Research Paper

Volume : 3 | Issue : 3 | March 2014 • ISSN No 2277 - 8179

Analysis of Drinking water quality of Underground Water from villages of Visnagar Taluka area, District-Mehsana, Gujarat, India.

Chemistry

KEYWORDS:

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ABSTRACT

In this study the water sample were collected from different villages of Visnagar taluka area of Mehsana district, Gujarat state, India. For the analysis of the water sample various types of Physico–chemical parameters as like as pH ,Total dissolved solids TDS, Total Hardness, EC, Ca^{+2}, Mg^{+2} were studied. The underground water samples were taken from ten different villages of Visnagar taluka and the analysied physic chemical parameter data were compared with the standard drinking water quality data of World Health Organisation (WHO) and Bureau of Indian standard (BIS). From the analysis it was found that the some of the water sample data 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 one of the most precious natural resources for all living organism on the Earth. The life is not possible on the earth without water. Water covers 70% on the earth surface similarly in the human body contains major portion of water. For the survival of the human water is the most prominent requirement after the fresh air .water is easily available everywhere, but the good quality of drinking water is main concern for the health. Water is used in so many fields such as, the production of electricity, Irrigation for the preparation of food, Domestics purpose and in the Industries. All kind of the human activities are dependent on water. Every person should get the fresh air and good quality of water for the health. Due to urbanization, industrialization and excess uses of the pesticide and insecticide, the ground water and the surface water gets polluted. The polluted and contaminated water becomes poor in quality and this poor quality of water causes many diseases in the human. so that the quality of the water must be checked and maintained .The good quality of drinking water for human life is directly related with the health, survival of the life and its development .there are many areas they depends ground water for drinking and domestics purpose .The aim of this study is to check the quality of water and its safe use for drinking and domestics purpose for the human..

Materials and Method:

Study area:

For the analysis of drinking water quality the water samples were collected from different ten villages of Visnagar taluka in of Mehsana district, Gujarat state, India .it is located 23.700 latitude and 72.550 longitude it the 36th biggest city in Gujarat it is surrounded by many great places of religious and architectural important

Sampling:

The water samples were collected from the different Ten villages of Visnagar taluka area. One Lit capacity of polythene bottle with Stoppard were used for the collecting the samples .before collecting the samples the bottles were cleaned with 2% Nitric acid and then distilled water. All the water samples bottles were kept in clean area and then for the physic chemical analysis bottles were brought in the lab.

Expperimental Method:

For the analysis of water samples in the lab various types of physico–chemical parameter were measured . The pH value is the first important parameter for the quality of water. Which indicates the acidic, basic or neutrality of the water sample .The pH value of the water sample was measured by digital pH meter .To measure the pH of the water sample the instrument was first calibrated by buffer solution. TDS indicates the total dissolved solids in the water .TDS was measured by TDS meter. Electrical conductivity (EC) was measured by digital conduct meter. Before measuring the EC of the water sample, the conductometer was standardize by KCL solution. .and the other parameters like Ca, Mg, F, Cl and 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 (mg/l)
S_1	Kansa	7.2	1250	63	250	0.2	51	320	2800
S_2	Bhandu	7.4	180	35	29.3	0.1	23	109	480
S_3	Savala	7.3	1370	85	350	0.12	56	325	2700
S_4	Kamana	7.4	1290	96	445	0.1	60.2	378	2298
S_5	Magaroda	7.6	495	76.5	180	0.2	40.3	310	835
S_6	Kharvada	7.7	503	60	155	0.1	42	306	1100
S_7	Dadhi yal	7.1	475	70.2	198	0.2	40.1	290	900
S_8	Kansarakui	7.4	789	78.9	240	0.29	42.5	325	1200
S_9	Basana	7.2	1020	97	432	0.1	44.5	450	1880
S_{10}	Chitroda	7.0	1210	90.5	423	0.32	48.3	432	2200
Minimum		7.0	180.0	35.0	29.3	0.1	23.0	109.0	480.0
Maximum		7.7	1370.0	97.0	445.0	0.3	60.2	450.0	2800.0
Average		7.3	858.2	75.2	270.2	0.2	44.8	324.5	1639.3

