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AN ANALYSIS OF PHYSICO-CHEMICAL PARAMETERS AND WATER QUALITY OF BOREWELL FROM UDPUR GELHAWA VILLAGE, BADLAPUR TAHSIL, JAUNPUR (U.P.)

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ABSTRACT

Water of good drinking quality is of basic importance to human physiology and man's continued existence depends very much on its availability. The assessment of borewell water quality for suitability for drinking, domestic purpose as well as Agriculture purpose was carried out from Udpur Gelhawa village of Badlapur Tahsil, Jaupur, Uttar Pradesh. 21 borewell water samples were collected from this village during March 2015. The physico-chemical parameters like pH, E.C., total alkalinity, total hardness, calcium hardness, magnesium hardness, chloride, salinity, TDS and DO have been analysed .The result were compared with WHO, BIS & ICMR drinking water standards. On the basis of hardness, Out of 21 bore well water samples, 7 samples were above 300 mg/l. So it causes harmful effect on Human health.

Keywords: Bore well water, physico-chemical parameters, drinking water quality, Udpur Gelhawa village.

INTRODUCTION

Water is basic precondition for life. Quality and quantity of water at a place plays a vital role in Health, Wealth and Prosperity of the region. The modern civilization, rapid industrialization and increased population have led to fast degradation of our environment. Water is indispensable and one of the precious natural resources of our planet. Groundwater is an important source of water supply throughout the world. It's used in irrigation, industries and domestic uses continue to increase where perennial surface water sources are absent [1].

Groundwater meets domestic needs of more than 80 % rural and 50 % urban population, besides fulfilling irrigation needs of around 50% irrigated agriculture. Around two-fifth of India's agriculture output is contributed from area irrigated by groundwater. Assessment of groundwater quality and its suitability for drinking is the objective of present study. Badlapur is one of the important Tahsil of Jaunpur district of Uttar Pradesh Badlapur had a population of 36,943. Males constitute 51% of the population and females 49%.Peoples residing in this Tahsil are depends on borewell water for domestic and agriculture purpose, so these borewell acts as a lifeline for the peoples. So, the present study deals with Physico- chemical parameters of Udpur Gelhawa village of Badlapur Tehsil of Jaunpur district.

MATERIAL AND METHODS

Collection of samples: Borewell water Twenty one sample were collected from Udpur Gelhawa village of Badlapur Tahsil in March 2015. Samples were collected in plastic container and brought to the laboratory for analysis.

Analysis of Physico-Chemical Parameters: For the analysis standard methods were followed [2,3]. Some parameters like E.C., pH, Salinity, TDS and DO were analysed by Microprocessor based Water and Soil analysis kit. All physico-chemical parameters were analysed within 24 hrs.

Results and Discussion

The results obtained from analysis of water samples of only one village (Udpur Gelhawa) of Badlapur Tehsil are given in table 1. These result were compared with WHO (1963), BIS (1991) and ICMR (1975) drinking water standard [4-6]. Drinking water standard is in table 2. All the water samples were collected during the month of March 2015.

pH: pH values ranged from 7.10 to 9.30. All samples were ranged within the permissible limit of WHO. However higher values of pH hasten the scale formation in water heater and reduce the germicidal potential of Chlorine [7].

Total Dissolve Solid: The values of TDS in a different water samples ranges from 50 to 520 mg/l .The most important aspect to drinking water quality is its effect on taste [8]. The drinking water containing more than 5000 mg/l of TDS is not considered desirable [9] and it can also cause excessive scaling in water pipes, water heaters, boilers and household appliances [10]. Out of 21 samples, only 1 sample (Ug13) has excess limit of 500 mg/l by BIS.

Total Hardness: The classification of groundwater, based on total hardness shows that majority of the groundwater samples fall in the very hard water category. The maximum allowable limit of total hardness is 500 mg/l and the most desirable limit is 100 mg/l as per the WHO standards. For total hardness, the most desirable limit is 80 mg/l to 100 mg/l [11]. Hardness below 300 mg/l is considered potable but beyond this limits cause gastro-intestinal irritation (ICMR 1975). Normal water hardness does not pose any direct health problems. Jain et.al 1998 reported that high concentration of hardness (150 to 300 mg/l and above) May cause kidney problems [12].

All 21 water samples have total hardness content within the WHO and BIS permissible limit. The Total hardness values ranged from 90 to 500 mg/l. Out of 21 samples, 3 samples (Ug2 ,Ug13,Ug15) fall in the medium, 2 samples (Ug17 ,Ug19) are hard and 16 samples are very hard category.

