Research article Available online www.ijrpsonline.com ISSN: 2249–3522

International Journal of Research in Pharmacy and Science

A Specific Study of Drinking Water Status in Term of Essential Characteristics Present in Rural and Urban Area of Alwar District (Raj.), India

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ABSTRACT

Water is a precious commodity and very essential part of human life. We can say that survival of life can not possible without water and if drinking water has some undesirable substance because of its good solvent nature. Then it will harmful for the community. The use of pure waters for drinking and other purposes have been the dominant concern along with the concern of better environment. The development of new technology has grown up steadily but water purification in the community level almost remains same. Water purification process will be a major challenge throughout the world. Ground water is one of the major sources of water for domestic purposes in India. In our rural areas water is considered to be pure and unpolluted if it is odorless, free from turbidity and good from aesthetic point of view. But even if the water is clear, it may be polluted. Besides that, the surface water is contaminated by the effluents from industries, municipalities and other places. The hydro-geochemical analysis and quality evaluation of drinking water sources are the strategic topic for research and development activities as well as natural resources management. This study is performed to bring out a drinking water quality status in rural and urban area of Alwar district (Raj.). Alwar district lies in the eastern plains of Rajasthan State, covers an area 8,380 km^2 and lies between 27°-57' N latitude and 76°-6'E longitude. Different sampling stations were selected for the study purpose in the district. Sample collected from the Bore-wells and hand pumps were analyzed for the various physicochemical parameters like pH, electrical conductivity (EC), sodium(Na^+), potassium (K^+), Calcium (Ca^{+2}), magnesium (Mg^{+2}), fluoride (F^-), chloride (Cl^-), sulphate (SO_4^{-2}), nitrate (NO^{3-}), total dissolved solids (TDS) and total hardness (TH). The results revealed that most of the water samples were out of limit according to the WHO standards.

KEYWORDS:- Alwar, water, pH, TDS, Hardness, chloride, fluoride, Sulphate, Nitrate, Sulphate.

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INTRODUCTION

The many problems worldwide associated with the lack of clean, fresh water are well known: 1.2 billion people lack access to safe drinking water, 2.6 billion have little or no sanitation, millions of people die annually—3,900 children a day—from diseases transmitted through unsafe water or human excreta1. As we the water is good solvent for mostly organic and Inorganic chemical substance which is dissolved from the air, soil and by the human activity in to the drinking water. Even when the concentration of essential elements of water is increased by above causes, drinking water is being polluted and can't be used as the purpose for drinking.[1, 2]

Chemicals can enter water ways from a point source or a non point source. Point source pollution is due to discharges from a single source, such as an industrial site. Non point-source pollution involves many small sources that combine to cause significant pollution. For instance, the movement of rain or irrigation water over land picks up pollutants such as fertilizers, herbicides, and insecticides and carries them into rivers, lakes, reservoirs, coastal waters, or groundwater. Another non point source is storm water that collects on roads and eventually reaches rivers or Paper and pulp mills solid waste products into the environment. [3, 4] One of the most important crises of the twenty-first century is the scarcity of drinking water. Most freshwater bodies the world over are becoming increasingly polluted, thus decreasing the potability of water**.** Increasing urbanization is taking place along coastlines and estuaries and causing increased use of groundwater that will have a large impact on the quality and quantity of aquifer water [5]**.**

OBJECTIVE OF THE STUDY

This study is been done for collection & analysis the specific data which can help the further researchers, local people, and the related local govt. & private authority who supply the water for human community in Alwar region. To aware the local public health department and find out the areas which have an out of limit impurities in drinking water. So that the major step will be taken for purification of water and adopt some other sources for drinking water according to human health.

SAMPLING AND LABELING

Water sample is collected from the drinking water sources in different areas or alwar district like as tube well, hand pumps, lacks etc. these sample are labeled according to their site for analysis.[5, 6]

Table No. 1: Summary of Collect sample and Labeling Code

S.No.	Name of sample collecting site	Source of sample	Sample code
1	Bhagat Singh	TW	ALW A
2	Ashoka Takij	TW	ALW B
3	Manni ka Bar	TW	ALW C
4	Hassan Kha	TW	ALW D
5	Telco Circle	TW	ALW E
6	Hanuman Circle	HP	ALW F
7	Kati Ghati	TW	ALW G
8	MIA	TW	ALW H
9	Rupbas	HP	ALW I
10	Chikani	HP	ALW J
11	Thanagazi	TW	ALW K
12	Narayanpur	TW	ALW L
13	Bahror	HP	ALW M
14	Bansur	HP	ALW N
15	Laxmanghar	HP	ALW O
16	Rajghar	HP	ALW P
17	Malakheda	TW	ALW Q
18	Ramghar	TW	ALW R
19	Tiajra	TW	ALW S
20	Khairtal	HP	ALW T

TW- Tube Well, HP- Hand Pump

EXPERIMENTAL DESIGN & METHODOLOGY

The following method & equipment are used in the analysis of different essential characteristics of the water. Each and every sample is analyzed for the following parameters.[1, 2, 3, 4, 5, 6, 14.]