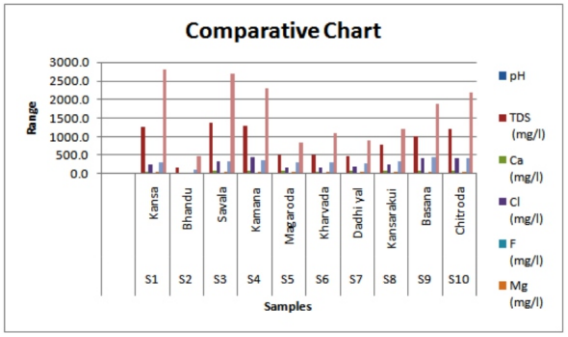

Table: 2 Comparision of the Ground water quality with the standard drinking water as per BIS and WHO.

Parameter	Maximum	Minimum	Average	Indian Standard (BIS)	WHO
pH	7.7	7	7.3	6.5-8.5	7.0-8.0
TDS	1370	180	858.2	300	100
Ca	97	35	75.2	75	-
Cl	445	29.3	270.2	250	250
F	0.3	0.1	0.2	1	1
Mg	60.2	23	44.8	30	-
TH	450	109	324.5	200	-
EC	2800	480	1639.3	-	-

Result and Discussion:

pH :- The pH value is good indicator to determine wather water is acidic or alkaline or neutral in nature.The pH of pure water is 7. If the pH is less than 7 it is considered acidic and with greater than 7 is considered alkaline in nature.the normal range of pH of the surface water is 6.5 to 8.5 and for ground water range between 6.0 to 8.5.water with a pH less than 6.5 could be acidic and corrosive,acidic water contain toxic metals.and acidic water can create premature damage to metal piping.

In the above Table No.1, the physico chemical analysed samples data is maimtained and in the Table No.2 this analyzed Ground water sample data are compared with the standard drinking water data of WHO and BIS Indian Standards. In all the water samples The pH range was found in 7.0 to7.7 which was in the permissible limits as per Indian standard and WHO limits is 6.5 to 8.5.

Electrical conductivity (EC) :- Ectrical conductivty depends on TDS and inorganic materials. Electrical conductivity increases as the concentration of ions increases and it is a measure of the ability of waters capability to pass electrical flow .there was a variable change in the EC.

Total Dissolved solids (TDS) :- Total dissolved solids is a measure of the combined context of all inorganic and organic substances contained in water .TDS is the study of water quality for streams rivers and lacks TDS is not generally considered a primary pollutants. It is used as a indication of aesthetic characteristics of drinking water .Some of the water sample in which TDS value was found in the desirable limits but in some samples the TDS range was found more than the desirable. The human body requires a certain amount of salt to maintain electrolyte balance in the human system.TDS below 500mg/l of water is safe and recommended . Excessive TDS particulary with salt of calcium and magnesium leades to hardness of water and then causes scaling in the household devices .the amount of mineral were found in the standard permissible. Mg activate many enzymes reaction in the body.Mg is crusial to nerve transmission muscle contraction blood coagulation and energy production. but the .the Fluoride value were in less than one .The range of Fluoride was in 0.1 to 0.29 and the range of Chloride was in 29 to 445 Fluoride and Chloride both were in the permissible limits. The range of Calcium was found in 35 to 97 and it was in permissible limit.

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 Visnagar taluka were in the permissible limits as per WHO, BIS Indian Standard 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 TDS in Drinking water should maintain. Drinking water with moderate amount of TDS is good for the health. As per BIS and WHO standard the Fluoride, Calcium chloride were in permissible limits All the samples were clean and odourless.

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