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# Physico-Chemical Analysis of Bore Well, Tube Well and Open Well Water nearby Railway Station Area of Aurangabad City, Maharashtra, India

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**ABSTRACT:** There is no life on the earth without water therefore water is essential for health. The population is increasing day by day worldwide. Industrialization, urbanization, and other human activities affect the quality of groundwater. The present research work represents the analysis of ground water on the basis of physiochemical parameters nearby railway station area of Aurangabad city. The evaluation of physiochemical parameters was carried by selecting three sampling stations. The parameters were analysed over a period of 12 months seasonally from June 2021 to May 2022 and seven physiochemical parameters were taken for water analysis. The selected physiochemical parameters temperature, pH, Dissolved Oxygen (DO), Biological oxygen demand (BOD), Chemical oxygen demand (COD), Total dissolved solids (TDS) and Turbidity. The samples collected were carefully tested and compared with standardised databases. The results revealed that the samples collected were suitable for human consumption. There is significant variation observed in the values which were analysed at sampling locations. It is found that all the parameters were within the range. Water is one of the most precious resources on planet for floral and faunal consumption, so it is need to be protected by all means.

**KEYWORDS:** parameter, analysis, values, within, range.

## I. INTRODUCTION

Water is the largest common liquid of the Earth, very important to all life forms. It is the best dispersion medium for all biochemical reactions of the living process on the earth. Water is an essential nutrient and is a crucial component of every cell, tissue, and organ. Water has ability to dissolve organic as well as inorganic compounds in it; hence water is called as universal solvent (Potadar *et al.*, 2021; Jadhav and Jadhav, 2017). Water has many applications and since every organism need it, a study of water from different aspects becomes essential (Potadar *et al.*, 2021; Padalkar and Kumar, 2018). Groundwater is an essential resource from a global perspective the largest store of freshwater, apart from the ice caps. Current groundwater abstraction represents approximately 26% of total withdrawal globally. Groundwater supplies almost half of all drinking water in the world and 43% of the global consumptive use in irrigation. In arid and semi-arid regions of the world, groundwater is the only reliable water resource. In the environment, the ground makes an important contribution to base flow in rivers and supports the groundwater-dependent ecosystem.

## II. RELATED WORK

Human activities and climate variability are increasing the pressure on the groundwater resources, but groundwater is an invisible resource that remains out of sight and out of mind for most people. Protection of groundwater resources is necessary for protecting human health, maintaining food supplies, and conserving the ecosystem. On account of high density of population, large number of industries, towns and cities in the river basin, large amount of domestic and industrial wastes are continually discharged into the river besides, waste water from agriculture source, animal care, domestic and industrial use also mixed into it; drainage and surface wash off during the monsoon season. Due to contaminated water, human population suffers from varied water borne diseases (Chaudhari *et al.*, 2021).



### III. METHODOLOGY

Aurangabad District is situated mainly in the Godavari river basin and partly in the Tapi river basin. The district is from 19 to 20 degrees north longitude with 74 to 76 degrees to the east latitude (Chaudhari *et al.*, 2021; Potadar *et al.*, 2021; Potadar and Patil, 2016). Collection and analysis of water samples were carried out at regular interval, for a period of a year. Three sampling stations (only average is given) along the areas having bore well, tube well and open wells were selected for the study. Physical and chemical parameters of the samples were analyzed. Physical parameters include temperature, pH and total dissolved solids (TDS). Water temperature was recorded with thermometer. pH was measured by a digital pH meter. TDS was measured with the help of a Portable Water Analyzer Kit, dissolved oxygen (DO), biological oxygen demand (BOD) were estimated by following APHA standard methods (APHA, 1985). Average has been tabulated in the table no. 1.