HARDNESS:-

The hardness of water is generally due to dissolved calcium and magnesium salts and may be determine by complexometric titration by the help or EDTA method.

TDS:-The determination of TDS has been carried out by the electronic method, which is fairly reliable.[7, 8]

PH: - The determination of pH has been carried out by the electronic method by the help of pH meter. In this process a pH glass electrode and reference electrode is inserted in water sample. pH is recorded directly on a scale.[9, 10]

NITRATE: - It is measured my titration method.

CALCIUM: - Calcium is the second major constituent, after bicarbonate, present in most natural waters, with a concentration range between 10 and100 mg/l. Calcium is a primary constituent of water hardness and calcium level between 75 and 100 mg/l are generally considered as hard to very hard. It is measured my titration method.[11]

IRON: - Iron is measured my titration method. The iron limit is also be determined by Iron limit test according to Indian pharmacopeia.

MANGANESE: - It is measured my titration method.[12]

CHLORIDE: - In typical surface waters, the chloride concentration is less than 250 mg/l. It is measured my titration method. The chloride limit is also be determine by Chloride limit test according to Indian pharmacopeia.[11, 12]

STANDARDS FOLLOWED: Analyzed date of dinking water samples are compared by the standard data which are recommended by the *Bureau of Indian Standard*, Summarized as below: -[7, 13, 14]

RESULT AND DISCUSSION:

This study is show the analyzed data of essential characteristics of the drinking water of Alwar district. In table no 2 red mark data show the influence in the desirable quantity limit of water. These data show as follow:-

The total hardness and total dissolved solid of the Alwar district water is more than Desirable limit.

The pH of the Alwar district water is under Desirable limit.

The concentration of SO_4^{-2}, NO_3^- , Cl^- is also more than Desirable limit in approximate 70% of tested sample.

The concentration of Fe^{+2}, Mn^{+2} is slightly more than Desirable limit in only 20% tested samples.

Table No. 2: Chemical status of drinking water

S.No.	Sample	Total Hardness	TDS	pH	Ca^{+2}	SO_4^{-2}	NO_3^-	Fe^{+2}	Mn^{+2}	Cl^-
1	Standard Values	200 ppm	500 ppm	6.5 – 8.5	75 mg/l	200 mg/l	45 mg/l	0.3 mg/l	0.10 mg/l	250 mg/l
2	ALW A	520	1680	7.5	110	220	50	0.15	0.08	320
3	ALW B	450	1265	7.2	95	245	20	0.28	0..07	380
4	ALW C	425	1320	7.4	98	280	90	0.19	0..08	260
5	ALW D	550	1180	7.6	115	350	25	0.22	0.15	560
6	ALW E	760	2016	8.1	160	320	40	0.26	0.17	400
7	ALW F	680	1827	7.8	140	180	75	0.28	0.05	250
8	ALW G	540	2016	7.2	165	160	60	0.30	0.08	270
9	ALW H	860	1750	8.2	180	190	50	0.26	0.27	320
10	ALW I	720	1620	7.8	170	325	35	0.24	0.12	190
11	ALW J	670	1240	7.1	158	220	120	0.19	0.18	120
12	ALW K	950	1570	7.6	192	315	95	0.15	0.16	250
13	ALW L	850	1720	7.4	165	180	88	0.18	0.15	600
14	ALW M	1050	2400	7.6	190	245	135	0.28	0.24	470
15	ALW N	970	1965	7.5	135	190	95	0.31	0.16	420
16	ALW O	1120	2280	8.0	185	240	100	0.30	0.08	650
17	ALW P	865	1540	7.6	152	180	75	0.32	0.02	680
18	ALW Q	650	1235	7.2	120	165	70	0.28	0.10	230
19	ALW R	320	1180	7.4	85	150	45	0.22	0.19	320
20	ALW S	935	1665	7.5	135	210	120	0.32	0.18	480
21	ALW T	870	1860	7.3	130	235	80	0.19	0.14	460

Table No. 3: Water Quality Standard as Bureau of Indian Standard (BIS 10500: 1991)

S.No.	Characteristic	Desirable Limit (mg / lit.)	Permissible Limit in the absence of Alternate Source (mg / lit.)
1	Ph Value	6.5 to 8.5	No relaxation
2	Total hardness	300	600
3	Total Dissolved solid	500	2000
4	Iron (as Fe)	0.3	1.0
5	Chloride (as Cl)	250	1000
6	Calcium (as Ca)	75	200
7	Manganese (as Mn)	0.10	0.3
8	Sulphate (as SO_4)	200	400
9	Nitrate (as NO_3)	45	100

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