Physical and Chemical Analysis of Selected Ground Water Samples of District Rewari, Haryana (India)

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ABSTRACT

Water intended for human consumption must be free from impurities and contaminants. Ground water and river water are the only sources of drinking water for the vast majority of India's people, who rely only on these two types of water. Because of the close connection between water quality and human health, mankind places a high value on water of high quality. It is imperative that drinking water and water used in the home must be of the highest quality. It must not be contaminated with dangerous compounds. The standard of the water that we consume is critical to both our physical health and mental wellbeing. Rivers, wells and bore wells are all significant sources of water; yet, these sources are becoming increasingly contaminated due to a variety of human and industrial activities. The altered physico-chemical properties of water are direct result of the presence of these chemical pollutants. During the course of the study, a number of different physical and chemical parameters were analysed, including Total Dissolved Solid (TDS), Fluoride (F), Alkalinity, pH, Calcium (Ca), Nitrate (NO3), Colour and Odour. There is not a big industry located in or around the study region at the moment, municipal sewage as well as waste water from households and rubbish are being directly dumped into the area. To ensure that it is safe for human consumption, water used for drinking should be devoid of any dangerous substances, living and non living creatures.

Keywords Physical, Chemical, Parameters, Ground water, Rewari

INTRODUCTION

The most valuable resource that the earth provides is water. It is a necessary component for all naturally occurring life things. To reach their full potential, all living things must have access to water that is of adequate quantity and quality. On the surface of the world, water may be found in many forms including sea, ocean, rivers, walls, lakes, and ponds making up 71% of the total water content. Only 3% of the water is considered to be fresh, while the remaining 97% is considered to be salt water. In the Polar Regions, 2% of the water is found in the form of ice. Just one percent is found in the form of surface water and ground water. Science has progressed to the point that it can now assist us in understanding the intricate water system that the world possesses and in finding solutions to issues with water quality

and quantity. The study of water's location, distribution, flow, and qualities, as well as their connection with the surrounding environment, is called hydrology. It is imperative that we have a comprehensive understanding of the many physico-chemical processes, in addition to the significance of ground water and surface water.

Ground water and river water are the only sources of drinking water for the vast majority of India's people, who rely only on these two types of water. Because of the close connection between water quality and human health, mankind places a high value on water of high quality. It is imperative that drinking water and water used in the home must be of the highest quality. It must not be contaminated with dangerous compounds. The standard of the water that we consume is critical to both our physical health and mental wellbeing. Rivers, wells, and bore wells are all significant sources of water; yet, these sources are becoming increasingly contaminated due to a variety of human and industrial activities. The altered physical and chemical properties of water are direct result of the presence of these chemical pollutants.

Materials and Methods

Rewari district is situated in the South-East direction of Haryana state. It is lies between 27.95^0 to $28.28^{0,}$ North latitudes and $76.29^{0,}$ to $76.85^{0,}$ East longitudes. Ten samples of groundwater were collected from different places like Bikaner, kakoria, Turkiawas, Chhuriawas, NRP Bass, Raliawas, Khaliawas, Rasgan, bhandor and Rojuwas in Rewari district of state Haryana from running Bore-wells, Hand pump, and Tube-wells. These samples were collected in one litre bottles. Following the completion of the sample collection, these bottles were then tagged, and every attempt was made to get them to the laboratory as quickly as humanly feasible. Standard methods were followed in order to conduct chemical analysis on the samples to determine the levels of a variety of water quality that were utilised in the process of physico-chemical parameter estimation. In the present research paper various physio-chemical parameters will be examined by prescribed BIS-10500/2012 and WHO standards.

