been collected from different tube wells. The water level shows a drastically change. The water samples were collected in stenciled bottles (polyethylene bottles). The test for pH, turbidity, water temperature and alkalinity has been carried out using multi functional water.

III. RESULTS AND DISSCUSION

Water being the vital element of life, maintenance of a good water quality is highly essential for human wellbeing. Ground water has several applications in the field of cooking, domestic uses, industrial applications, agricultural utility and many more. Due to its purity and rich nutrient and mineral contain, ground water is preferred as a major source in the form of purist form of water (4).

The selected Parameters and trace metals in all water samples i.e. pH, conductivity, Mn, Fe, Cu and Cd were analyzed using pH meter, conductivity cell and Atomic Absorption Spectrophotometer. The entire data obtained is being tabulated in Table-1, 2, 3 and 3 as mentioned herewith. pH is a term used to indicate alkalinity or acidity of substance. The pH value of all water samples are recorded within the limits of 6.4-8.1 for drinking water in Singrauli and 5.4-6.0 in Raipur.

Turbidity is recorded in higher side for all water samples beside desirable limit of 5.0 NTU. Turbidity is the cloudiness of a fluid by large numbers of individual particles that are generally invisible to naked eye. In drinking water the higher the turbidity level the higher the risk that people may develop gastrointestinal diseases. The turbidity value of all water samples are recorded within the limits of 5.2-7.2 for drinking water in Singrauli and 6.2-6.9 in Raipur. The conductivity varies between 375-39 $\mu\text{s/cm}$ in Singrauli and 373-375 $\mu\text{s/cm}$. The total dissolve solid is found to be in the range of 380-430 mg/l in Singrauli and 385-415mg/l in Raipur (5). Total solid ranges from 502-507 mg/l which is higher than (BIS 2012) 300 mg/l for drinking water in Singrauli. The recorded value of chloride is rang 251-253 mg/l for all water samples which is higher prescribed limit 250 mg/l. The recorded value of total hardness in all water samples is higher the prescribed limit of BIS 2012. Value of Ca hardness ranges from 80-85 mg/l and Mg hardness ranges from 85-115 mg/l.

Table 1 – Parameters of water analysis of Raipur region in Rainy session

Parameters	WS – 1	WS -2	WS -3	WS -4
pH	5.4	5.8	5.6	6.0
Conductivity($\mu\text{s/cm}$)	375	380	373	379
Odour	Not	Not	Not	Not
Temperature	Low	Low	Low	Low
Turbidity	6.9	6.4	6.2	6.3
Total solid (mg/l)	495	504	505	500
Total dissolved solid (mg/l)	385	400	410	415
Total hardness of water (mg/l)	305	302	306	309
Ca – hardness (mg/l)	85	90	92	89
Mg – hardness (mg/l)	105	115	85	115
BOD	125	130	128	122
DO	10.3	11.1	9.3	9.2
Nitrate (mg/l)	47	48	52	42
Chlorides (mg/l)	250	249	253	251

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Table 2 – Parameters of water analysis of Singrauli region in rainy session

Parameters	WS – 1	WS -2	WS -3	WS -4
pH	6.4	7.2	7.4	8.1
Conductivity(μ s/cm)	395	397	392	375
Odour	Not	Not	Not	Not
Temperature	Very high	Mid	Low	Low
Turbidity	7.2	6.5	5.4	5.2
Total solid (mg/l)	502	505	507	504
Total dissolved solid (mg/l)	380	405	410	430
Total hardness of water (mg/l)	302	303	304	305
Ca – hardness (mg/l)	80	82	85	83
Mg – hardness (mg/l)	105	115	85	115
BOD	130	132	125	120
DO	11.3	12.1	9.2	9.0
Nitrate (mg/l)	46	45	44	43
Chlorides (mg/l)	253	251	252	253

Table 3 – Metal Analysis in Water of Raipur region rainy

Metals	WS – 1	WS -2	WS -3	WS -4
Fe	0.3	0.2	0.4	0.1
Mn	0.2	0.1	0	0
Cu	0.01	0.02	0	0
Cd	0.01	0.01	0	0

Table 4 – Metal Analysis in Water of Singrauli region in rainy session

Metals	WS – 1	WS -2	WS -3	WS -4
Fe	0.4	0.3	0.2	0.4
Mn	0.2	0.1	0.1	0.2
Cu	0.04	0.05	0.04	0.03
Cd	0.02	0.02	0.02	0.02

IV. CONCLUSION

The above study concluded that the ground water sources near by the ash pond are getting highly contaminated due to the leaching of different metals and toxic elements into the ground water sources. Keeping in view the health of plants, animals and human beings adequate measures are to be taken to get rid of ground water pollution. When compared results of Raipur and Singrauli, we observed tremendous increase in magnitude of Physico-Chemical parameters. Our observations suggest that, Industrial area especially in case of thermal power plants needs regular monitoring of water sources.

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