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ORIGINAL ARTICLE

Quality status of potable water of Tehsil Amber District Jaipur, Rajasthan (India)

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ABSTRACT
People on globe are under tremendous threat due to undesired changes in the physical, chemical & biological characteristics of air, water & soil. Due to increased population, urbanization , industrialization , use of fertilizers water is highly polluted with different harmful contaminants Natural water resources are being contaminated due to weathering of rocks & leaching of soil, mining processing etc. It is necessary that quality of drinking water should be checked at regular time interval to prevent various waterborn diseases. In present analysis physico-chemical parameter of drinking water such as color, pH, hardness, TDS, residual chlorine, dissolved oxygen, electrical conductivity, Free CO_2have been analysed. Drinking water quality of 8 villages of Amber district Jaipur, Rajasthan was analysed to identify the nature and quality of water .The drinking water samples were collected in clean polythene one liter cans & subjected for analysis in laboratory. The main objective of thepresent paper is to awa re people of concerned area about the water quality & concerned health hazards.
Key words: - *Water quality,pH,Hardness,TDS, alkalinity*

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INTRODUCTION

Jaipur is the capital & largest city of Rajasthan in northern India. It is the tenth most populous district of India [1] & spreaded over area of 11,152km^2.It has 13 subdivision among those Amber is big subdivision of Jaipur. Mainly ground water , tube wells & rivers are the sources of drinking water in Jaipur. Industrialization, mining , urbanization ,domestic & agriculture waste is continuously contaminating water resources [2-3]. Water quality is being detiorated day by day. So water born diseases are spreading widely leading to the fatal hazards [4-5]. Study & interpretation of chemical characteristics of natural water was studied by Hem[6]. Water quality parameters of ground water, river water & industrial water have been reported by several workers[7,8]. Water quality standards of sanaganer tehsil of Jaipur have also been studied [9]. Pilani district of Jhunjhunu Rajasthan , has also been investigated for water quality parameters [10]. A review on analysis of drinking water of various places has been done by Bhalmeet al [11].

In present paper water of villages present in Amber sub division of Jaipur has been studied & compared with standards provided by WHO , BIS & ICMR.

EXPERIMENTAL

Drinking water sample of 8 villages of Amber subdivision were collected in good quality polythene bottles of one liter capacity viz. Hand pumps, tube wells, open wells, PHED supply. Sampling has been done without adding preservatives. Analytical grade reagents & double distilled water has been used for preparation of samples. Instruments like pH meter, conductivity meter .TDS meter were used in the limit of precise accuracy.

RESULT AND DISCUSSION

The results obtained for urban areas near Amber Tehsil of Jaipur are reported in table-2. The standards values of physico-chemical examination of water sample has been reported in table -1 . These values are given by BIS- Bureau of Indian Standard , ICMR- Indian council of medical Research , WHO - world health Organisation

Drinking Water Specifications

The Bureau of Indian Standards (BIS),Indian Council of Medical Research (ICMR) and World Health Organization (WHO) has laid down the standard specifications for drinking water .

Table-1 Standard Specifications for drinking water

S.NO	Parameters	BIS:1999	ICMR:1975	WHO:2003
1.	pH	6.5–8.5	7.0–8.5	6.5–9.5
2.	EC	-	-	1400
3.	TDS	2000	500	600
4.	Ca^{+2}	200	200	100
5.	Mg^{+2}	100	200	150
6.	Cl^{-1}	1000	200	250
7.	SO^{-2}_4	400	200	250
8.	NO_3^-	100	50	50
9.	Total hardness, Mg/L	600	600	500

Table-2 Physico-chemical analysis of urban areas of Amber District-Jaipur, Rajasthan

Village	pH	Free Cl_2 (ppm)	Permanent hardness (ppm)	Total Hardness (ppm)	DO (ppm)	TDS (ppm)	Conductivity (mS)	Sp.C mS/cm	Free CO_2 (ppm)	Alkalinity (ppm)
Amber	7.65±0.07	0.923	115	430	10	82.00	0.234	7.92223	12	210
Achrol	7.78±0.05	0.900	440	490	8	120.75	0.567	6.2971	12	215
Bhanpura	8.35±0.01	0.853	370	440	12	104.75	0.837	16.5200	7	200
Kookas	7.94±0.07	0.923	360	430	26	100.28	0.483	9.5300	5	217.3
NangalSusawatan	7.90±0.07	0.786	340	420	24	85.00	0.285	13.7278	6	217.3
Natata	8.00±0.07	0..856	360	480	16	83.00	0.256	9.5230	6	210
Dhand	7.46±0.07	0.956	290	400	12	99.34	0.415	10.8201	5	215
Khora Meena	7.78	0.976	330	470	8	117.20	0.512	12.3456	8	220

RESULT AND DISCUSSION

The data revealed that pH ranged from 7.24+ 0.26 to 8.35 + 0.01. The minimum pH was observed in Dhand and maximum pH was detected in Bhanpura village. pH is the negative exponent of H+ concentration. According to WHO (1992) standards, best and ideal pH value for human consumption is 7.0, but it may vary from 6.9-9.2. Thus, all the samples tested were slightly alkaline; water of bhanpura village is basic in nature due to presence of excessive salts.basic water can cause stomach problems so it must be treated prior to its use. Until recently, concerns about drinking water focused on eliminating pathogens. The chlorine used to reduce the risk of infectious disease may account for a substantial portion of the cancer risk associated with drinking water. Chlorination of drinking water was a major factor in the reduction in the mortality rates associated with waterborne pathogen. The use of chlorine was believed to be safe. This view is evident in an article, which appeared on the back page of the New York Times. The report stated that with the use of chlorine, "Any municipal water supply can be made as pure as mountain spring water. Chlorination destroys all animal and microbial life, leaving no trace of itself afterwards". This statement reflected opinion accepted until recent years when halogenated organic compounds, such as chloroform, were identified in chlorinated drinking water supplies. Recent surveys show that these compounds are common in water supplies throughout the United States.

These concerns about cancer risks associated with chemical contamination from chlorination by-products have resulted in numerous epidemiological studies. These studies generally support the notion that by-products of chlorination are associated with increased cancer risks.

The concentration of free residual chlorine should be between 0 to 1 ppm.excess chlorine in water can lead to various negative health effects [12]But all collected samples have free chlorine level with in limits.

Further value of total hardness of different villages ranges from 420 to 490 ppm.The desirable limit of drinking water hardness is 300 ppm (ICMR) and for washing water is 500 ppm.Water hardness is generally because of the geochemical formulations of water [13] and due to presence of various salts of calcium and magnesium (bicarbonates, carbonates, sulphates,chlorides etc.).Inadequate intakes of calcium have been associated with increased risks of osteoporosis, nephrolithiasis (kidney stones), colorectal cancer, hypertension and stroke, coronary artery disease, insulin resistance and obesity.Increased intake of magnesium
salts may cause a temporary adaptable change in bowel habits (diarrhoea) and is the cause of hypermagnesia in which human and animals are unable to excrete magnesium from body (WHO) [14]Temporary hardness of water can be reduced by boiling and permanent hardness can be treated by various methods [15].
Dissolved oxygen in various samples has been determined by Winkler's method[16]. Dissolved oxygen has been estimated on the basis of iodometrictitration. Presence of bacteria and chemical substances reduces the dissolved oxygen in water. Values of dissolved oxygen in drinking water samples are with in safe limits.
Samples are also tested to estimate TDS (total dissolved solids),specific conductivity, conductivity and alkalinity. Alkalinity due to hydroxides is absent in samples and mainly due to thecarbonates and bicarbonates.

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