

Some Physico-Chemical Parameter's Assessment for The Groundwater Samples of Kathlal Tehsil, Gujarat, India in Summer Season

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ABSTRACT

The present study deals with Assessment of Physico-Chemical parameters of ground water samples of Kathlal tehsil. Physio-Chemical parameters like EC, Temperature, TDS, Ca^{2+} , Mg^{2+} , Na^+ , K^+ , Cl^- , CO_3^{2-} , HCO_3^- , SO_4^{2-} , NO_3^- , F^- were analyzed in this present study. The samples were collected in April-2013 (Summer Season). Total 10 samples of groundwater was carried out from Tube wells/Bore wells of Kathlal Tehsil in order to assess water quality index.

Keywords : Groundwater, Bore wells, Tube wells, Physico-Chemical Parameters, Kathlal Tehsil, Summer Season

I. INTRODUCTION

Kheda District is located in the middle of Gujarat which is having ten tehsil and Kathlal is one of the Tehsil of it. Due to Urban growth, Industries, Higher use of Pesticides and fertilizers in agriculture groundwater becomes polluted day by day. Human binges having lots of health problem due to consumption of contaminated water. Groundwater is the main source of drinking and irrigation water so it is necessary to analyze ground water quality. So here in this present study we are analyzed ground water quality of selected rural part of Kathlal Tehsil of Kheda District in Summer season on the basis of some Physico-Chemical Parameters.

II. MATERIALS AND METHODS

In this study we collected ten groundwater samples from selected different rural part of Kathlal Tehsil.

These samples were collected in Pre cleaned polyethylene bottles. This samples were collected in April 2013 (Summer Season). In this Assessment all chemicals and reagents are used of Standard AR grade and analysis of groundwater sample was done as per standard process given by APHA. Double distilled water used for preparation of solutions and reagents. The temperature were recorded at the time of sample collecting by using standard Thermometer and then samples brought in to Laboratory of the analysis of other Physico-Chemical parameter such as EC, pH, TDS, Sulfate, carbonate, chloride, calcium, magnesium hardness, bicarbonate, sodium, potassium, Calcium and Magnesium.

III. RESULTS AND DISCUSSION

The data of Physico-Chemical parameters of ground water samples are presented in Table:1 given

bellowed. The results of the water samples vary with taint and pollution. different places because of the different nature of soil

Table :1

(Kathlhal Tehsil)

Latitude: 22.88654

Longitudes: 73.00619

Season- Summer

The Samples were collected in April-2013

Parameters	Name of Village (Sample)									
	Moti mudel	Nani modem	Gagiyal	Gadvel	Sarkhej	Gamani movadi	Shirani movadi	Mirzapur	Ratanpur	Chhipiyal
Depth (ft)	350	350	400	400	450	425	300	400	510	425
Temp.(°C)	31.3	31.1	32.6	31.5	30.7	29.8	29.2	30.3	31.6	32.1
pH	8.54	8.38	8.48	8.27	8.33	6.45	8.16	8.10	8.23	8.85
EC (mMho)	1.58	1.00	1.84	1.0	1.0	3.6	4.3	3.8	2.8	3.5
Turbidity (nu)	1.2	1.9	2.1	1.8	3.1	3.5	1.7	0.95	1.1	1.6
Total Hardness (mg/L)	118.14	145.46	89.17	72.45	92.56	189.11	231.25	186.55	250.61	116.74
Ca ⁺² (mg/L)	25.91	36.27	74.10	82.7	103.4	116.30	142.85	94.25	76.84	87.17
Mg ⁺² (mg/L)	36.41	22.19	48.37	20.66	32.07	51.50	39.32	28.46	42.90	37.29
Alkalinity (mg/L)	492	487	520	505	535	382	495	480	510	621
TDS (mg/L)	370	412	671	340	800	395	550	480	370	633
Cl ⁻¹ (mg/L)	78.6	65.13	102.5	115.68	148.3	83.45	27.68	95.36	76.15	80.22
HCO ₃ ⁻¹ (mg/L)	488	464	573	537	354	268	244	451	634	720
CO ₃ ⁻² (mg/L)	36.92	28.10	47.15	38.85	41.20	31.43	48.35	42.09	26.13	33.71
DO (mg/L)	6.0	6.2	7.1	7.0	6.8	5.7	6.5	4.7	5.3	4.9
SO ₄ ⁻² (mg/L)	352.3	364.59	265.95	220.17	169.50	215.51	136.62	192.83	48.14	363.91
NO ₃ ⁻¹ (mg/L)	99	85	165	205	241	253	205	237	215	185
F ⁻¹ (mg/L)	0.26	0.59	1.15	0.92	0.71	0.89	1.23	0.45	0.59	1.48
Na ⁺¹ (mg/L)	376	266	215	458	208	225	343	249	310	405
K ⁺¹ (mg/L)	1.14	1.40	0.72	1.70	3.87	2.0	1.79	1.60	1.81	2.90

