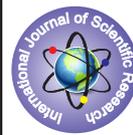


Physico –Chemical Analysis of Underground Water from Mehsana Taluka villages area, Mehsana District, Gujarat. India.



Chemistry

KEYWORDS: Physico –chemical parameters, drinking water quality, WHO, ICMR, Permissible.

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ABSTRACT

In this study the water samples were collected from different villages of Mehsana Taluka area of Mehsana district Gujarat, India. And For this water sample various types of Physico –chemical parameters as like as pH, Total dissolved solids, Total Hardness, EC, F, Ca²⁺, Mg²⁺ were studied. The water samples were taken from different ten villages of Mehsana taluka, and the analyzed data were compared with the standard drinking water quality data of World Health organization (WHO), Indian Standard, and ICMR. It was found from the study that the some of parameter of the water sample were not in the standard drinking water range but most of the samples were in the permissible limits of the standard range.

Introduction:

Water is the one of the most important and essential need for all living –organism. The chemical formula of water is H₂O. water covers 71% part of the earth surface. It is the most natural source for Human beings. In the human body water is major component. All the human activity in the day begins with water. Water plays most important role for the surviving of human beings and its development. Besides the drinking purpose of water there are so many fields in which water is used such as agriculture, preparation of food, and for the industry. The quality of drinking water for human life is directly related with the health, survival of the life and its development. Every person should get clean and fresh water. Now a days the industrialization, urbanization and the excess uses of pesticides the ground water gets polluted. The most of the human diseases spread from the using unsafe drinking water. The safe drinking water is essential for healthy life and development of the area. There are many areas they depends ground water for drinking and domestics purpose. The basic purpose of this study is to check the quality of drinking water for human beings.

Materials and Method:

Study Area:

In this study the water samples were taken from 10 different villages of Mehsana taluka. Mehsana is also one of the district place of Gujarat state in western India. Mehsana district borders with Banaskantha district in the north, patan and Surendranagar districts in west Gandinagar and Ahmedabad district in south. The Geographical location of Mehsana is 72.070 To 72.260 east longitude, and 23.150 To 23.530 north latitude. Mehsana consists 11 talukas such as Becharaji, Kadi, Kheralu, Mehsana, etc.

Sampling:

The water samples were collected from the different Ten villages of Mehsana taluka. For the collecting the water sample 1 Lit. capacity of polythene bottle with Stoppard were used. before sampling, the bottles were cleaned with 2% Nitric acid and then distilled water. After taking the samples, the bottles were kept in clean place, and then the bottle were brought in to the lab for the physico- chemical analysis.

Experimental Method:

In the physico chemical analysis of water sample the pH of water sample was measured by digital pH meter. before measuring the pH of the water sample the instrument was calibrated by buffer solution using buffer tablet. To measure the Electrical conductivity the digital conductometer was standardized by KCL solution and then conductivity was measured. TDS meter was used to measure the TDS of the water sample and the other parameter such as Cl⁻, F⁻, Mg²⁺, Ca²⁺ total Hardness (TH) were measured by standard titrating method.

Table: 1 Physico–chemical parameter of the water sample of Different village area.

Sample Nos.	Name of Village	pH	TDS (mg /l)	Ca (mg /l)	Cl (mg /l)	F (mg /l)	Mg (mg /l)	TH (mg /l)	EC
S ₁	Davada	7.5	175	36	17.1	0.1	11.1	120	545
S ₂	Palwasana	7.4	145	32	29.3	0.11	7.1	109	480
S ₃	Soneripura	7.6	131	29	16.2	0.12	10.2	115	401
S ₄	Nanidau	7.6	138	35	18.3	0.37	13.8	118	375
S ₅	Taleti	7.7	1000	90	403	0.41	69.4	490.2	600
S ₆	Palodar	7.4	1200	92	550	0.38	62.1	475.3	2000
S ₇	Fatepura	7.5	900	62.3	350	0.53	58.3	370	1500
S ₈	Ramosana	7.7	350	23.3	109.2	0.29	25.3	149.3	900
S ₉	Panchot	7.7	130	28.2	22.3	0.32	15.6	115.4	620
S ₁₀	Dediyasan	7.9	140	30.2	18.2	0.38	12.2	112.3	510
	Maximum	7.9	1200	92	550	0.53	69.4	490.2	2000
	Minimum	7.4	130	23.3	16.2	0.1	7.1	109	375
	Average	7.6	430.9	45.8	153.3	0.301	28.51	217.4	793.1

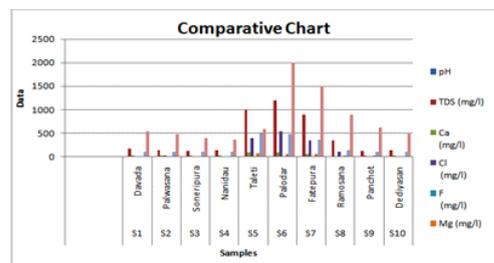


Table: 2 Comparison of the Ground water quality with the standard drinking water as per BIS, WHO and ICMR.

Parameter	Maximum	Minimum	Average	Indian Standard (BIS)	WHO	ICMR
pH	7.9	7.4	7.6	6.5-8.5	7.0-8.0	7.0-8.5
TDS	1200	130	430.9	300	100	500
Ca	92	23.3	45.8	75	-	75
Cl	550	16.2	153.36	250	250	200
F	0.53	0.1	0.301	1	1	1
Mg	69.4	7.1	28.51	30	-	50
TH	490.2	109	217.45	200	-	300
EC	2000	375	793.1	-	-	-

Result and Discussion:

The physico- chemical analysis of water sample data is mentioned in the above Table No.1, and in Table No.2 this analyzed Ground water sample data are compared with the standard drinking water data of WHO, ICMR Indian Standards. The pH value was found in 7.4 to 7.9 in all the water sample. as per Indian standard limits is 6.5 to 8.5 so it was in the permissible limit. There was a variable change in The Electrical Conductivity (EC), Electrical conductivity is a measure of the ability of the water to conduct electricity. and it depends on TDS

and inorganic materials as like as alkalis, sulfides ,chloride. The most of the water sample the TDS value was found in the permissible limits but in some samples it was out of the permissible range. The Minerals value were found in the standard permissible but the amount was less than the required acceptable limits. the Fluoride value were in less than one. The range of Fluoride was in 0.1 to 0.5 and the range of Chloride was in 16 to 550 Fluoride and Chloride both were in the permissible limits.

Conclusion:

From the above physico-chemical analysis of water sample data it can be concluded that the most of the water samples collected from the villages of Mehsana taluka were in the permissible limits as per WHO, Indian Standard and ICMR but some of the water samples were found higher TDS value as per prescribed desirable limit. higher TDS in water is not desirable for drinking purpose. Drinking water with moderate amount of TDS is good for the health. As per standard Fluoride and chloride were both in permissible limits All the samples were clean and odourless.

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