RESULT AND DISCUSSION

The results of all collected groundwater samples from different villages of district Rewari are given below : -

Sr. No.	**Parameters Locations**	**TDS** (mg/l)	**Fluoride (F)** (mg/l)	**Alkalinity** (mg/l)	**pH**	**Calcium (Ca)** (mg/l)	**Nitrate (NO_3)** (mg/l)	**Colour**	**Odour**
1	**Kakoria**	350	1.15	140	8.4	20.2	1.2	Clear	None
2	**Turkiawas**	380	0.52	90	7.1	14.2	1.2	Clear	None
3	**Chhuriawas**	1320	1.08	330	7.8	36.15	2.6	Clear	None

4	**NRP Bass**	770	0.38	330	7.2	44.15	12.8	Clear	None
5	**Raliawas**	550	0.14	370	7.3	25.15	3.4	Clear	None
6	**Khaliawas**	780	0.45	320	7.6	42.12	1.1	Clear	None
7	**Rasgan**	1420	0.75	410	8.2	28.12	2.4	Clear	None
8	**Bhandor**	920	1.25	310	8.2	12.25	3.8	Clear	None
9	**Chandawas**	310	0.16	150	7.3	24.4	1.8	Clear	None
10	**Rojuwas**	890	1.45	380	7.4	26.5	12.5	Clear	None

