Original Research Paper Chemistry

Analysis of Drinking Water quality from the villages of Becharaji Taluka area, Mehsana District, Gujarat .India.

D.K.Panchal Assistant Professor, Department of Chemistry, Shree M.P.Shah Arts and Science College, Surendranagar

ABSTRACT

The present study is based on the analysis of drinking water quality of the different area. In this study the water samples were collected from ten different villages of Becharaji Taluka, Mehsana district Gujarat state, India. To determine the drinking water quality ,the water samples were analyzed different kind of Physico–chemical parameters as like as pH ,Total dissolved solids(TDS), Total Hardness(TH), Electrical conductivity(EC), Fluoride (F), Chloride(Cl), Calcium (Ca^{+2}), Magnesium (Mg^{+2}) and Alkalinity. After analysis the data were compared with the standard drinking water quality data of World Health organization (WHO), Bureau of Indian Standard (BIS) and ICMR. From the study it was observed that the most of parameter of the water sample were in the standard drinking water range but the TDS level in some sample found more than the desired limits .the aim of this study is to check the quality of drinking water and its safety for the health.

KEYWORDS Drinking water, parameter, standards, BIS, WHO, ICMR.

Introduction:

It is necessary to know the quality of water for drinking purpose because good health depends on the quality of water. Water should be in prescribed limit for drinking purpose. It is well known fact that fresh and clean water is essential for healthy living. It is a basic need for all human beings on the earth. Yet it has been observed that the millions of people are deprived of this fresh water. Water is one of the most important and essential need for all living –organism .but many areas of ground water and surface water gets polluted due to discharge of un treated waste, dumping of industrial effluents and run off from agriculture fields .industrial growth, urbanization and excess uses of pesticides have serious and adverse impact on fresh water. The chemical formula of water is H_2O. The 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 serving of human. Every person should get clean and fresh water. The most of the human diseases are spread from the using unsafe drinking water. The safe drinking water is essential for healthy life and development. 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 and its safe use for health.

Materials and Method:

Study Area:

In this study the water samples were taken from 10 different villages of Becharaji taluka. Mehsana district Gujarat state of India. It is a religious place in North Gujarat. The latitude and longitude of Becharaji is 23.4989 and72.0439.

Sampling:

The water samples were collected from the different ten villages of Becharaji taluka area. For the collection of the water sample 1 lit. Capacity of polythene bottle with Stoppard was 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 area, and then all the bottle were brought in to the lab for the analysis of different physico- chemical parameter .

Experimental Method:

To determine the quality of drinking water the measurement of the pH is the first physico chemical parameter. pH indicates whether the water is acidic, basic or neutral in nature. Drinking water should be in proper in pH range .To measure the pH of the water sample the pH meter was calibrated by buffer solution using buffer tablet then the pH was measure by the pH meter. Total dissolved solids (TDS) were measured by TDS Meter. Before measure the Electrical conductivity the digital conductometer was first standardize by KCL solution and then conductivity was measured. The other chemical properties such as Alkalinity, Cl^-, F^-, Mg^{+2}, Ca^{+2} and Total Hardness (TH) were measured by standard titrating method.

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

Sample Nos.	Name of Village	pH	TDS (mg/l)	Ca	Cl	F	Mg (mg/l)	TH	EC	Alkalinity
S_1	Ranela	7.7	1900	127	924.6	0.5	88.2	679.8	2900	223.6
S_2	Dedarda	8.0	142	28.9	17.1	<0.1	10.2	114.3	530	112
S_3	Ganbhu	7.8	138	28.5	17.6	0.12	10.8	115.4	430	112.6
S_4	Modhera	7.9	1340	64.3	577.3	<0.1	38.6	319.3	2600	150.5
S_5	Poyada	8.0	686	34.2	317.9	0.13	19.3	164.8	1440	116.1
S_6	Nava delvada	8.1	130	26.8	14.7	<0.1	10.8	111.2	390	111.8
S_7	Delvada	8.1	137	28	14.2	0.14	10.8	114.3	330	107.5
S_8	Kalari	8.3	133	28.9	13.7	0.15	9.9	113.3	290	111.6
S_9	Chadasan	8.0	130	28	13.7	0.1	11.1	115.4	320	114.2
S_{10}	Asjol	7.7	1690	98	724	0.2	60.7	484.1	2500	184.9
Maximum		8.3	1900	127	924.6	0.5	88.2	679.8	2900	223.6
Minimum		7.7	130	26.8	13.7	0.1	9.9	111.2	290	107.5
Average		8.0	642.6	49.3	263.5	0.2	27.0	233.2	1173.0	134.5

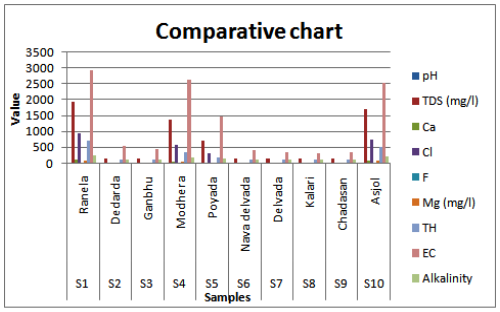

Table :2 Comparision of the Ground water quality with the standard drinking water as per BIS ,WHO and ICMR.

