PHYSICO- CHEMICAL ASSESSMENT OF TUBE WELLS WATER QUALITY OF CHURELA VILLAGE IN JHUNJHUNU DISTRICT, RAJASTHAN

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ABSTRACT

Tube wells water is increasingly being sought as a supply of ingesting water because of the shortage, non-availability and bacteriological pollutants of floor water. This paper describes the vital results of the Physico-chemical evaluation of the tube wells water samples of the rural areas in Churela, District – Jhunjhunu of Rajasthan State. The special parameters determined are pH, TDS, fluoride, chloride, nitrate, sulphate, overall alkalinity and overall hardness. It has been discovered that nitrate values are better compared to ICMR requirements. Other parameters had been determined inside appropriate limits. As a result the analysis of the water pleasant is very important to maintain and prefect the natural eco system. The examine of physico-chemical and biological characteristics of this tube wells water samples indicates that the evaluation of water nice parameters in addition to water pleasant control practices ought to be accomplished periodically to shield the water sources.

Key Words: Physico-chemical analysis, Tube wells water, ground water, water quality standards, churela village.

INTRODUCTION

Churela village is located in the Indian country of Rajasthan on the Jhunjhunu district. The range and longitude of Churela is 24.7230645 and 77.038182. Churela the usage of IST (indian wellknown time) and it's miles located within the UTC time region 5.30. INR is a forex code for Indian Rupee; Churela humans are the usage of its countrywide currency INR. In this village best 0.04% of water is available for human being use. Tube wells water is the crucial supply for irrigation and ingesting cause. Water pollutants is an crucial aspect of environmental pollution floor water is an essential natural aid global that exists best on our planet, without this treasured resource life on the earth might be non-existent. Precise first-class water is insufficient even for ordinary residing and is getting contaminated because of home wastes, agricultural wastes, runoff from rural regions and soluble effluents. Consistent with Indian Council of scientific

research (ICMR), it's far important for boom of bones and teeth, when it is up to one ppm. Nitrate happens in hint quantities in floor waters but may additionally achieve excessive degree in some ground water. Challenge approximately multiplied concentrations of nitrate in consuming water is growing in particular in rural regions where runoff from nitrate rich fertilizers and animal manure often unearths its way into the water deliver. The ICMR (1975) has endorsed maximum suited degree of 500 mg/L and maximum permissible limit of 1500 mg/L for total dissolved solids, which might be in good agreement with the WHO worldwide requirements.

Water is the maximum crucial in shaping the land and regulating the climate. It is one of the maximum critical compounds that profoundly have an effect on lifestyles. Inside the last little a long time, there has been a remarkable growth within the demand for fresh water due to rapid boom of populace and the elevated pace of industrialization. Consistent with WHO business enterprise, approximately 80% of all the sicknesses in people are caused by water. The extra part of the soluble constituents in ground water comes from soluble minerals in soils and sedimentary rocks. The more commonplace soluble constituents include calcium, sodium, bicarbonate and sulphate ions. Nitrate may be a natural constituent but excessive concentrations frequently propose a source of pollution. Water excellent standards are needed to determine whether or not tube wells water of a sure nice is suitable for its supposed use.

MATERIAL AND METHODS

The existing observes gives a detailed description of the chemical standards of tube wells water. Because of increasing urbanization, surface water is getting over contaminated and greater stringent remedies might be required to make floor water potable. Therefore, it is required to additional sources for fulfill the requirement of water. Due to the fact the ground water resources are secure and potable for ingesting and other beneficial functions of individual. Consequently research of physic-chemical characteristics of underground water to discover whether its miles suit for consuming or a few other beneficial makes use of. Seven representative samples of entire study area were collected and analyzed for pH, total dissolved solids (TDS), fluoride, chloride, nitrate, sulphate, total alkalinity, and total hardness. The sampling sites were identified and then the samples were collected from tube wells sources after allowing some amount of water to flow out. The samples were collected in clean plastic bottles, which were pre cleaned, dried in dust free environment and sterilized. The instruments were used in the limit of précised accuracy and chemicals used were of analytical grade. All the water sample were properly labeled as 1, 2, 3, 4, 5, 6, 7, and a record was prepared indicating the source of the sample, location of the source and data of collection.

