



ASSESSMENT OF GROUND WATER QUALITY FOR DRINKING PURPOSE IN DHULE CITY.

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Abstract: Water is life. Water is essential to all living organisms. Water is a natural source which is easily available for all of us. We cannot live without water. Our human body consists of 60 to 70 % water. So, water must be cleaned, disinfected & purified before drink. Therefore, it is required to check the quality of water for preventing the diseases occurred due to contaminated water. The proper treatment should be given to make water potable for drinking purpose. The physical, chemical & biological characteristics of water were checked by performing the different tests on it & these values were compared with the standard values specified by BIS. By collecting nearly 10 ground water samples i.e. well water samples from different regions of Dhule city & comparing the observed values with standard values, suitable purification process i.e. treatment to be given to ground water to make it potable.

CHAPTER I INTRODUCTION

Water is a chemical compound & may occur in a liquid form or in a solid form or in a gaseous form. All these three forms of water are extremely useful to man, providing him the luxuries & comforts in addition to fulfilling his basic necessities of life. No life can exist without water. We cannot imagine our life without water. Ground water plays an important role in our daily activities like drinking, cooking, bathing, washing, etc. Ground water is also important for agricultural purpose. The quality of ground water varies from place to place along with the depth of water table. It also varies with the seasonal changes & is primarily governed by the extent & composition of dissolved solids present in it. Due to the higher increase in population, pollution of water also increases & hence quality of water get deteriorated or damaged.

Due to increase in living standards of people, water consumption increases, hence more & more ground water is used. The rate of depletion of ground water levels & deterioration of ground water quality is of immediate concern in most of the countries. Because of large scale disposal of urban & industrial waste & use of chemical fertilizers & pesticides in agricultural fields.

OBJECTIVE -

Due to the increase in pollution it becomes difficult to supply sufficient quantity of pure water. It is necessary to find out the quality of ground water whether it is potable for drinking purpose.

To check the quality of ground water i.e. well water in Dhule city by performing different test on the well water.

LITERATURE REVIEW

Huynh The An et al¹ [2021] Day by day the quality of ground water was decreasing, so it affect on life and health of the people. So, it becomes essential to check the ground water quality to minimize the health problems which occurs due to water. They were collected total 30 drinking water well water samples to calculate water quality index and also find out the concentration of physical parameter like total dissolved solids , total solids and chemical parameters like pH, nitrite , nitrate, ammonia , iron. After the analysis it was found that the pH value was very low i.e. water was acidic and it was harmful for drinking purpose, 10 % of ground water samples had high nitrate content, and 6.67% of ground water samples had high ammonium content. Therefore, ground water quality was not good for drinking , cooking.

Esmail Asadi et al² [2019] The research aims to identify suitable areas of water pumping for drinking and agricultural harvest. The ground water samples were collected from 39 wells. The study was conducted by analyzing electrical conductivity (EC), total dissolved solids(TDS), chloride content, calcium (Ca), magnesium (Mg), sodium (Na), Potassium (K), sulphate , total hardness, carbonate, bicarbonate, pH, Sodium absorption ratio. The water quality index (WQI) and irrigation water quality (IWQ) were also found out. The results showed that about 37% of study area had high compatibility, and 63% of study area had average compatibility for agricultural purpose.

Verandani S. et al³ [2012] They were collected total 25 ground water samples from sampling sites during the pre- monsoon season. They analysed the water samples for dissolved metal concentrations & also measured the different physicochemical parameters such as pH value, temperature, turbidity, hardness, total alkalinity, dissolved oxygen (DO) , total dissolved solids (TDS), electrical conductance (EC) .They found out the concentrations of dissolved metals such as Cd, Cu, Pb and Cr from the collected water samples. They also carried out microbial analysis by testing the samples for E coli and thermo tolerant bacteria. By performing all this tests on all ground water samples they found out the results from each test. They got that lead was identified as major dissolved metal contaminant in most of the analysed samples.

