iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.53224

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

Water Quality Analysis of Bore Wells in Government Medical College at Mera Rajouri

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Abstract: ***Water Quality of two bore wells in newly constructed Government Medical College at Mera Rajouri was analysed for some important physico- chemical parameters like colour, taste odour, turbidity, pH, TDS, Alkalinity, Hardness , Chloride Content, Calcium, Copper, Iron,, manganese, sulphates, nitrates and fluorides. Three samples for both the bore wells were taken from site and then transferred to the Public Health Engineering (PHE) Division Rajouri lab. The analysis was carried out using the methods recommended by Indian Standard Drinking Water-Specification (Second revision). The results were then compared with the prescribed limits set by the said IS code. The study revealed that water on the whole for Medical college for both the bore wells was safe and was well within the prescribed limit of Indian Standard Drinking Water-Specification (Second revision)[9], the water sample however in 1st Bore well was little higher but was safe. The water can be safely used for any of the domestic/drinking purpose without any danger.***

Keywords: Water Quality, Mera, Rajouri , Parameters, Bore wells, Drinking.

I. INTRODUCTION

Water is one of the most important gift from God and is necessary for survival for all the living beings which includes plants, humans, animals etc [1]. Majority of earth (nearly 80%) is covered by water[1]. Out of this about 97% is covered by sea and is used for industrial and agricultural uses only because sea water is too salty and one cannot drink it. 2.4% of total water forms giant glaciers and polar icecaps. Nearly 1% quantity of water is available for drinking purposes out of this percentage in areas not covered by sea this water have to be used for agriculture, domestic and industrial uses as well[2]. Due to rise industrialization and population, the water supply demand is also increasing [3]. But sad part of the fact is that even this small quantity of water is also getting polluted due to activities of man himself and that around 780 million people do not have access to clean and safe water and around 2.5 billion people do not have proper sanitation [4]. The throwing of wastage in river bodies in un scientific way is prime example of that[5]. Dumping of waste in non engineered landfill also pollutes groundwater through leachate [6-7]. Before water is supplied to general public it is necessary that water is free from any impurities like physical, chemical and bacteriological which may effect their health in different ways like several water borne diseases like fever, headache, chicken pox, diarrhea, jaundice, cold cough, dysentery, Pneumonia, kidney related dieseses etc [8] . Different tests recommended by Indian standard guidelines for different parameters needs to be carried out to check if water is Suitable for different uses like cooking, washing, drinking, bathing etc [9]. Studies all over the world in this regard have been carried out to check out impurities of water. [10-14] In the rural and most urban areas of Jammu and Kashmir like Rajouri spring, surface, ground and rainwater are the main sources of drinking water[15]. Most of water used for drinking purposes here in Rajouri Town is from bore wells, hand pumps, springs etc. The surface water from rivers is supplied to general public for different domestic purposes like washing, cooking, bathing etc and may be used for drinking at some places after proper treatment like boiling or by filtering [17]. Government Medical College was sanctioned for Rajouri district and accordingly it was constructed and handed over to the health department, site being hilly there were no water resources. Accordingly two bore wells were also constructed. Before handing over the college building the analysis of water of these two bore wells was carried out to know its safety for different routine purposes.

II. STUDY AREA

Rajouri is also known as Rajapuri or the land of kings. As per survey of india Rajouri lies between latitudes 330000'00"& 330035'20" North and longitudes 74^{00}08'00" & 74^{00}42'30" East. It is located at an elevation of about 562-4800m. Rajouri town is the head quarter of the Rajouri district. Rajouri district is located in the south western part of state of Jammu and Kashmir. Rajouri town is located on the Jammu Poonch highway, 154km away from Jammu and about 85 km away from Poonch district. Rajouri is bordered by Poonch, Mirpur (Pakistan occupied Kashmir), Udhampur and Jammu districts. Temperature on the average varies from 7 degree Celsius to 40 degree Celsius. The average annual rainfall is 769 mm.

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The river flowing through Rajouri town comes from Darhal and Thanamandi, meeting each other near Darhali Bridge at Kheora. Population of the district as per census of 2012 is 642,415 out of which 28% falls in town i.e. 179876 souls. Water is supplied from rivers where pipes have been dugged deep and from there water is supplied to different areas, Dhanidhar filteration plant is also a source of water supply in this area. Water from here is pumped to main water tank located in Rajouri main market and from there it is supplied to people in the town. Elsewhere drinking water sources here includes springs, tube wells, dug wells, hand pumps etc

III. SITE DESCRIPTION

The campus of Medical College is located at Mera about 5 km away from district headquarter. The Administrative/Academic Block along with Girls/Boys/Nurses Hostel and Faculty Quarters are situated here. The approximate population benefiting from these bore wells is about 3000 souls which also includes the people residing in nearby village besides the college beneficiaries like students, faculty, visitors, patients and other staff. Figure 1 shows the satellite image of GMC Rajouri & Site along with locations of two bore wells.

Figure 1: Satellite image of selected locations. (Source: Google Earth)

IV. METHODOLOGY

Water Quality of two bore wells in newly constructed Government Medical College at Mera Rajouri was analysed for some important physico- chemical parameters like colour, taste odour, turbidity, pH, TDS, Alkalinity, Hardness , Chloride Content, Calcium, Copper, Iron,, manganese, sulphates, nitrates and fluorides. Three samples for both the bore wells were taken from site and then transferred to the Public Health Engineering (PHE) Division Rajouri lab. The analysis was carried out using the methods recommended by Indian Standard Drinking Water-Specification (Second revision). The results were then compared with the prescribed limits set by the said IS code in clean sterile glass bottles of 100 to 1000 ml capacity.