Table: 1 Locations from where tube wells water samples were collected

Sample No.	Collected sample address
TW1	TW water MBA building JJTU, Churela
TW2	TW water Main building JJTU, Churela
TW3	TW water sports complex JJTU, Churela
TW4	TW water Bala ji temple, Churela
TW5	TW water Vikram shop, Churela
TW6	TW water government senior school, Churela
TW7	TW water power house, Churela

Note: TW = Tube Well

The Parameters and methods selected for the water sample analysis are detailed in Table-2.

Table-2: Parameters, methods, standard values and unit employed in physico-chemical examination of samples

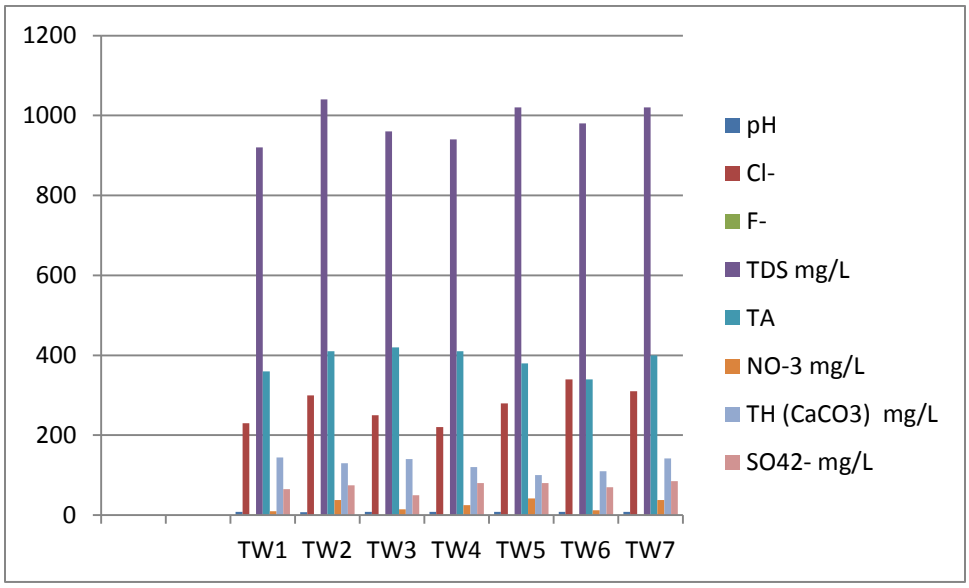
Sample No.	Parameters of Water Samples	Methods	Standard Values as guided by ICMR		Unit
			Desirable concentration	Maximum Permissible	
1	pH	pH meter	7.0-8.5	6.5-9.2	-------
2	Total alkalinity	Titrimetric	200	600	Mg/L
3	Total hardness	Titrimetric	300	600	Mg/L
4	Chloride	Argentometric	200	1000	Mg/L
5	Sulphate	Turbidity meter	200	400	Mg/L
6	Total dissolved solids (TDS)	Conductivity meter	500	1500	Mg/L
7	Nitrate	Colorimetric	20	50	Mg/L
8	Fluoride	Ion selective electrode	1.0	1.5	Mg/L

RESULTS AND DISCUSSION

The results obtained for rural areas churela are reported in Table-3. Seven water samples were analyzed for the following eight parameters – pH, TDS, fluoride, chloride, nitrate, total alkalinity, sulphate, total hardness. The parameters analyzed in this assessment include:

Table-3: Physico-chemical analysis of tube wells water for rural areas, churela:-