Calcium hardness values ranged from 14.43 to 104.26 mg/l.

Magnesium hardness values ranged from 11.62 to 101.02 mg/l.

Electrical Conductance: Electrical conductance values ranged from 0.16 to 0.53 mmho. Electrical Conductivity is used to measure the ability of water to carry an electric current .Absolutely pure water is a poor conductor of electricity .Water shows higher conductivity when dissolved salts are present. The conductivity is proportional to the amount of salts dissolved in water [13].

Alkalinity: The Total Alkalinity of water samples were ranges from 30 to 88 mg/l. All samples are within the permissible limit. Alkalinity in itself is not harmful to human being; still the water samples with less than 100 mg/l are desirable for domestic use [14]. The high alkalinity imparts an unpleasant taste.

Dissolve Oxygen: There is no standard for dissolved oxygen for water quality assessment. Low D.O. gives bad odour to water due to anaerobic decomposition of organic wastes. In the present Analyse dissolved oxygen values of water samples varied from 0.9 to 7.8 mg/l. The D.O. level in natural waters depends upon physical, chemical and biological activities prevailing in the water bodies. The amount of D.O. also varies with water temperature and attitude. Depletion of D.O. is enhanced by high concentration of organic matter of the water bodies [15].

Chloride: Chloride values ranged from 14.2 to 130.64 mg/l. High chloride content can cause high blood pressure in people. Chloride in excess (<250 mg/l) imparts a salty taste to water and people who are not accustomed to high chloride may be subjected to laxative effect. High Chloride concentration is also an indicator of large amount of organic matter [16].

Salinity: Salinity of water samples were ranges from 120 to 450 mg/l.

Table-1

Physico- chemical analysis of Borewell water samples from Udpur Gelhawa village of Badlapur Tehsil

S.N.	pH	TDS	TH	EC	A	DO	CL	S	Ca.H.	Mg.H.
Ug1	7.26	350	320	0.31	44	2.8	130.64	450	42.50	67.43
Ug2	8.58	080	090	0.42	60	3.2	25.56	120	24.06	16.02
Ug3	8.31	180	206	0.36	40	3.0	28.4	240	55.31	44.18

Ug4	8.11	210	298	0.28	46	2.3	25.56	290	48.17	38.35
Ug5	7.78	300	280	0.44	34	0.9	34.08	420	28.07	65.59
Ug6	7.54	300	250	0.33	80	4.1	19.88	400	14.43	64.53
Ug7	7.70	250	240	0.18	88	1.7	51.12	390	68.97	43.98
Ug8	8.45	250	265	0.32	66	4.1	14.2	340	25.66	52.08
Ug9	8.21	300	320	0.27	40	3.8	45.44	180	32.08	56.59
Ug10	7.59	220	310	0.38	40	3.2	68.16	220	25.68	71.51
Ug11	8.17	300	200	0.25	84	2.8	51.12	310	35.28	66.75
Ug12	8.34	200	380	0.16	46	1.2	34.08	205	68.35	33.20
Ug13	8.58	520	104	0.21	80	1.7	48.28	440	61.71	77.34
Ug14	7.10	230	500	0.53	52	7.2	68.16	380	56.14	11.62
Ug15	9.30	210	120	0.49	60	7.8	36.92	300	104.26	101.02
Ug16	7.54	050	310	0.45	30	3.3	22.72	170	32.08	21.36
Ug17	8.17	060	134	0.27	60	6.7	39.76	300	80.2	55.84
Ug18	8.21	070	250	0.39	50	7.0	34.08	310	74.58	14.43
Ug19	8.45	170	146	0.33	48	2.6	25.56	310	49.72	48.66
Ug20	8.22	140	184	0.36	30	4.1	51.12	190	28.07	28.65
Ug21	8.79	230	320	0.28	30	1.7	59.64	310	36.09	35.94

Where : Ug - Udpur Gelhawa village, TDS- Total Dissolved Solid, TH- Total Hardness , EC- Electrical Conductivity, A.-Alkalinity, DO-Dissolved oxygen, CL- Chloride, S- Salinity, Ca.H.- Calcium Hardness and Mg. H.-Magnesium Hardness.

