Physico-Chemical Analysis of Selected Ground Water Samples of Umarala And Talaja Talukas of Bhavnagar District, Gujarat, India

Darshan Edhatiya*1, D.H.Edhatiya2 , Dr. Kartik Vyas3

1Research Scholar ,PAHER (Pacific Academic Higher Education & Research University) ,Udaipur, India

2Sir P.P.Institute of Science,Bhavnagar, Gujarat, India

3Sheth L.H. Science College, Mansa, Gujarat, India

ABSTRACT

This study is aim to assess the quality of groundwater of Umarala and Talaja talukas of Bhavnagar district. In southern part of Gujarat state. Samples were tested from Jan.-Feb.2015. The test such as temperature, pH, EC, TDS, Alkalinity, Calcium, Magnesium, Sulphate, Chloride etc.. The water samples are from bore wells carried out in a polythene bottles from five samples of each talukas of Bhavnagar district, Gujarat State. The results were compared with standards prescribed by WHO and ISI 10500-91.

Keywords: Physico-chemical parameters, TDS, pH, EC, Umarala taluka, Talaja taluka.

I. INTRODUCTION

Water plays an essential role in human life. Fresh water is one of the most important resources crucial for the survival of all the living beging. Ground water is store in the soil and rock arrangement below the earth's surface. Ground water plugs a vital role in human life. The quality of water is of vital concern for the mankind since it is directly linked with human welfare. It is the chief source of drinking water for many community and the less important source for others. In this research paper Umarala and Talaja Talukas region water containg pH,TDS,EC,Hardness of drinking water so the studies of this physico-chemical parameter. Ground water attached with the soil so Calsium and Magnesium hardness become less or more. Water is one of the majority important inputs necessary for the manufactures of crops. Plants need it incessantly during their life and in huge quantity.

II. MATERIALS AND METHOD

Five different villages well/bore well water sample collected in brown glass bottles from difference areas located in Umarala and Talaja Talukas. Analysis of water samples was done as per standard process.The water samples were immediately brought in to Laboratory for the estimation of Physico-chemicals parameters, like water temperature were recorded at the time of sample collection by using Thermometer , While pH of the water samples were noted at the sampling sites itself.Calcium and Magnesium hardness of water was estimated by complex metrics titration method.

Table 1. List of Physico-Chemical Parameters

pH	Calcium hardness
Electric Conductivity	Magnesium hardness
Total Dissolved Solids	Sodium
Alkalinity	Pottasium
Chloride	Sulphate

III. RESULTS AND DISCUSSION

The Physico-chemical parameter data of the well/bore well water samples collected in june-2016 are present in table respectively. The results of the samples vary with different collecting places because of the different nature of soil contamination. All metabolic and physiological activities and life processes of aquatic organisms are generally influenced by water temperature.The ground water samples collected were analysed for the above said parameters and the results are tabulated in Table-2, Table-3.

Table 2. Physico-Chemical Characteristic Of Ground Water in Umarala Taluka.

S.No.	Village Name	pH	EC	TDS	Alkalinity	Cl⁻	Ca^{+2}	Mg^{+2}	Na^+	K^+	$SO4^{-2}$
1.	Bajud	7.98	2.05	136	680.0	289.8	148.0	13.9	84.5	2.50	247.0
2.	Langala	8.42	3.37	454	556.0	192.0	88.0	7.7	135.3	2.36	148.1
3.	Keriya	8.03	2.69	721	692.0	292.0	160.0	9.6	215.4	2.38	321.0
4.	Timba	7.98	2.03	650	328.0	125.9	224.0	15.9	197.3	2.09	259.3
5.	Chogath	7.95	2.12	455	304.0	213.8	256.0	25.9	168.7	1.88	160.5

Table 3. Physico-Chemical Characteristic Of Ground Water in Talaja Taluka.