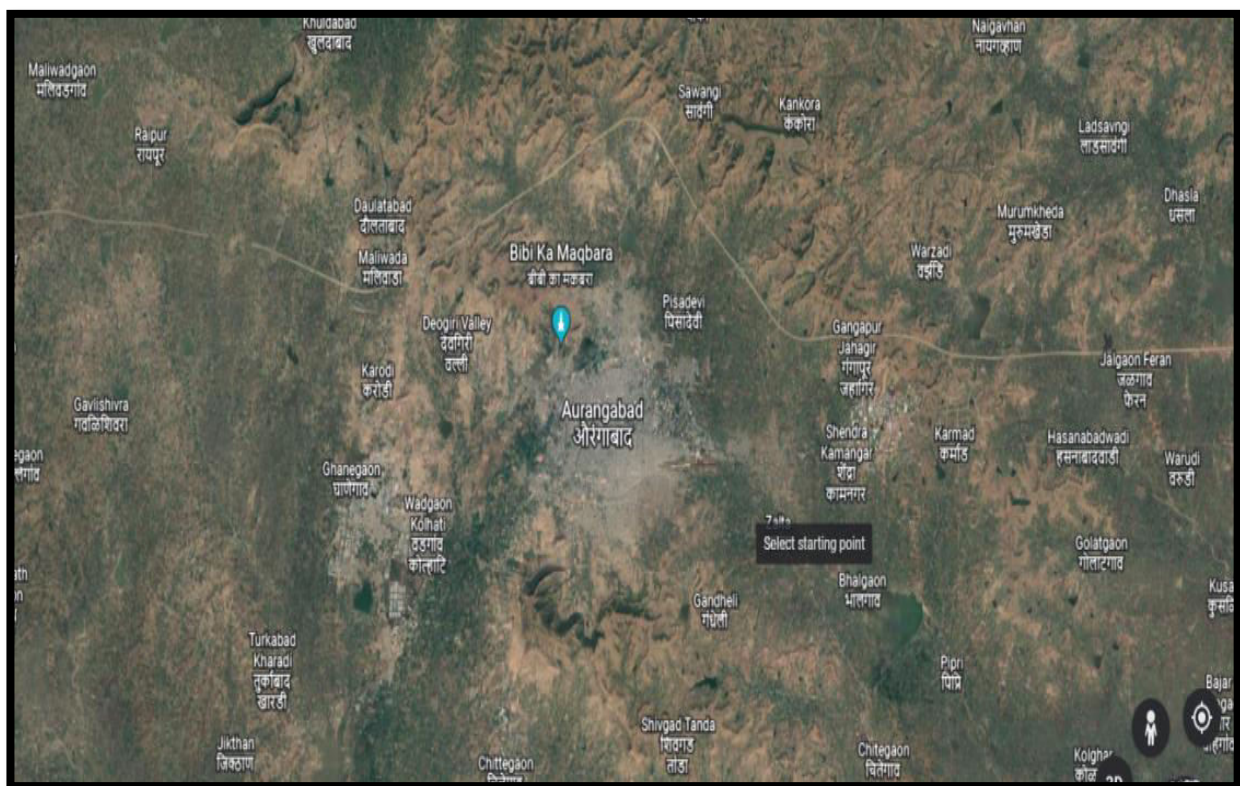


Fig 1: Study area showing sampling location

### IV. EXPERIMENTAL RESULTS

The samples collected from the study area were analyzed for their physical and chemical properties for determining their designated best use of ground water. The results obtained have been tabulated in Table. The observed values have been tabulated in the table no.1 and graphically represented in fig. no. 2 to 8. The highest observed values of bore well water sample of temperature 29.6 °C in the summer whereas lowest value is 24 °C in monsoon.

**Table No. 1: Seasonal observed values of bore well, tube well and open well in the study area**

Sr. No.	Parameters	Bore well			Tube well			Open well			WHO
		Monsoon	Winter	Summer	Monsoon	Winter	Summer	Monsoon	Winter	Summer	
1	Temperature	28	24	29.6	26	27	24	24.8	22.5	25.7	-
2	pH	6.7	6.1	6.5	6.7	6.7	6.1	7.2	6.8	6.1	6.5-8.5
3	DO	6.4	7.6	5.5	6.8	7.6	5.5	7	7.6	5.5	6-10
4	BOD	8.3	10.7	12.1	9.4	8.3	9.2	10	10.5	11.2	8-16
5	COD	10	10.5	11.2	10.3	9.2	10.7	10.5	9.1	8.7	9-15
6	TDS	250	298	365	345	309	256	355	376	291	500
7	Turbidity	1.5	1.8	1.6	1.2	1.05	1.29	1.7	1.89	1.16	5