Sample No.	pH	Cl^- mg/L	F^- mg/L	TDS mg/L	TA ($CaCO_3$) mg/L	NO^{-3} mg/L	TH ($CaCO_3$) mg/L	SO_4^{2-} mg/L
TW1	8.2	230	1.6	920	360	10	144	65
TW2	7.7	300	0.8	1040	410	38	130	75
TW3	7.9	250	0.8	960	420	15	140	50
TW4	8.0	220	1.8	940	410	25	120	80
TW5	7.8	280	1.2	1020	380	42	100	80
TW6	8.0	340	1.0	980	340	12	110	70
TW7	8.5	310	1.6	1020	400	38	142	85



1. **pH:** All chemical and biological reactions are without delay dependent upon the pH of water device. The lower values of pH might also cause tuberculation and corrosion even as the higher values may also produce incrustation, sediment deposit and difficulties in chlorination for disinfection of water. In the present study the pH values in all the samples range from 7.7 to 8.5, which are all within the limit. The pH of water is very important indication of its quality and provides information in many types of geochemical equilibrium or solubility calculations.

2. **TDS:** Total dissolved solid is an important parameter for drinking water and water to be used for other purposes. The maximum permissible limit of TDS is 1500 mg/L (ICMR). Beyond the prescribed limit, it imparts a peculiar taste to water and reduce its potability. TDS was found in the range of 920 to 1040 mg/L, which is also within the limit.

3. **Fluoride:** Fluoride is important in human nutrition for the normal development of bones. The required level of fluoride is 1.0 to 1.5 mg/L. Due to higher concentration of fluoride

in ground water may develop molting of teeth, skeletal fluorosis, deformation in knee joints etc. In the Present study, it is observed that the fluoride content varied from 0.8 to 1.8 mg/L.

4. **Chloride:** Chloride contents in fresh water are in large part prompted with the aid of evaporation and precipitation. Chloride is the toughest anion inside the irrigation water. They are normally greater toxic than sulphate to most of the vegetation and are great indicator of pollutants. Chloride contents varied from 220 to 340 mg/L in all the samples, which is all in the limit.

5. **Sulphate:** The sulphate ion is one of the major anions occurring in natural water. Sulphate in most of the samples was found to be lower than highest desirable level i.e., 200 mg/L. Sulphate was found in the range of 50 to 85 mg/L, which is also within limit. Higher value of sulphate may cause intestinal disorder.

6. **Nitrate:** The nitrate concentration in the studied area varied from 10 to 42 mg/L. The maximum permissible limit is 50 mg/L (ICMR). Due to higher concentration (over 100 mg/L) of nitrate in water, infants, less than six month old, are suffering from methamoglobinemia or blue baby disease.

7. **Total alkalinity:** The desirable limit for total alkalinity is 200 mg/L (ICMR). The value of water samples varies from 340 to 420 mg/L. In ground water, most of the alkalinity is caused due to carbonates and bicarbonates.

8. **Total hardness:** Hardness is an important criterion for determing the usability of water for domestic, drinking and many industrial supplies. The value of water samples varies from 100 to 140 mg/L. The desirable limit for total hardness is 300 mg/L. (ICMR). Water hardness is more often than not due to the results of interplay between and the geochemical formations. The hardness of water is due to the presence of alkaline earths inclusive of calcium and magnesium. Better values of hardness are liable for incrustation and scaling in pipelines.

CONCLUSION

Although it became a consultant pattern observe of the ground water nice of Churela village; however the effects are very alarming. All parameters had been determined inside permissible limits. The general flavor of water is also correct. A layman can't determine the feasible hazards of water pleasant. This reality makes the examine vital. There may be no business boom in Churela, no dense populace. Irrigation is the primary profession of the encompassing populace and chemical fertilizers are extra commonly getting used. Water excellent is depending on the type of the pollutant brought and the nature of mineral found at unique quarter of tube properly.

Tracking of the water great of floor water is completed by way of collecting consultant water samples and evaluation of physicochemical characteristics of water samples at different locations of churela village.

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