Graphical represent of physico-chemical parameters :-

Figure-1

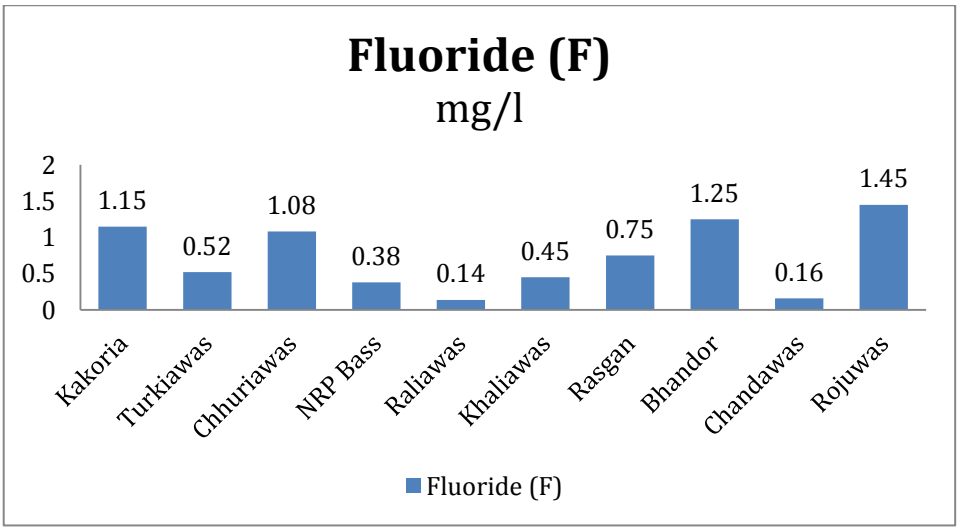


Figure-2

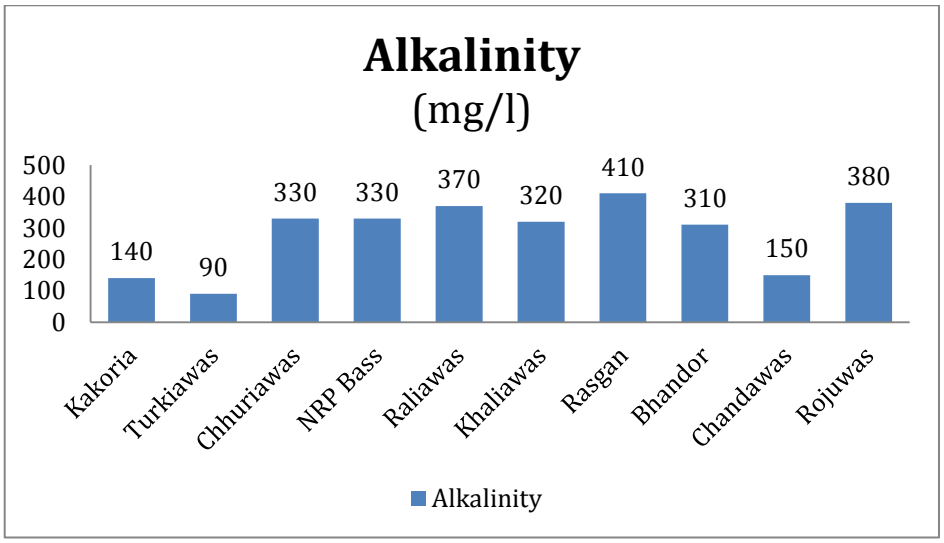


Figure-3

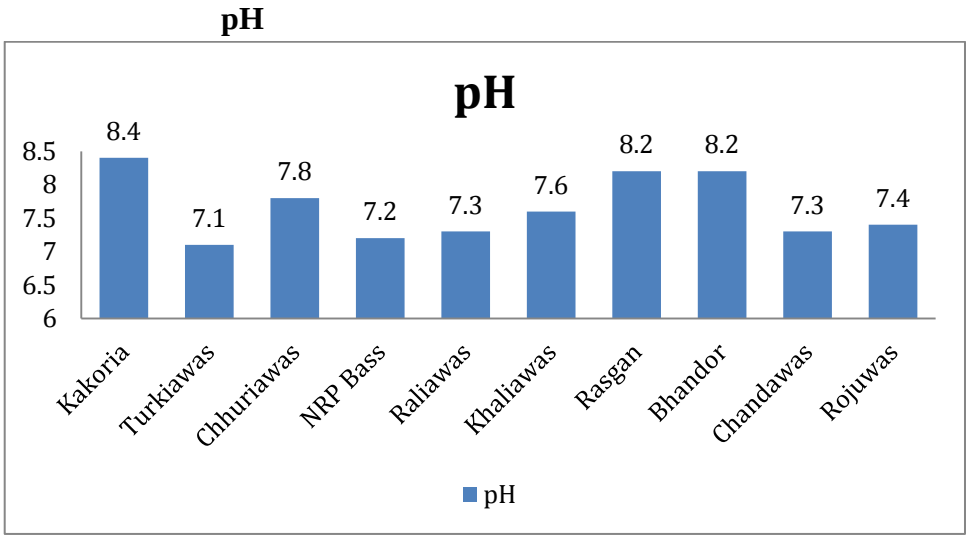


Figure-4

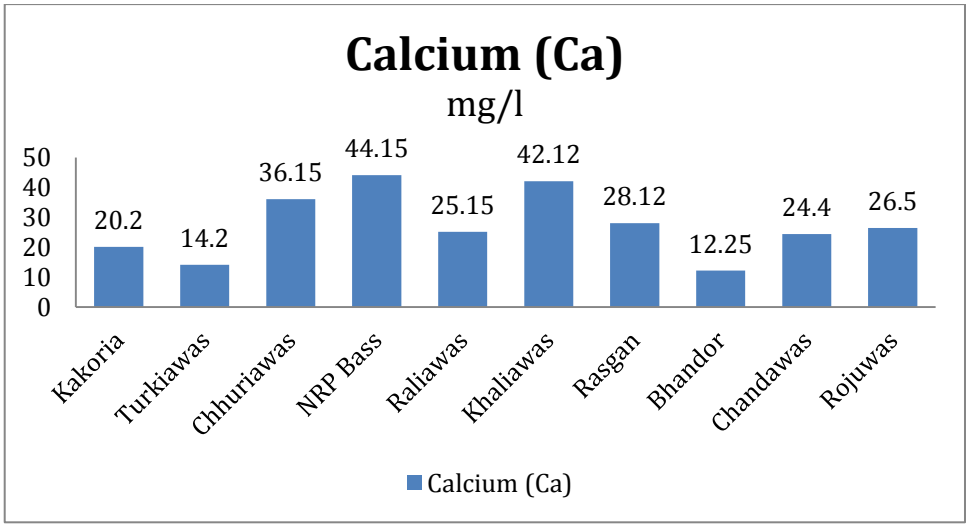
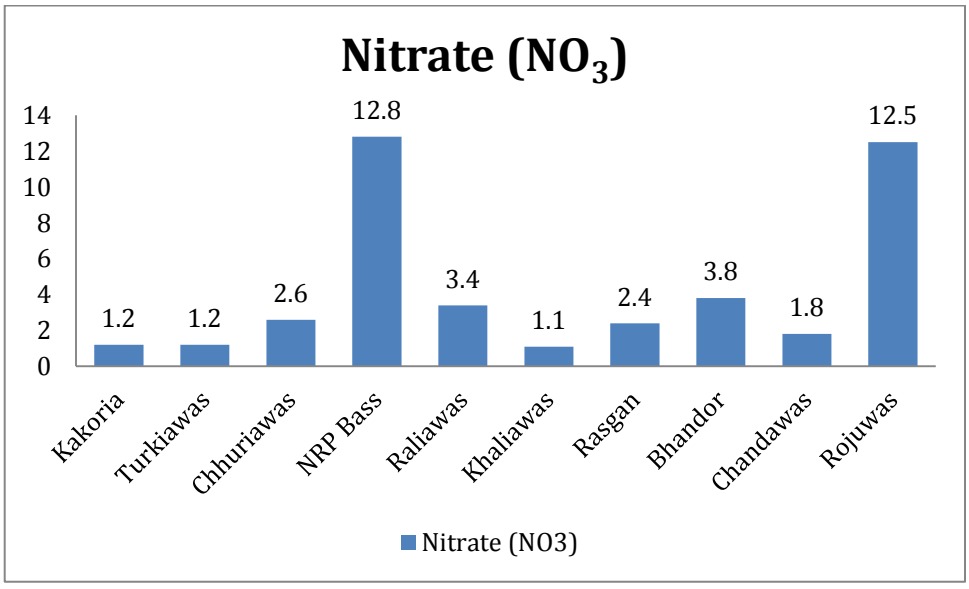