K.R.Aher et al⁴ [2012] has stated that ground water is a vital source of clean drinking and irrigation water. They were collected 35 ground water samples from different dugwells and borewells. In this , he had check the ground water quality of Sukhana river for drinking and irrigation purpose. For these , there was an estimation of pH value, electrical conductance (EC) , total dissolved solids (TDS), total hardness as $CaCO_3$, Ca^{2+} , Mg^{2+} , Na^+ , K^+ , Cl^- , CO_3^- , HCO_3^- and SO_4^{2-} . Also some parameters like sodium adsorption ratio , sodium soluble percentage and residual sodium carbonate were calculated. There was a graphical representation obtained from analytical data for the classification of water. It was concluded that the value of TDS , Cl^- , SO_4^{2-} ion concentration was within the limits in most of the water samples and more water samples can be useful for irrigation purpose.

C.K. Jain, et al⁵ [2009] The paper examined the suitability of ground water which includes spring water for drinking purpose. The ground water samples including 28 spring water samples were collected and analysed for different water quality contents during pre monsoon and post monsoon seasons. TDS, alkalinity, hardness, calcium, magnesium, chloride, sulfate, nitrate, and fluoride content in water was found out by performing the tests on water samples. The bacteriological test also performed. The results shown that six samples exceed permissible limit of ten coliforms per 100 ml of sample. The concentration of iron

and lead exceeded permissible limit . Therefore, water should be disinfected before used for drinking and any other domestic purposes.

Vaibhav R. Dhavale, et al [2016] A study was done to check the quality of ground water of Amaravati city of Maharashtra. In this they took total ten ground water samples from the different areas of Amaravati city & performed the physical & chemical tests on it. They analysed the odour, taste, pH value, hardness, alkalinity, TDS. Therefore, They found out that the ground water quality for Amaravati city was satisfactory for many parameters.

METHODOLOGY

The total 10 number of ground water i.e. well water samples from different areas of Dhule city, Dist. Dhule, each were collected & further analysed in a laboratory by performing physical, chemical & biological test on such water samples. The physical analysis consists of turbidity test. The chemical analysis consists of pH value , hardness ,total dissolved solids (TDS), chlorine demand (C.D.) & dissolved oxygen(D.O.) tests. The biological analysis consists of M.P.N. test.The various characteristics determined as above were compared with the standard values specified by BIS.

RESULTS & DISCUSSION

1. Table of Permissible Limits

Sr. No.	Test Name	Permissible Limits
1.	Turbidity	<10 NTU
2.	pH value	6.6 to 8.5
3.	Hardness	75 to 115 ppm
4.	Chlorine Demand	≤ 250 ppm
5.	Dissolved oxygen	≤ 10 ppm
6.	Total Solids	≤ 1000 ppm
7.	M.P.N.	1 bacteria for 100 ml water sample

2. Result Table

Sr.No.	Sample No.	Area	Name of the tests					MPN (Index)
			Turbidity (NTU)	pH	Hardness (ppm)	D.O.	Chlorine Demand (ppm)	
1.	S1	Bhagawati nagar	0.3	7.5	224	5	100	19
2.	S2	Tryambak Nagar	2	8	288	5.1	100	9.2
3.	S3	Trimurti Colony	0	7	260	5.1	100	6
4.	S4	Datta Mandir	0.4	7	420	5.2	200	6.1
5.	S5	Surya Nagar	0.4	7.5	304	3.5	200	3
6.	S6	Ekta Nagar	0	7.5	180	3.2	100	15
7.	S7	Sakri Road	0	7.2	560	4	300	11
8.	S8	Nateshwar Colony	0	7.1	568	4	200	13
9.	S9	Barafattar	0	7	220	3.8	100	16
10.	S10	Railway Staion	0	8	480	7	200	12

CONCLUSION

After performing all physical, chemical & biological tests, the experimental values are compared with the standard values specified by BIS. Chlorine demand is more in Sakri Road area water sample, so it requires purification process. Hardness of water in Nateshwar colony & sakri Road area is more than 500, so it is very very hard. So these well water samples are not suitable for drinking & laundry purpose. MPN index of water sample in all areas is also more. So it is not potable. So water in all areas requires purification

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