Physicochemical analysis of water samples of Dhansura taluka area villages in Aravalli District, Gujarat, India

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ABSTRACT In this study area ground water is the only source of drinking water for people. Physicochemical parameters were studied and analyzed to understand the quality of water in Dhansura taluka area villages, dist. Aravalli during January 2016 to June 2016 pre monsoon time. These all parameters were compared with the WHO and Indian Standard parameters. Samples were collected from different twelve sampling points and analyzed some of following parameters pH, EC, Total Hardness, Chloride, TDS and Alkalinity. The sample results revealed that there were some seasonal variations in some parameters and some of were in normal range. Suitable suggestions were made to increase the level of quality of ground water.

Introduction:

Quality of water is not only important for drinking purpose, however it is also important for lend as well as climate. The quality of water is depending on its physical, chemical and biological characteristics. Unfortunately in many countries the quality of water become unhealthy due to some anthropogenic activities, more uses of chemicals in the form of fertilizers, pesticides in farm, chemical products uses in daily life style and one of the biggest reason population of countries which are consume lots of ground water without manners and the level of water going to deep. Actually ground water is less contaminates and polluted compared to open surface water body. Ground water is only the source of drinking water for most of people in the study area.

The analysis of water samples involves quality in relation to physicochemical parameters. The sources of samples were selected from the Dhansura taluka area villages dist. Aravalli for studied and analyzed.

Study Area:

All physico chemical parameters of twelve sample stations like Antisar, Bhensavada, Dolpur, Kesharpura, Kidi, Lalino math, Lalpur, Ramos, Rahiyol, Ramana, Shika and Shinol of ground water were studied.

Preparation of Water Samples:

For analyze the samples are collected from sources in bottles after cleaned by rinsing with 8M HNO_3 followed by repeated washing with distilled water. Analysis was carried out for parameters such as pH, EC, Total Hardness, Chloride, TDS and Alkalinity as per standard.

Analysis of Water Samples:

A study was carried out for some of water quality parameters (Table 1) such as pH, EC, Total Hardness, Chloride, TDS and Alkalinity from various parameters.

Table 1: Determination of water quality parameters

Sr.No.	Water quality parameters	Method of determination
1	pH	pH Metry
2	EC	Conductometry
3	Total Hardness	EDTA titrimetry
4	Chloride	Titrimetry
5	TDS	Evaporation Method
6	Alkalinity	Titrimetry

Table 2: Physico-chemical parameters of different water samples.

Sample Nos.	Village	PH	EC μmhos/cm	Total Hardness (mg/L)	Cl⁻ (mg/L)	TDS (mg/L)	Alkalinity (mg/L)
S1	Antisar	7.7	665	326	101	424	242
S2	Bhensavada	7.6	704	256	96	469	266
S3	Dolpur	7.6	628	297	165	499	310
S4	Kesharpura	7.8	690	331	98	472	254
S5	Kidi	8.4	684	291	84	454	184
S6	Lalino math	7.9	679	279	92	470	169
S7	Lalpur	8.3	698	311	81	458	188
S8	Ramos	8.2	677	261	86	442	204
S9	Rahiyol	7.9	711	324	114	511	309
S10	Raman	7.6	754	313	147	541	348
S11	Shika	7.8	692	287	110	524	318
S12	Shinol	7.7	689	267	83	423	189
Maximum		8.4	754	331	165	541	348
Minimum		7.6	628	256	81	423	169
Average		7.9	689.3	295.3	104.8	473.9	248.4

Comparative Chart
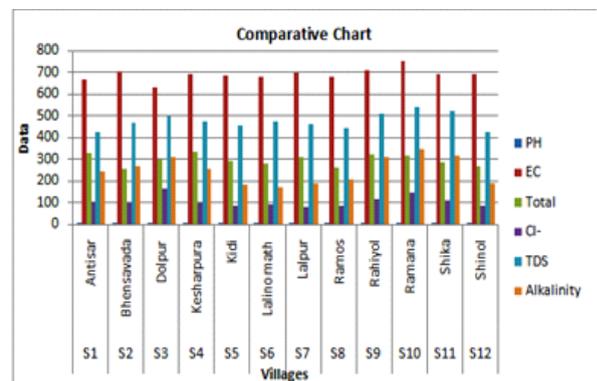
Results and Discussions:

pH

The pH value is one of an important value to provide importance in solubility calculation or geochemical equilibrium. Most of aquatic organisms are try to live in an average pH and do not withstand abrupt changes so far that pH is an important parameter of water body. In present study pH values vary from 8.4 to 7.6. The specified limit of pH for drinking water is 6.5 to 8.5. So the results revealed that the samples lie in alkaline region.

EC

EC value measured the electric current by Digital conductometer. Conductivity is very important parameter for determining the drinking water quality and agriculture needs. EC data is in ranged from 754 to 628.

Total Hardness

In water hardness is the basic property finds with less lather formation with soap. It is mainly cause by Ca^{2+} and Mg^{2+} ions. Some of hardness effect of water causes by alkaline earth metals. There are two types of hardness one is temporary and second is permanent, temporary hardness depends on carbonate and bicarbonate ions which are removed by boiling water and permanent hardness causes by sulphates and chlorides of metals. Hardness of water is playing in little level role to causes heart disease. Here maximum and minimum values of total hardness are 331 and 256 respectively.

Chloride

Higher value of chloride indicates pollution level high in water. Here the values of chloride in the range of 165 to 81.

Total Dissolved Solids

TDS mean the various kinds of mineral substances present in water. Total dissolved solid value also affected by dissolved organic matters. We get ideas from Total dissolved solid values suitable as potable purposes or various uses. It is also provide information about salinity of water. The value of TDS increases according to increase the pollution in water. More than 500 mg/L values of any water samples are not considered as potable water.

Alkalinity

Alkalinity in water is due to free hydroxyl ions. It may be the results of weak acids and strong base for drinking water. Alkalinity value is the capacity of neutralizing strong acid and is characterized by combining hydroxyl ions with hydrogen ion. The alkalinity values are varied from 348 to 169.

Conclusions:

The pH analyse data of these water samples are greater than 7.0 showing the alkaline nature of water and all the pH values lies in permissible limits. All EC values are in normal range not exceeded the desired limit. Hardness of samples No.1, 4, 7, 9 and 10 are found in the highest degree. Such water required to be softened to make them drinkable. Total hardness values of rest of the samples are in suitable range. Chloride values of all samples are lies in desirable range. Samples No. 9, 10 and 11 are greater than the desired limit; they are harmful for using as potable water. Rest of the samples has TDS values in normal range. Most of all samples have high range of alkalinity values compare to desirable limits except samples No.5, 6, 7 and 12.

Acknowledgment:

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