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Studies of physicochemical parameters of water samples

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ABSTRACT

Water is a important part of human life, Physicochemical analysis of underground water was carried out during a winter season. All the samples were collected from the different places. People used water for drinking and irrigation purpose. Ground water samples were collected from different villages of Yawal taluka, Jalgaon District (India). These water samples from six different villages of Yawal, taluka were analyzed for their physicochemical characteristics. Laboratory tests were performed for the analysis of samples for pH, Hardness, Chloride, Alkalinity, TDS, Conductivity Temperature Calcium Magnesium, hardness, total hardness, sulphate, phosphate, nitrate, & COD were studied.

Key words: Physicochemical, Conductivity, Hardness.

INTRODUCTION

Water is essential natural occurring resources for human life and environment that we have always thought to be available in abundance and free god gift of nature [1-2]. The water for the consumption of human beings comes in different forms and from different sources. There were two main sources of drinking water; one is a surface water resources river, lakes. Under ground water mainly from the seepage of surface water and is held in the subsoil and in previous rock. About 94% of total available water all over world is in the form of ground water. In villages the main source of drinking water is under ground water available from wells, bore wells or hand pumps [3-5].

MATERIALS AND METHODS

All the water samples were collected in the month of January. Samples were collected in pre-cleaned blue colored Sampling bottles of one liter capacity, using the standard method for collection of samples. The villages form Yawal taluka, S₁ Atrawal, S₂ Bhalod, S₃ Chitoda, S₄ Hingona, S₅ Chikali bk, S₆ Sangavi bk. Standard procedure was used for determination of physiochemical parameters. The chemicals used for analysis and determination of certain parameters they were analytical grade. The water quality analysis of different ground water samples have been carried out for pH, Electrical conductivity, TDS, Total hardness, Ca ion, Mg ion, Chloride, and Sulphate, nitrate, COD.

RESULTS AND DISCUSSION

Table 1 shows physicochemical parameters of underground water from six villages of Yawal taluka, Jalgaon District. The temperature, pH, conductivity and dissolved solids of the water samples were determined by using a thermometer; pH meter, conductometer. The samples were analyzed using various analytical methods; Total

hardness and calcium were measured by EDTA titration method [7-9]. Chloride was determined by Mohr's method using potassium chromate indicator. The data revealed that there were considerable variations in the examined samples from different sources with respect to their chemical characteristics. The results indicate that the quality of water considerably varies from location to location [10-12].

Table 1 shows physicochemical parameters of underground water from six villages of Yawal taluka, Jalgaon District

Sr No	Parameter	unit	S1	S2	S3	S4	S5	S6
1	Temperature	^o C	22 ^o c	23 ^o c	19 ^o c	21 ^o c	20 ^o c	22 ^o c
2	pH		7.44	7.23	7.36	7.88	7.98	7.67
3	TDS	(mg/L)	432	620	656	721	543	566
4	Ca hardness	(mg/L)	140	145	165	125	134	146
5	Mg hardness	(mg/L)	80	116	119	94	83	89
6	Total hardness	(mg/L)	220	261	284	219	217	238
7	Chlorides	(mg/L)	213	95	155	210	280	232
8	Sulphates	(mg/L)	56.5	49.7	45.8	66.4	55.9	62.3
9	Nitrate	(mg/L)	7.3	11.6	10.1	16.5	18.6	17.5
10	Phosphate	(mg/L)	0.21	0.34	0.61	0.56	0.83	1.12
11	DO	(mg/L)	6.9	7.0	6.8	6.6	7.1	7.2
12	COD	(mg/L)	11.7	12.1	11.7	13.1	13.4	12.8
13	EC	mho/cm	980	890	1120	1060	1350	1250

In the present study pH value of water samples varied in a narrow range within the permissible limits in all sources. The pH has showed significant positive relation with electrical conductivity and alkalinity. The variation of pH values are shown in the present study. The EC values were found higher at S₅ village (1350 μ mhos/cm) and very low conductivity was found at S₂ village (890 μ mhos/cm). EC values can be used to estimate the dissolved solids concentration which may affect the taste of water and suitability for various uses. Higher the conductivity values indicate higher the dissolved solids concentration in water. Higher the concentration of acid, base and salts in water, more will be the conductivity [13-15].

Hardness is the measure of the capacity of water to produce lather with soap or detergent. Hardness is one of the very important properties of ground water from utility point of view for different purposes. Calcium and magnesium are directly related to hardness and hence they are discussed in combined. The acceptable limits for calcium and magnesium for domestic use are 75 mg/L and 30 mg/L, respectively in ground water [16-19].

CONCLUSION

The study of various physicochemical parameters such as hydrogen ion concentration (pH), electrical Conductivity, total alkalinity, dissolved Oxygen, chloride, total hardness, magnesium, calcium, total dissolved solid, chemical oxygen demand (hereafter COD), was carried out by using various standard methods reported in the literature. Specific representative six villages of Yawal Taluka selected. From the study it was clear that the water of all these sources is suitable for drinking purpose after some treatment, with respect to the studied physicochemical parameters.

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