V. RESULTS AND DISCUSSION

Table 1 shows the results of different parameters analysed and the recommended/acceptable /Permissible values of IS code of these parameters[9]. After carrying out the analysis water on the whole of both the bore wells was safe and was well within the prescribed limit of Indian Standard Drinking Water-Specification (Second revision)[9].

Parameter	Bore well 1	Bore well 2	Acceptable	Permissible
Physical				
Colour	3	2	5	15
Turbidity	1	1	1	5
Taste & Odour	U	U	Agreeable	Agreeable
Chemical				
PH	7.9	7.6	6.5-8.5	No Relaxation
TDS	290	275	500	500
Total Hardness	180	178	200	200
Calcium	60	55	75	200

Copper	0.04	0.03	0.05	1.5
Iron	0.2	0.2	0.3	NR
Manganese	0.05	0.04	0.1	0.3
Chlorides	177	171	250	1000
Sulphates	160	152	200	400
Nitrates	16	14	45	NR
Fluorides	0.05	0.04	1	1.5

Note: Colour in Hazen units, Turbidity in NTU and all chemical parameters except pH value in mg/ltr. pH, Taste and odour are unit less. N indicates Nil and U indicates Unobjectionable, NR stands for not recommended.

VI. CONCLUSION

The study revealed that water on the whole for Medical college for both the bore wells was safe and was well within the prescribed limit of Indian Standard Drinking Water-Specification (Second revision)[9], the water sample however in 1st Bore well was little higher but was safe. The water can be safely used for any of the domestic/drinking purpose without any danger.

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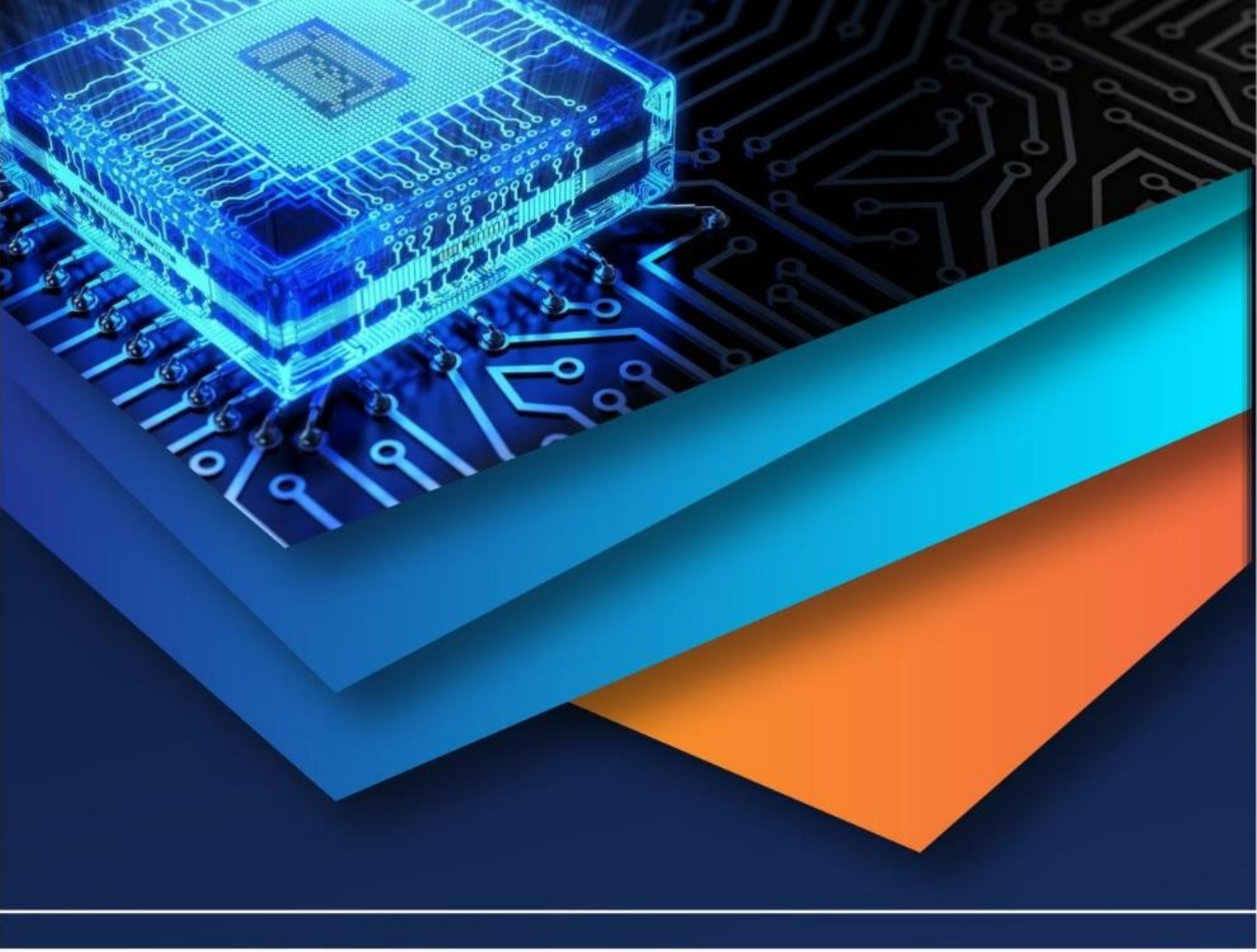

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