Figure-5



Discussion

In the present research paper, the various physical and chemical parameters that are Total Dissolved Solid (TDS), Fluoride (F), Alkalinity, pH, Calcium (Ca), Nitrate (NO3), Colour and Odour were analysed with the help of above graphs according to the BIS-10500/2012 and WHO standards.

The acceptable values of TDS is 500 mg/l according to the BIS-10500/2012 and WHO standards. With the help of graph no.1, it is observed that the TDS of groundwater at the locations that are Chhuriawas, NRP Bass, Raliawas, Khaliawas, Rasgan, bhandor and Rojuwas are not in acceptable limit. The Fluoride is very important ion of water for human health. It's permissible limit is 1.0 mg/l. It is analysed that some ground water samples of Fluoride are not in permissible limit at the locations that are Kakoria, Chhuriawas, Bhandor and Rojuwas shown in graph 2. The highest allowable limit of Alkalinity is 200 mg/l. With the help of graph no. 3, it is assessed that seventy percent of groundwater samples of Alkalinity are above the acceptable limit. The ground water samples at the locations that are Turkiawas, Kakoria and chandanwas are in permissible limit. It is also observed that the physico-chemical parameters pH, Calcium and Nitrate are in permissible limit. The acceptable limit of pH, Calcium and Nitrate are 6.5-8.5, 75 mg per litre and 45 mg per litre respectively according to BIS-10500/2012 and WHO standards.

Conclusion

According to the results of an analysis, it has been assessed that five Physico-Chemical parameters that are pH, Calcium (Ca), Nitrate (NO3), Colour and Odour are within the acceptable limit prescribed by the BIS-10500/2012 and WHO standards and other three parameters that are Total Alkalinity, Total Dissolved Solids (TDS) and Fluoride (F) are within the permissible limit at some locations and are not in permissible limit at some other location according to prescribed by the BIS-10500/2012 and WHO standard. In this paper, it has been noticed that the quality of ground water greatly affected by Physico-Chemical contamination. In the present time it is possible that emphasis may be laid on the installation of simple, acceptable and low cost devices at the household level which will be able to enhance the physico-chemical quality of drinking water and reduce the hazards associated with it. It is common knowledge that improving the quality of water by treating drinking water with the help of equipment available at home can reduce the number of cases of many diseases like vomiting, dizziness etc..

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