

# Analysis of Some Physico-chemical Parameter of Groundwater Samples of Mahudha County of Kheda District, Gujarat, India

Pravin Mevada<sup>1\*</sup>, Preksha Patel<sup>2</sup>

<sup>1</sup>Department of Chemistry, Parekh Brothers Science College, Dakor Road, Kapadwanj-387620, Kheda, Gujarat, India

<sup>2</sup>Department of Chemistry, Pacific University, Udaipur, Rajasthan, India

## ABSTRACT

These research work is about analysis of the groundwater quality of Mahudha County, District Kheda (Nadiad), Gujarat state. Here we analyzed the quality of bore wells/tube wells and wells water with the reference of Physico-Chemical parameters such as Depth, EC, Temperature, TDS,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$  and  $\text{CO}_3^{2-}$ ,  $\text{HCO}_3^-$ , and  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ , F such parameters. Samples were analyzed April 2013 Summer season. The water from Tube wells/Bore wells was carried out from 10 Samples villages area of Mahudha Taluka county district Nadiad Middle of Gujarat State.

**Keywords :** Rural, Water, Bore wells, Tube wells, Wells, Physico-Chemical analysis, pH, EC, Temperature, Mahudha county.

## I. INTRODUCTION

In middle Gujarat have District Ahmedabad, Vadodara, Anand, Gandhinagar, Kheda / Nadiad, Mahisagar, Chhotauadepur. In Nadiad/Kheda. In Kheda(Nadiad) district has ten talukas. Many villages are facing water quality problem as well as storage for drinking, especially in summer season. Children and Adults of this area are suffering from health problem due to consumption of contaminated water, But water consummates some sediments from agriculture and industrial pollution. They can be classify ground water levels based on the rainfall patterns. This paper analyzed ground water quality of Mahudha taluka county, Nadiad district region for determining of suitability.

## II. MATERIALS AND METHODS

Ten different water samples were collected from different location of rural area from Mahudha taluka

county and kept in polyethylene bottles with cover. Analysis of water sample was done as per standard process. All chemicals materials used of LR and AR grade. Double distilled water use for preparation of solutions and reagents. The samples brought in to Laboratory of the analysis of Physico-chemical parameter like temperature were recorded at the time of sample collecting by using standard Thermometer. While other parameters such as EC, pH, TDS, Sulfate, carbonate, chloride, calcium, magnesium hardness, bicarbonate, sodium, potassium contents. Calcium and Magnesium hardness of water was determined by complexometric titration like EDTA method. Silver nitrate titration method using potassium chromate ion content by volumetric method. pH, TDS measured by water analysis kit and method.

## III. RESULTS AND DISCUSSION

The Physico-Chemical data of ground water samples collected in April-2013 are presented in Table-1

respectively. The results of the water samples very different nature of soil taint and pollution. with different collecting places because of the

Table: 1

Summer - Mahudha Tehsil Latitude: 22.81870 Longitude: 72.94103 The Sample collected in April-2013

Parameters	Name of Village (Sample)									
	Vadthal-1	Vadthal-2	Vansoli-1	Vansoli-2	Rudan-1	Rudan-2	Ram na muvada-1	Ram na muvada-2	Meena vada-1	Meena vada-2
Depth (ft)	180	300	108	150	105	140	130	150	180	140
Temp.(°C)	31.0	30.8	32.3	29.9	29.4	30.2	30.9	29.8	28.7	30.5
pH	7.24	7.38	8.45	7.74	7.80	7.98	8.06	7.19	8.01	8.49
EC (mMho)	2.2	1.8	2.2	2.1	2.0	1.3	2.0	4.4	1.8	0.9
Turbidity (nu)	1.9	2.1	1.8	3.1	3.5	1.7	0.95	1.1	1.6	1.7
Total Hardness (mg/L)	142.36	152.25	102.63	109.45	195.78	212.81	239.75	221.44	147.13	133.52
Ca <sup>+2</sup> (mg/L)	35.45	38.16	28.67	33.56	42.28	40.18	45.58	44.71	85.84	81.34
Mg <sup>+2</sup> (mg/L)	46.52	56.33	44.72	55.23	24.62	30.34	26.58	57.28	67.15	58.14
Alkalinity (mg/L)	315	352	407	442	558	429	618	462	535	541
TDS (mg/L)	1701	1345	558	786	758	770	701	675	836	795
Cl <sup>-1</sup> (mg/L)	43.74	48.26	51.18	39.08	15.12	22.65	21.34	18.47	22.15	29.74
HCO <sub>3</sub> <sup>-1</sup> (mg/L)	265	277	252	245	237	268	238	293	316	256
CO <sub>3</sub> <sup>-2</sup> (mg/L)	31.03	27.65	27.14	28.07	34.22	33.90	28.16	31.05	30.92	32.19
DO (mg/L)	4.5	4.9	5.8	5.4	5.3	5.6	6.0	6.2	4.3	4.8
SO <sub>4</sub> <sup>-2</sup> (mg/L)	156.47	148.25	144.58	149.09	145.23	141.56	138.74	142.35	139.17	133.84
NO <sub>3</sub> <sup>-1</sup> (mg/L)	98	107	98	105	109	99	112	120	90	97
F <sup>-1</sup> (mg/L)	1.35	1.16	1.13	1.24	1.31	1.09	1.38	1.42	1.15	1.05
Na <sup>+1</sup> (mg/L)	192	186	212	223	453	468	298	291	336	338
K <sup>+1</sup> (mg/L)	1.81	1.65	1.46	1.39	4.34	4.98	2.01	1.58	2.05	1.94

Here is discussion about result of some analyzed Physico-Chemical parameters.