Parameter	Minimum	Maximum	Average	Indian Standard (BIS)	WHO	ICMR
pH	7,7	8.3	8.0	6.5-8.5	7.0-8.0	7.0-8.5
TDS	130	1900	642.6	300	100	500
Ca	26.8	127	49.3	75	-	75
Cl	924.6	13.7	263.5	250	250	200
F	0.5	0.1	0.2	1	1	1
Mg	88.2	9.9	27.0	30	-	50
TH	679.8	111.2	233.2	200	-	300
EC	2900	290	1173.0	-	-	-
Alkalinity	223.6	107.5	134.5	-	-	-

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 range of pH was found in 7.4 to 8.3. 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 and chloride. The most of the water sample the TDS value was found in the permissible limits but in out of three samples The TDS level was higher than the other samples. The Minerals value was found in the standard permissible but the amount was less than the required acceptable limits. The Fluoride value was in less than one .The range of Fluoride was in 0.1 to 0.5 and the range of Chloride was in 13 to 924. Chloride level was found higher than accept 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 Becharaji 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. similarly the Chloride level was found than the acceptable limit Drinking water with moderate amount of TDS is good for the health. As per standard, Fluoride was found in permissible limits. All the samples were clean and odourless.

References:

1. WHO. Guidelines for drinking water supply quantity (2nd edn). Geneva, vol1, 1993.
2. B. Guru Prasad, B, Evaluation of Water Quality in Tadepalli Mandal of Guntur Dist. A.P., Nature Environ. Poll. Tech., 2(3), 2003, 273-276.
3. S. K.Pandey, and S. Tiwari, Physicochemical analysis of ground water of selected area of Ghazipur city - A case study. Nature and Science, 6 (4), 2008, 25-28.
4. K. K. Yadav , N. Gupta, V. Kumar, S.Arya, and D. Singh, Physico-chemical analysis of selected ground water samples of Agra city, India, Recent Research in Science and Technology, 4(11), 2012, 51-54. |
5. P. Shivasharanappa, Srinivas, and M. S. Huggi, Study on the physico-chemical characteristics of ground water of Bidar city and its industrial area,International Journal of Applied Biology and Pharmaceutical Technology, 3(1), 2012, 359-367.
6. Sanjay Parmar;Physico-Chemical Analysis of Underground Water from Meghraj Taluka Area, Sabarkantha district, Gujarat, India. IJSR Volume : 2 | Issue : 7 | July 2013 ISSN No 2277 - 8179
7. S. A. Makwana, C. G. Patel and T. J. Patel, Physico-Chemical analysis of drinking water of Gandhinagar District Arch. Appl. Sci. Res., 4 (1), 2012, 461-464.
8. R. S. Dave, D. G. Acharya, S. D. Vediya, M. T. Machhar, Status of fluoride in ground water of several villages of Modasa Taluka,
9. North Gujarat for drinking purpose, Der Pharma Chemica, 2(2) , 2010, 237-240.
10. R. Ullah, R. N. Malik, and A. Qadir, Assessment of groundwater contamination in an industrial city, Sialkot, Pakistan. African Journal of Environmental Science and Technology, 3(1), 2009, 429-466.
11. N.Kalra, R. Kumar, S. S. Yadav, and R. T. Singh, Physico-chemical analysis of ground water taken from five blocks (Udwantnagar, Tarari, Charpokhar, Piro, Sahar) of southern Bhojpur (Bihar), J.Chem. Pharm. Res., 4(3), 2012, 1827-1832. |
12. WHO. Guidelines for drinking water supply quantity (2nd edn). Geneva, vol1, 1993.
13. B. Guru Prasad, B, Evaluation of Water Quality in Tadepalli Mandal of Guntur Dist. A.P., Nature Environ. Poll. Tech., 2(3), 2003, 273-276.
14. S. K.Pandey, and S. Tiwari, Physicochemical analysis of ground water of selected area of Ghazipur city - A case study. Nature and Science, 6 (4), 2008, 25-28.
15. K. K. Yadav , N. Gupta, V. Kumar, S.Arya, and D. Singh, Physico-chemical analysis of selected ground water samples of Agra city, India, Recent Research in Science and Technology, 4(11), 2012, 51-54. |
16. D. K. Tank and C.C.P Singh, Analysis of major ion constituent ground water of Jaipur city. Nature and Science, 8(10). 2010, 1-7.
17. APHA, Standard methods for the examination of water and waste water. 21st Edn.,Washington, D. C., 2005.
18. Acharya, G. D. Hathi M. V., Patel, A. D., & Paramar. K. C. (2008). Chemical properties of Groundwater in Bhiloda Taluka Region, North Gujarat, India. E-Journal of Chemistry, 5(4), 792- 796.