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Assessment of Water Quality Parameters of Water in and Around Wani City, Dist.Yavatmal, MS, India.

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ABSTRACT
In the present study, physico-chemical and microbiological characteristics of the underground water, were determined in December 2019 from different location in Wani, Maharashtra, India. Total 4 water samples were collected from different locations. This study involves determination of physical, biological and chemical parameters of surface water at different points. Total dissolved solids and magnesium are found above BIS permissible limit at some sampling sites. Nostoc and water scorpion were found in samples viz S-1, S-2, S-3 and S-4 respectively. No coliforms were observed in samples. It is observed that the quality of groundwater is suitable for drinking and domestic purpose in some sampling sites.

Keywords: Ground water, bore well water, conductivity, TDS, DO, chlorides, total solids,

INTRODUCTION

Water quality means the physical, chemical and biological characteristics of water. Ground water contains high amount of various ions, salts etc. so if we were using such type of water as potable water then it leads to various water-borne diseases**.** The present work is a primary attempt to examine the water quality of various potable water resources in and around Wani. Among the water quality parameters acidity, alkalinity, pH, hardness, biological parameters, TDS, Conductance, carbonates, bicarbonates, chlorides, calcium ,magneshium, temperature,density.

Ground water contains various types of pollutants and several other substances are dissolved in it. Concentration of which is useful for human body but in a specific limit. The study was conducted to know the physico -chemical properties of ground water and in different seasons and its impact on human life. In present study, at certain places various parameters exceeds the WHO / Indian standards of potable water.

METHODOLOGY

Study Area

Total 16 water samples were collected in December 2019, from different locations (Nirguada river, Ravi Nagar, Chikhalgaon, Chhoriya Layout) in Wani city, Yavatmal district, Maharashtra, India. All the samples were collectedin sterilized bottles and were stored at 5°C till further investigation. Acidity, alkalinity, pH, hardness, biological parameters, TDS, Conductance, carbonates, bicarbonates, chlorides, calcium, magneshium temperature, density.

Samples collected from the study sites were properly labeled and a record was prepared.The temperature, density, pH, conductivity and total dissolved solids of the water samples were determined on the spot using a thermometer, densitymeter, pH meter, conductometer and TDS meter. Various standard methods were used for the determination of other parameters viz. acidity, alkalinity, hardness, biological parameters, carbonates, bicarbonates, chlorides. Alkalinity was determined by visual titration method using methyl orange and phenolphthalein as indicator. Total hardness and calcium were measured by EDTA titrimetric method using EBT indicator respectively. The chloride ions were generally determined by titrating the water samples against a standard solution of AgNO3 using potassium chromate as an indicator. The conductivity of the water sample was measured using the conductometry method.

RESULTS AND DISCUSSION

The physico-chemical characteristics of drinking water of the study area are presented in Table 1.

pH

In our study the pH of surface water ranges from 6.98 to 8.22. The min. value responded at sampling location Chikhalgaon, while the max pH was noted on sampling point Nirguda river, which was above the max. Permissible range as prescribed by BIS drinking water standards.

Alkalinity

The min. value was recorded at Chikhalgaon sampling spot and max is at Nirguda river both values are above the above the desirable range as prescribed by BIS drinking water standards.

Total Hardness

This water quality is due to the presence of calcium and magnesium salt. The average value 832.37 mg/L and range covered from 649.5 mg/L to 979.5 mg/L as low and high value from the BK7 (Mar) and BK5 (May) sampling spots. The max. value was far from the limit level as per BIS1and WHO15 standard.

Total Dissolved Solids (TDS)

The total dissolved solids are expressed by the weight of residue left when a water sample has been evaporated to dryness. The mean value was 360 mg/L (Nirguda river) to 2320 mg/L(Ravi nagar). The min. value was recorded at sampling spot which was within the permissible limit prescribed by BIS standard.

Electrical Conductivity

The electrical conductivity of water is due to the presence of dissolved inorganic salts. The average and ranging values were noted as 0.72mhos / cm to 1.5mhos / cm. The minima and maxima value were reported at the sampling location Nirguda river and Chhoriya layout, respectively. The max. value is within the limit prescribed by BIS standard.

Chlorides

The total dissolved solids are expressed by the weight of residue left when a water sample has been evaporated to dryness. The mean value was 360 mg/L (Nirguda river) to 2320 mg/L(Ravi nagar). The min. value was recorded at sampling spot which was within the permissible limit prescribed by BIS standard.

Carbonates
The min. value was recorded at Nirguda river sampling spot and max is at Ravi nagar.

Bicarbonates
The min. value was recorded at Ravi nagar sampling spot and max is at Chikhalgaon.

Acidity
The min. value was recorded at Nirguda river sampling spot and max is at Chikhalgaon.

Biological Parameters
Nostoc and water scorpion are observed in all sample. Nirguda river also contains Cladophora.

Density
The min. value responded at sampling location Nirguda river, while the max. was noted on sampling point Ravi nagar.

DO
The min. value responded at sampling location Ravi nagar, while the max. was noted on sampling point Nirguda river.

Calcium
The min. value responded at sampling location Chhoriya layout, while the max. was noted on sampling point Ravi nagar, which was above the above the desirable range as prescribed by BIS drinking water standards.

Magnesium
The min. value responded at sampling location Nirguda river, while the max. was noted on sampling point Ravi nagar, which was above the above the desirable and permissible range as prescribed by BIS drinking water standards.

Table 1: The physico-chemical characteristics of drinking water of the study area

Parameters	BIS standards	Nirguda river	Chhoriya layout	Chikhalgaon	Ravinagar
pH	6.5-8.5	8.22	7.19	6.98	7.42
Alkalinity	Desirable :200 mg/l , Permissible: 600 mg/l	476	362	328	440
Hardness	Desirable:300 mg/l , Permissible: 600 mg/l	56	140	68	40
TDS	Desirable:500 mg/l , Permissibl: 2000 mg/l	360	710	1170	2320
Chlorides	Desirable:250 mg/l, Permissible:1000mg/l	16.37	9.92	44.6	129.03
Carbonates	-	5.92	12.2	19.52	24.26
Bicarbonates	-	1.36	3.5	4.26	0.64
Temperature	-	27	30	27	28
Acidity	-	4.72	6.24	7.78	6.45
Biological Parameters	-	Nostoc, Water scorpion, Cladophora	Nostoc, Water scorpion	Nostoc, Water scorpion	Nostoc, Water scorpion
Conductance	-	0.720	0.90	1.5	1.07
Density	-	0.9978	0.9985	0.9980	0.9986
Dissolve Oxygen	-	8.5	7.9	7.2	6.6
Calcium	Desirable:75 mg/l, Permissible: 200 mg/l	64.08	72.43	42.69	84.95
Magnesium	Desirable:30 mg/l, Permissible : 100 mg/l	34.176	68.20	51.26	104.66

CONCLUSION

The results show that water quality of Nirguda river, Chhoriya layout, Chikhalgaon and Ravi nagar shows no remarkable variation from the BIS recommended values. The values are mostly above desirable level but within permissible limit.

Conflicts of interest: The authors stated that no conflicts of interest.

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