Here we discuss about Physico-Chemical parameters which were analyzed for selected groundwater samples named Temperature, pH, Electrical Conductivity, Chloride, Calcium Hardness, Magnesium Hardness, Potassium, Sodium, Total Dissolved Solid, Fluoride, Nitrate, Sulphate, Dissolved Oxygen, Carbonate, Bicarbonate, Alkalinity, Total Hardness and Turbidity. All data is compared with desirable and permissible limit given by WHO an Indian Standard. Discussion about all parameters are given bellow:

1. **Temperature:** Temperature can be measured by thermometer. Temperature parameter indicates thermal pollution. In this present analysis we found temperature range from 29.2°C to 32.6°C in summer season.
2. **pH:** pH is the measure of hydrogen ions concentration ion aquis solution. pH range is from 0 to 14. 0 to 7 pH indicate acids, 7 to 14 pH indicates bases and 7 pH indicates neutral. Here

we found pH range from 6.45 to 8.85 in summer season.

3. **Electrical Conductivity:** Electric Conductivity is a measure of water capacity to convey electric current. Its unit is mho/cm at 25^o c or milli siemens per meter (ms/m). Here we found EC range from 1.0 to 4.3 mMho in summer season.
4. **Turbidity:** The turbidity measurement is the test of water quality in which we can find out cloudiness, opaque or thickness of water with suspended matter. Here we found Turbidity range from 0.95 to 3.5 nu in summer season.
5. **Total Hardness:** hardness of water is commonly expressed as a calcium carbonate and magnesium carbonate. Total Hardness is measure of the mineral content in a water sample. Here we found Total Hardness range from 72.45 to 250.61 mg/l in summer season.
6. **Calcium Hardness:** A hard water is not appropriate for bathing and washing due to its Lather formation with soap. Hard water has very high boiling point. Here we found Calcium Hardness range from 25.91 to 142.85 mg/l in summer season.
7. **Magnesium Hardness:** Magnesium hardness is prevents lather formation with soap so it can not appropriate daily life uses. Here we found Magnesium Hardness range from 20.66 to 51.50 mg/l in summer season.
8. **Alkalinity:** Alkalinity is the measure of the ability of water to neutralize acidity. Alkalinity test can measure the level of carbonates, bicarbonates and hydroxides in water. Here we found Alkalinity range from 382 to 661 mg/l in summer season.
9. **Total Dissolved Solids:** Total dissolved solids shows the total concentration of dissolved substances in water. According to WHO and INDIAN STANDARDS 500mg/l is desirable limit value of TDS for drinking water. Here we found TDS range from 340 to 800 mg/l in summer season.
10. **Chloride:** Chloride ions come into solution in water in underground aquifers, geological formations that contain groundwater. Chloride can give an unpleasant taste in drinking water and high level of chloride in water can damage plants if it used for irrigation. Here we found Chloride range from 27.68 to 148.3 mg/l in summer season.
11. **Bicarbonate:** Bicarbonate can affect a pH of water. It can change acid balance in water. Here we found Bicarbonate range from 244 to 720 mg/l in summer season.
12. **Carbonate:** Carbonate can affect a pH of water. Here we found Carbonate range from 26.13 to 48.35 mg/l in summer season.
13. **Dissolved Oxygen:** The dissolved oxygen level can be an indication of how polluted the water is and it can also measure that how well the water can support aquatic plant and animal life. Here we found Dissolved Oxygen range from 4.7 to 7.1 mg/l in summer season.
14. **Sulphate:** high level of sulphate concentration in drinking water can give laxative effect in humankind. Here we found Sulphate range from 48.14 to 364.59 mg/l in summer season.
15. **Nitrate:** High level of nitrate in drinking water can affect how blood carries oxygen and also cause methemoglobinemia which is also known as blue baby syndrome. Here we found Nitrate range from 85 to 253 in summer season.
16. **Fluoride:** High level of fluoride in water can cause Dental fluoresces in humans. It can damage teeth and bones also. Here we found Fluoride range from 0.26 to 1.48 mg/l in summer season.
17. **Sodium:** sodium is essential for normal functioning of the human body. It is not generally considered harmful at normal levels of intake from combined food and drinking water.

Here we found Sodium range from 208 to 458 mg/l in summer season.

18. **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. Here we found Potassium range from 0.72 to 3.87 mg/l in summer season.

IV. CONCLUSION AND FUTURE WORK

In this present research work we analyze some of the important Physico-Chemical parameters. This study is particularly based on summer season. The Seasonal changes also affected on water quality level. We collected these water samples in April 2013. These samples were collected from different sites of selected 10 villages of Kathlal Tehsil. Here we analyzed Physico-Chemical parameters named Temperature, pH, Electrical Conductivity, Chloride, Calcium Hardness, Magnesium Hardness, Potassium, Sodium, Total Dissolved Solid, Fluoride, Nitrate, Sulphate, Dissolved Oxygen, Carbonate, Bicarbonate, Alkalinity, Total Hardness and Turbidity. And all data is compared with desirable and permissible limit given by WHO an Indian Standard. This results of analysis vary with different places because of the different nature of soil taint and pollution. In this study almost samples showed under limit only few found under the tolerance limits given by India Standard & WHO standard. There are some normal process to do of purification of water before using it for drinking purpose.

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