The highest observed values of Tube well water sample of temperature 27 °C in the winter whereas lowest values is 24 °C in summer. The highest observed values of open well water sample of temperature 25.7 °C in the summer whereas lowest values are 22.5 °C in winter. The observed values for various parameters like DO, BOD, COD, TDS and Turbidity significantly varies from season to season and bore well, tube well and open well respectively. The detailed graphical interpretation has been given in the figure 2 to 8. Saxena and Sharma (2017) measured physical and chemical parameters to know the water quality and found results within the standard limits (Saxena and Sharma, 2017). Temperature is one of the crucial physical factors which have significant influence on ground water quality (Jogdand *et al.*, 2021). pH values have the positive correlation with electrical conductance and the total alkalinity (Gupta, 2004). However, water from all the natural sources which contain impurities in the gaseous, liquid and solid phases (Jogdand *et al.*, 2021). Generally, groundwater quality varies from region to region, sometimes based on seasonal changes the types of soils, rocks and surfaces through which it generally moves (Trivedi *et al.*, 2010; Thivya *et al.*, 2014). As groundwater flows through the sediments, metals like iron and manganese are dissolved and may later be found in the high amounts in the water (Moyo, 2013).

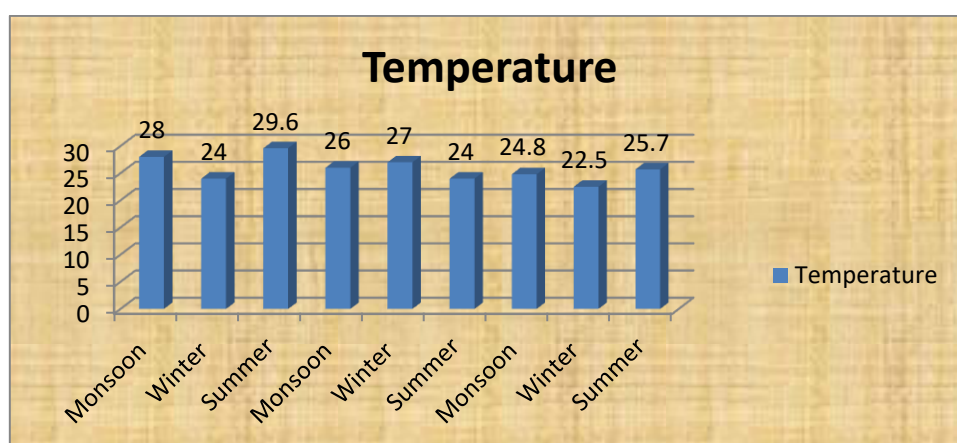


Fig 2 : Values indicating seasonal variation in temperature

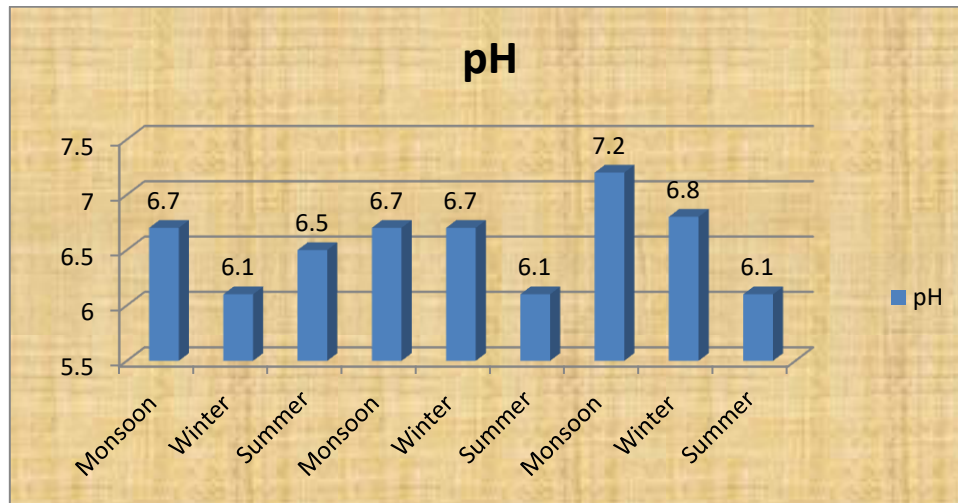


Fig 3 : Values indicating seasonal variation in pH

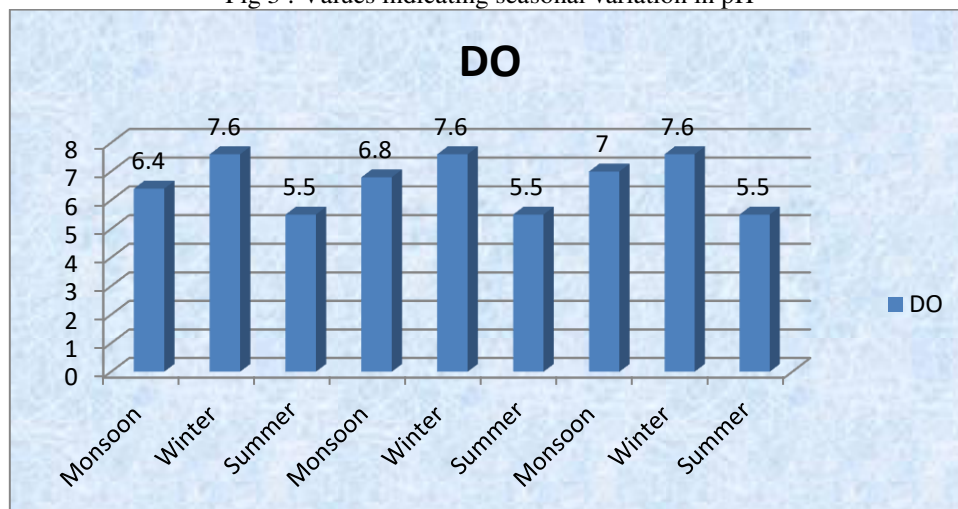


Fig 4: Values indicating seasonal variation in DO

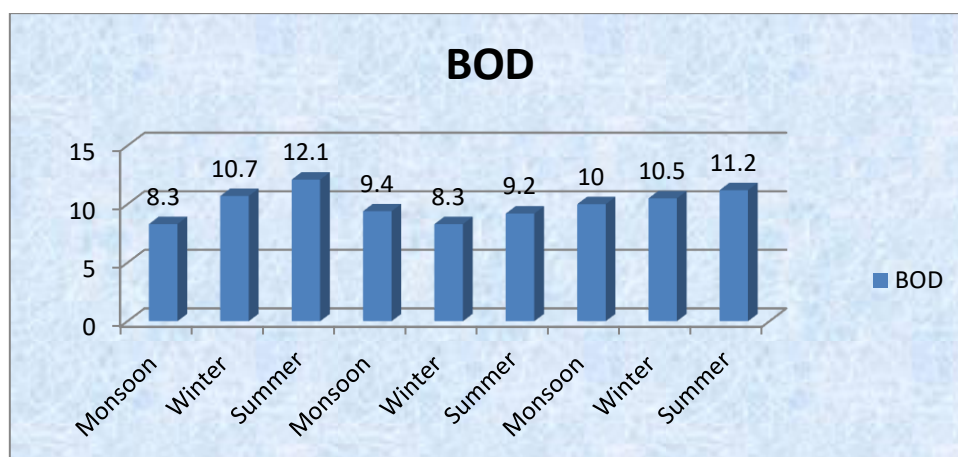


Fig 5: Values indicating seasonal variation in BOD

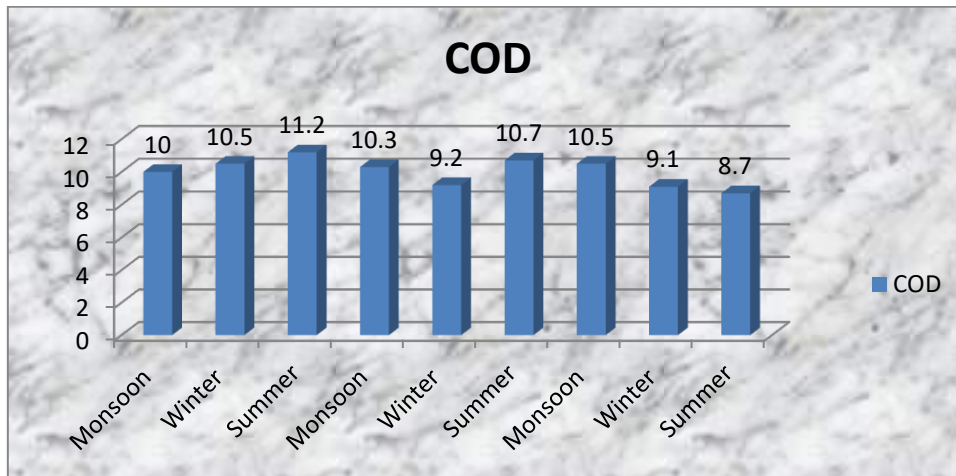


Fig 6: Values indicating seasonal variation in COD

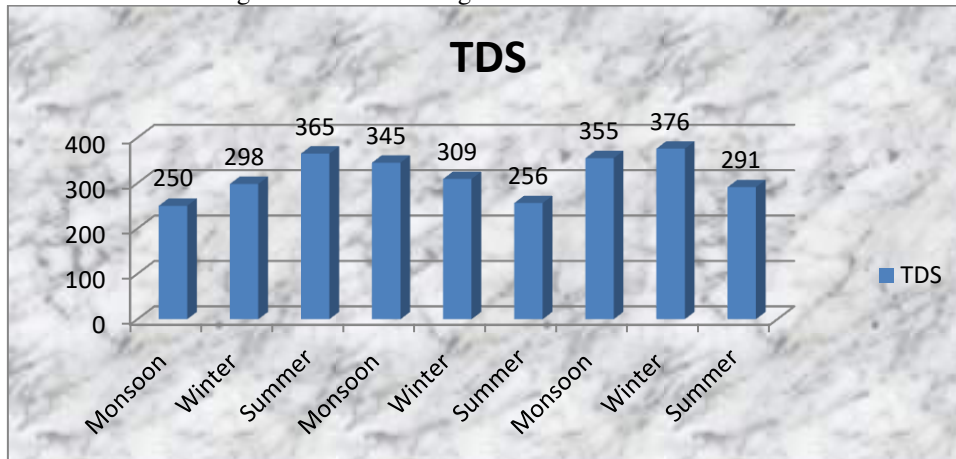


Fig 7: Values indicating seasonal variation in TDS

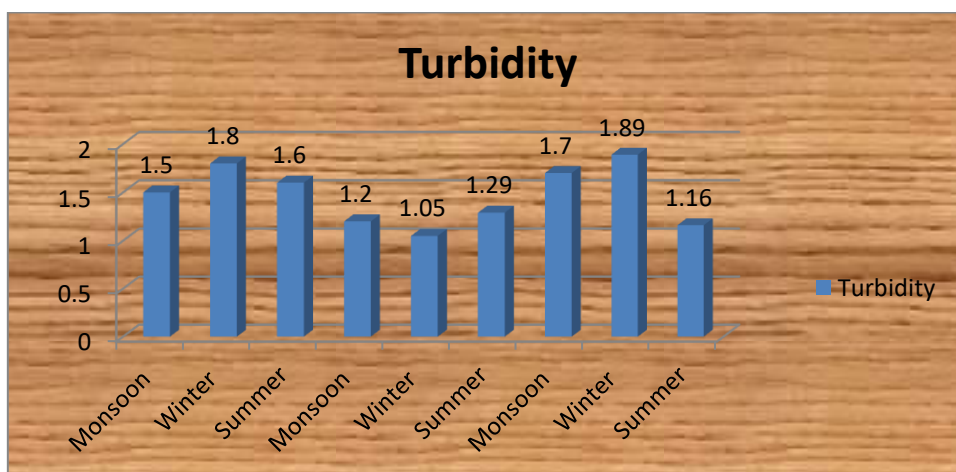


Fig 8: Values indicating seasonal variation in Turbidity

## V. CONCLUSION

Water is one of the most crucial inorganic chemical compounds present on the earth planet. A well designed laboratory study was carried out to assess the physicochemical characteristics of ground water samples of railway station area of Aurangabad city. The main objective of present research work was to know the ground water quality of



the study area. The analysis of Physical and chemical parameters of groundwater like Temperature, pH, TDS, DO, COD and BOD and Turbidity were determined. The evaluation of physiochemical parameters was carried by selecting three sampling stations. The parameters were analysed over a period of 12 months seasonally from June 2021 to May 2022 and seven physiochemical parameters were taken for water analysis. The samples collected were carefully tested and compared with standardised databases. The results revealed that the samples collected were suitable for human consumption. Based on the present study it is suggested that there should be ecologically sound plan of ground water use for drinking purpose so as to avoid the harmful effects on the individuals resides in the railway station area. The study further suggests that the groundwater of the area is good for the human consumption.

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