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# Physiochemical Analysis of Drinking Water of Municipal Corporation Area of Satna 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. Four samples from different places around Satna were collected in summer and analyzed for different physico-chemical parameters such as temperature, conductivity, pH, TDS, turbidity, chloride, total alkalinity, hardness, magnesium and iron. The analysis of various parameters carried out using standard methods (APHA) and then compared with the standard guideline values.

**KEYWORDS:** Water and Physico-Chemical Parameters .

### I. INTRODUCTION

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70% of water. But due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity it is highly polluted with different harmful contaminants. Therefore it is necessary that the quality of drinking water should be checked at regular time intervals, because due to use of contaminated drinking water, human population suffers from various water-borne diseases. It is difficult to understand the biological phenomenon fully because the chemistry of water reveals much about the metabolism of the ecosystem and explains the general hydro-biological relationship. (1)

The quality of groundwater is affected by many factors such as physico-chemical characteristics of soil, rainfall, weathering of rocks etc. (2). 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. (3)

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 municipal of Satna. The groundwater 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

Satna district is located on latitude 23.58 to 25.12 and longitude 80.21 to 81.23. The area receives about 1000 mm annual rainfall mainly from the southwest monsoon and enjoys subtropical to humid climatic conditions. The temperature goes up to 45°C in summer and 6°C in winter season. Geologically, the study area forms a part of Vindhyan Supergroup.

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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, Fe and Mg were analyzed using pH meter, conductivity cell and Atomic Absorption Spectrophotometer. The entire data obtained is being tabulated in Table-1 and 2 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 5.6-6.2 for drinking water in Satna.

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 5.9-6.8 for drinking water in Satna. The conductivity varies between 375-380  $\mu\text{s}/\text{cm}$  in Satna. The total dissolve solid is found to be in the range of 388-418 mg/l in Satna (5). Total solid ranges from 500-510 mg/l which is higher than (BIS 2012) 300 mg/l for drinking water in Satna. The recorded value of chloride is rang 245-254 mg/l for all water samples which is higher prescribed limit 250 mg/l. Value of Ca hardness ranges from 88-96 mg/l and Mg hardness ranges from 105-120 mg/l.

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

Parameters	WS – 1	WS -2	WS -3	WS -4
pH	5.8	5.6	6.2	5.9
Conductivity( $\mu\text{s}/\text{cm}$ )	380	378	375	376
Total solid (mg/l)	502	510	508	500
Total dissolved solid (mg/l)	388	401	415	418
Temperature	14	15	12	12
Turbidity	6.8	5.9	6.0	6.1
BOD	130	135	125	128
DO	10.0	11.5	10.6	10.2
Nitrate (mg/l)	49	50	58	52
Chlorides (mg/l)	245	252	254	250
Total hardness of water (mg/l)	300	305	302	306
Ca – hardness (mg/l)	88	92	96	90
Mg – hardness (mg/l)	110	112	105	120

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Table 3 – Metal Analysis in Water of Satna region rainy session

Metals	WS – 1	WS -2	WS -3	WS -4
Fe	0.5	0.4	0.4	0.3
Mg	0.2	0.3	0.5	0.2

## IV. CONCLUSION

The above study concluded that the ground water sources near by the municipal area 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.

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