S.No.	Village Name	pH	EC	TDS	Alkalinity	Cl⁻	Ca^{+2}	Mg^{+2}	Na^+	K^+	$SO4^{-2}$
1.	Devali	7.23	2.94	1370	75.6	89.9	44.8	17.3	268.0	1.80	238.7
2.	Piparala	7.98	1.90	650	78.1	145.0	45.6	37.9	274.0	1.59	259.3
3.	Bhalar	7.76	2.90	1200	80.5	130.9	31.2	17.8	262.0	0.98	242.8
4.	Dihor	7.98	1.90	950	23.2	101.9	39.2	24.0	295.0	1.69	226.4
5.	Pavathi	7.61	2.90	870	83.5	137.9	34.4	21.1	231.0	1.49	271.6

pH

The pH value of drinking water is an important index of Acidity, Alkalinity, and resulting value of the acidic-basic interaction of a number of its mineral and organic components. pH below 6.5 starts corrosion in pipes. Resulting in release if toxic metals. In the study pH ranged from Umarala Taluka 7.95 to 8.42 and Talaja Taluka 7.23 to 7.98.

Electrical Conductivity (EC)

Electrical conductivity is a measure of water capacity to convey electric current. It signifies the amount of total dissolved salt. Ec value were in the range of 0.7 micromhos/L to 2.5 micromhos/L.

Total Dissolved Solids (TDS)

Total dissolved solids indicate the salinity behavior of ground water. Water containing more than 500 mg/L of TDS is not considered desirable for drinking water supplies, but in unavoidable cases 1500 mg/L is also allowed. TDS value varied from 320 mg/L to 950 mg/L. Umarala Taluka highest TDS is Keriya Village and Talaja Taluka highest TDS is Devali.

Alkalinity

Alkalinity of water is its capacity to neutralize a strong acid and it is normally due to the presence of bicarbonate, carbonate and hydroxide compound of calcium, sodium and potassium. Total alkalinity values for all the investigated samples were found to be greater than the value prescribed by WHO. In the present study total alkalinity range was from 23.2 to 692.0.

Chloride

The chlorides contents in the samples between 125.9 to 292.0 from Umarala Taluka and 89.9 to 145.0 from Talaja Taluka natural water contain low chloride ions. The tolerance range for chloride is 200 to 1000 mg/l.

Calcium Hardness

The calcium hardness is from Umarala Taluka 88.0 to 292.0 and Talaja Taluka 31.2 to 45.6. The tolerance range for calcium hardness is 75 to 200 mg/L. Calcium contents in all samples collected fall within the limit prescribed. Calcium is needed for the body in small quantities, though water provides only a part of total requirements.

Magnesium Hardness

Magnesium hardness ranged from Umarala Taluka 7.7 to 25.9 and Talaja Taluka 17.3-37.9 mg/L. The tolerance range for magnesium is 50 to 100 mg/L.

Sodium (Na^+)

Sodium concentration were found in between 84.5 to 215.4 in Umarala taluka and 231.0 to 295.0 in Talaja taluka.

Potassium (K^+)

Potassium elements shown in natural water and most of the waste water and fresh water is weathering of rocks but the quantities increase in the polluted water due to disposal of waste water. Potassium content in the water samples varied from Umarala Taluka 1.88 to 2.50 and Talaja Taluka 0.98 to 1.80 mg/L.

Sulphate

Sulphate parameter contain anion so it is combined with cation like as calcium and magnesium. They contribute to permanent hardness. Sources of sulphates are mainly sulphates rocks such as gypsum (calcium Sulphate) and sulpur minerals such as pyrites.

Sulphate ranged from Umarala Taluka 148.1 to 321.0 and Talaja Taluka 226.4 to 271.6 mg/L. The high concentration of sulphate may induce diarrhoea and intestinal disorders.

IV. CONCLUSION

The very important physico-chemical parameters of well/bore well water samples from 5 location in two taluka like as Umarala and Talaja in Bhavnagar District. It was observed that the pH, Fluoride, TDS, Total Alkalinity, Total Hardness, chloride, sulphte, calcium, magnesium are normal for the water samples. Only very few samples showed values above the desirable by Indian Standard Index

V. REFERENCES

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