**Temperature** : Temperature is one of the essential parameter for water. Temperature parameter indicates the trends of various chemical, bio-chemical and biology activities. It is detecting thermal pollution. In this study temperature range from 28.7°C to 32.3°C

**pH**: It helps in understanding chemically processes that take place in water bodies. pH is expressed as a number 0-14. Very much samples are slightly

alkaline above neutral pH between 7.19 at Ramna Mevada-2 station to 8.49 at Meenawada-2 station.

**Electrical Conductivity** : Conductivity is a measure of water capacity to convey electric current. It is given an estimate as mho/cm at 25°C or milli siemens per meter (ms/m). Electrical conductivity is a helping hand in determining suitability of water for domestic and irrigation purpose. EC value in this study the range is 0.9 at Meenawada-2 station to 4.4 at Ramna Muvada-2

**Chloride:** It is helpful to counting calculation of salinity. The tolerance limit for chloride is 250 to 1000 mg/l. Here we found the chloride parameter range is 15.12 mg/l at Rudan-1 station to 51.18 mg/l at Vansoli-1.

**Calcium Hardness:** Lather formation with soap prevents the hardness of water. A hard water is not appropriate for bathing and washing. Hard water has very high boiling point and so not-suitable for cooking. The calcium hardness is range in present study shown is 28.67 mg/l (Vansoli-1) to 85.84 mg/l (Meenawada-1) The range I calcium hardness is 75.0 to 200.0 mg/l.

**Magnesium Hardness:** Magnesium hardness is due to prevents lather formation with soap. In this present study the results shown magnesium hardness was due to ranging from 24.62 mg/l (Rudan-1) to 67.15 mg/l (Meenawada-1). The tolerance range for magnesium is 50.0 mg/l to 100mg/l.

**Potassium:** The main source of potassium in fresh water from nature is weathering of rocks but quantities increase in the polluted water due to disposal of waste water. Potassium content in water in the present study it is 1.39 mg/l (Vansoli-2) to 4.98 mg/l (Rudan-2).

**Sodium:** Thesodium ion concentration were found in between 186 mg/l Vadthal-I to 468 mg/l.

**Total Dissolved Solids:** Total dissolved solids shows that the salinity behavior of ground water from sources. It useful in understanding the level of turbidity and hardness of water. A large number of solids are found dissolved common meter are like carbonates, bicarbonates, chloride, sulphate, phosphate, etc. There for TDS according to WHO and INDIAN STANDARDS values should be 500mg/l for drinking water. In the study the TDS range for 558 mg/l at Vansoli- 1 to 1700 mg/l at Vadthal- 1.

#### IV. CONCLUSION

The most important Physico-chemical parameter taken in march-2013 was observed that the pH, Ca,

Mg, TDS, chloride, EC, Na, K etc. In our study very few samples showed above the tolerance limits by India Standard Index & WHO standard.

#### V. REFERENCES

- [1] WHO, Guidelines for Drinking-Water Quality, 1984, Vol. 2, Health Criteria and Other Supporting Information, World Health Organization, Geneva.
- [2] W.H.O. Guidelines for Drinking Water Quality, 1997, Volume. 3, Surveillance and Control of Community Supply, Geneva, Arul Antony, Indian Journal of Science and Technology. 2008, 1(6), 1.
- [3] Sudhir Dahiya and Amarjeet Kaur, J Environ Poll. 1999, 6(4): 281.
- [4] BIS, Indian standards specifications for drinkingwater, Bureau of Indian Standards, 1991, IS:10500.
- [5] H P Jarvie, B. A. Whitton, and C. Neal, Sci. Total Environ., 210-211, 79 (1998).
- [6] J Nouri, A. R. Karbassi, and S. Mirkia, J. Environ.
- [7] Prajapati J. R. and Raol B. V, Poll Res., 23(1):165-168 (2004).
- [8] Patel K. P, Poll Res., 22(2): 241-245 (2003).
- [9] Arul Antony, Indian Journal of Science and Technology., 1(6), 1 (2008).
- [10] Mitra A and Gupta S. K J Indian Soc Soil Sci., 47: 99-105 (1999).
- [11] Potassium in Drinking-Water, Background Document for Development of WHO Guidelines for Drinking-Water Quality, World Health Organization (2009)
- [12] APHA and AWWA (1985). Standard Methods for Examination of Water and Wastewater. 16th American Public Health Association, Washington, DC
- [13] Indian Standard Specification for drinking water. (1992). New Delhi: Indian Standard Institute, (Bureau of Indian Standard).