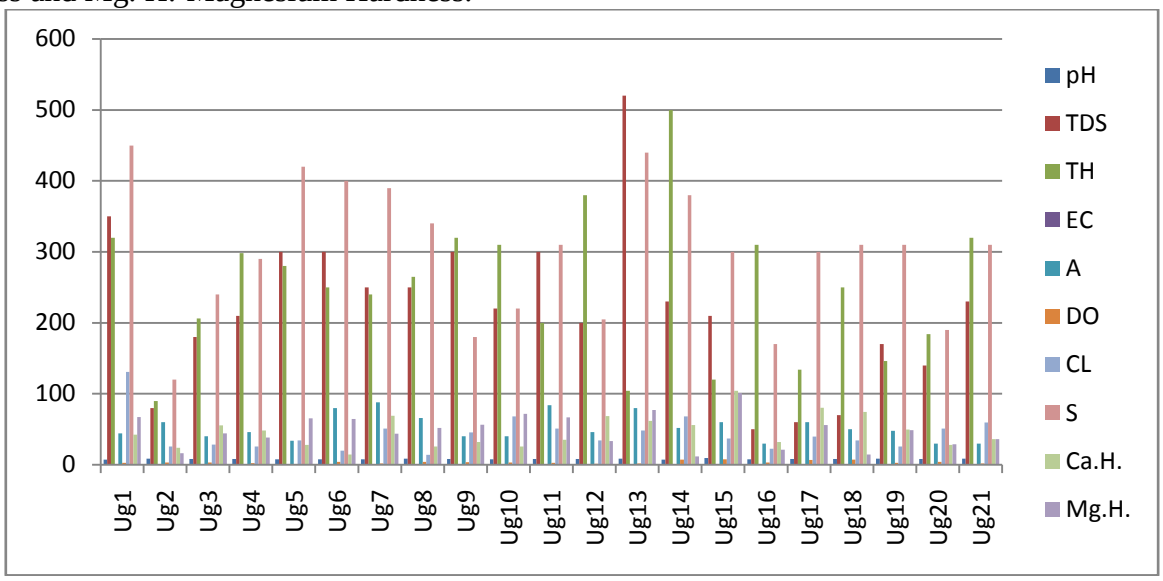
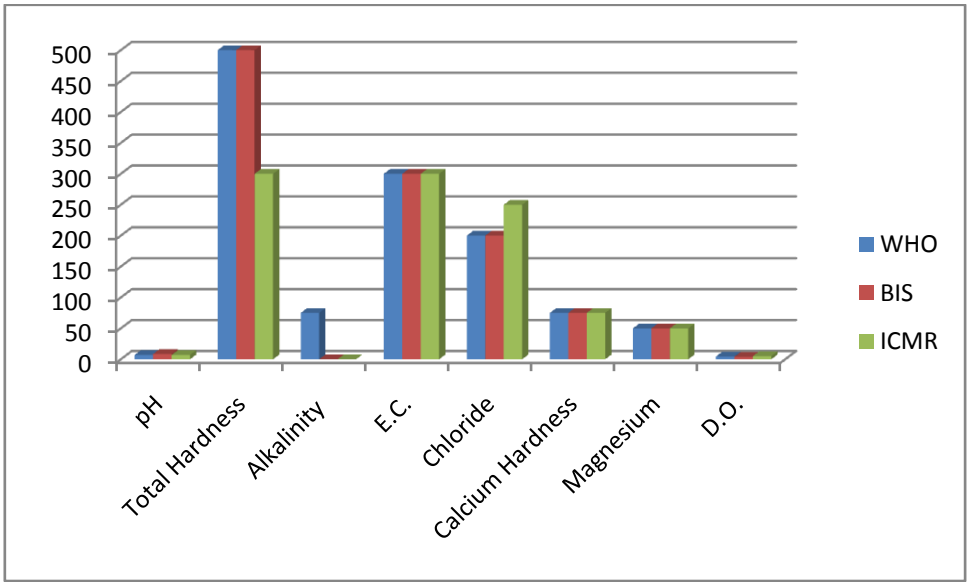


Table-2

Drinking Water Standards of WHO (1963), BIS (1991) and ICMR (1975)

Parameters	WHO	BIS	ICMR
pH	6.5-8.5	7-8	7-8.5
Total Hardness	500	500	300
Alkalinity	75	---	---
E.C.	300	300	300
Chloride	200	200	250-1000
Calcium Hardness	75	75	75
Magnesium	50	50	50
D.O.	4-6ppm	4-6ppm	4-6ppm



CONCLUSION

In the present investigation, out of 21 water samples, only 7 water samples (Ug1, Ug9, Ug10, Ug12, Ug14, Ug16, and Ug21) have the total hardness value above 300 mg/l. These samples affect the human health. Therefore, it is recommended that water from these bore are to be used for drinking purpose only after pre-treatment like filtering, boiling, reverse osmosis and electro dialysis.

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