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Research Article

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Physico Chemical Study of Ground Water from Katwan Region in Sakri Tehsil (MS)

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ABSTRACT

There is no life without water, it plays important role in living system. Hence there is great attention on study of analysis of water to ascertain that to determine suitable for consumption. The ground water quality is determined in five blocks of five villages (Deur, Kakani, Mhasadi, Vasamar, Dhamanar) that lies in Katwan region of Sakri tehsil in Dhule district (MS) from where one sample from each block and one sample of drinking water from each village are studied. In physico-chemical analysis various parameters was studied like pH, Turbidity, Electrical conductivity, TDS, TH, TA, BOD, COD etc., out of which only physical parameters are studied in this paper.

Keywords: Ground water; pH; Total dissolved solids

INTRODUCTION

Without water there is no human life. The fresh water is most precious thing which is essential for life [1]. Water is the most widely present and abundant substance found on the earth, and main thing is that our planet is wash with water, in total there is 1400 million billion liters of water but most of this water is cannot be used for drinking because 97% is sea water and only 3% is fresh water, out of which 2% is ledged in the polar ice caps and glaciers. Only 1% of water available for portable use, whereas more water is utilized for irrigation than drinking, sanitation and all other use (WHO-2004) Along with it is used for food product, industrial, waste disposal and for agriculture [2,3]. Due to the urbanization and industrialization there is spoil of water take place, for agriculture tremendous amount of water is required in rural area where there is no alternatives like dam, river, or canals. During last two decades the level of ground water decreases dramatically because of exploration of human intervention and therefore water borne diseases has been seen which cause health hazards. The physic-chemical study of water in the given region is great aspect of aquatic environmental chemistry in which the study of sources, composition, reaction and transportation of water occurs. The quality of water is highly concerned with human being and is directly linked with human welfare [4-6]. The present work is an attempt to measure the quality of various sample of water from Katwan region of north Maharashtra.

EXPERIMENTAL SECTION

Study Area

The study area comprises of Katwan region in Sakri tehsil, Dhule district of Mharashtra, Dhule district. The area is situated near the Panzara River. The samples of well waters collected from Deur, Kakani, Mhasadi, Vasamar and Dhamnar villages. In the present study only physical parameter of water samples taken from wells of given villages in the month of May are studied (Tables 1-6).

Water Sampling

In the present study of water samples, the water samples were collected in polyethene bottles which are cleaned with acid water and again with distilled water [7]. The analysis is carried out with standard methods.

Methodology

The pH, EC, TDS was measured using soil and water analysis kit.

Table 1: Study of physical parameter of well water samples

Area	Temperature	pH	EC	TDS
Deur	28.5	7.54	543	358
Kakani	28.1	7.46	827	547
Mhasadi	28.2	7.92	446	294
Vasamar	28.6	7.89	623	411
Dhamnar	28.5	7.95	877	580

Table 2: Comparison of well water at the study area with drinking water samples

Sr. No	Parameter	Minimum	Maximum	Mean	ICMR(Desirable limit)
1	pH	7.46	7.95	7.7	7.0-8.5
2	EC	446	877	661.5	-
3	TDS	294	580	437	500

Table 3: Study of physical parameter of drinking water samples

Area	Temperature	pH	EC	TDS
Deur	28.5	7.52	834	551
Kakani	28.5	7.5	736	494
Mhasadi	28.7	7.8	771	509
Vasamar	28.6	7.86	643	424
Dhamnar	28.9	7.9	1178	776

Table 4: Comparison of tap water at the study area with drinking water slandered

Sr. No	Parameter	Minimum	Maximum	Mean	ICMR(Desirable limit)
1	pH	7.5	7.9	7.7	7.0-8.5
2	EC	643	1178	910.5	-
3	TDS	494	776	635	500

Table 5: Classification of well water sample on the basis of TDS

Sr. No	Classification of Water	TDS(mg/l)	No. of Sample
1	Non Saline	<1000	5
2	Slight saline	1000-3000	Nil
3	Moderate saline	3000-10000	Nil
4	Very saline	>10000	Nil

Table 6: Desirable limits of physical parameters

Parameter	B.I.S		I.C.M.R		WHO	
	Highly Desirable	Max. Permisible	Highly Desirable	Max. Permisible	Highly Desirable	Max. Permisible
EC	No desirable standard					
TDS	500	1500	500	1500	500	1500
pH	6.5-8.2	6.5-9.2	7-8.5	6.5-9.2	7-8.2	6.5-9.2

pH:

The pH of given samples at any temperature represent the potential of hydrogen ion concentration which can be measured quickly. It plays an important role in environmental engineering for water supply, water softening and disinfection and corrosion control [8-11]. Low pH affects the corrosion, high pH cause taste, soapy feel and pH greater than 8 is preferable for the effective disinfection with chlorine reported that the value of pH ranges from 8.0 to 9.0 unit in Indian water. The average pH of ground water in Dhule district is around 8 slight alkaline.

Electrical conductivity:

The Electrical conductivity is ability to carry current due to the presence of ions such as Cl^-, SO_4^{--}, CO_3^-, HCO_3, NO_3^-, Ca^{++}, Mg^{++}, Na^+ and K^+ are responsible for carry electric current (Table 7).

Table 7: Electrical conductivity carrying

Sr.No	Type	EC	No of samples
1	Excellent	<250	--
2	good	250-750	3
3	Doubt	750-2250	2
4	Unsuitable	>2250	--

As per the EC there is no village belongs to the excellent category. Out of these only three villages has good category as per Kakani EC and Dhamnar are doubtful and suitable for drinking purpose [12].

Total dissolved solids (TDS):

Natural water contain uncountable solids such as Cl^-, Fe, SO_4^{--}, CO_3^-, HCO_3^-,NO_3^-, Ca^{++}, Mg^{++}, Na^+ and K^+. Simply TDS can be express as sum of the cations and anions concentration expressed in mg/l [13]. Cl^- is major inorganic constituent in natural water (Tables 8 and 9). It may come from soil, rocks, discharge of agriculture, industrial and domestic waste water.

Table 8: Distribution of TDS of well water

Sr. No	Range	Type	No of samples
1	<300	Low	1
2	300-600	Average	4
3	>600	High	0

Table 9: Distribution of TDS of drinking water

Sr. No	Range	Type	No of samples
1	<300	Low	0
2	300-600	Average	4
3	>600	High	1

RESULTS AND DISCUSSION

The water samples of both drinking and well from the study area has no colour, odour and taste. The taste of the water sample almost all location is pleasant in taste. The study of physical parameters of given water sample are given in Tables 1-4. Both types of water samples are compared with standards are given by WHO. The pH of water sample shows variation in its range which indicate they are in the range of quality parameter permissible limit. The EC of water shows high variation in all samples of all blocks. TDS also shows variation in its range out all these samples only one sample is not in desirable limit.

CONCLUSION

In the present study of ground water (Well Water) and sample of water which people are used to consume in the given study area, the result of chemical analysis of sample water shows considerable variation. Most of the water samples comply with ICMR and WHO standard for drinking purpose. The water quality in the investigated area is found to be suitable for drinking except few locations. It requires regular chemical analysis to ensure that the quality of water is not contaminated.

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