

# Water Quality Analysis in Mandawa Town And It's Surrounding Area of Jhunjhunu District (Rajasthan)

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**Abstract**— The water has become an emotive issue with the people. The paper presents groundwater quality assessments of Mandawa town and it's surrounding area of Jhunjhunu district (Rajasthan). The results of this analysis were compared with the water quality standards of WHO AND BIS. The water samples were collected from 15 open wells and tube wells in Mandawa town and it's surrounding area. In this analysis the various physicochemical parameters such as pH , EC, Total Dissolved Solids(TDS), Total Hardness(TH), Alkalinity, F-, Cl-, NO<sub>3</sub>- were determined using standard procedures.

The study reveals that the concentration of major constituents are not within the permissible limits of IS (10500-2012). It is observed that the water is polluted and affecting the human health in certain areas. Hence a study has been carried out for the quality of the available groundwater.

**Index Terms**— Groundwater, Mandawa, Water Quality, Physicochemical parameter.

## I. INTRODUCTION

Water is one of the most indispensable resources and is the elixir of life. Water constitutes about 70% of the body weight of almost all living organism. Life is not possible on this planet without water. It exists in three states namely solid, liquid and gas. It acts as a media for both chemical and biochemical reactions and also as internal and external medium for several organisms. About 97.2% of water on earth is salty and only 2.8% is present as fresh water from which about 20% constitutes ground water. Ground water is highly valued because of certain properties not possessed by surfaces water<sup>1</sup>. Ground water is a main source of water supply throughout the world and it is the main source of drinking water in the most of the rural areas. The quality of ground water is continuously changing as a result of nature and human activities. During last decade, this is observed that ground water get polluted drastically because of increased human activities<sup>2,3</sup>. Groundwater is an excellent reservoir of water but as lakes, streams and rivers are influenced by human and natural factors, groundwater is also face the same situation around the world. Hydrological aspects, human activities and characteristics of recharged water influence the quality of groundwater. As groundwater is used in large amount, some difficulty are created such as lowering of water table, water logging, land subsidence, sea water intrusion in coastal deterioration and aquifers in water quality

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.Groundwater is most sensitive topic which has importance not only at local level, but also at global level<sup>5,6,7</sup>. The aim of this study was to determine the physico-chemical analysis of groundwater sources of Mandawa town and surrounding area and to compare with levels obtained with the WHO<sup>8</sup> and IS:10500<sup>9</sup> drinking water directive. The purpose of this study is to determine the water quality, through analysis of selected water samples, quality parameters like temperature, pH, EC, TH, TDS, Cl, F, NO<sub>3</sub><sup>-</sup> and TA compare the results with the standards values suggested by BIS and WHO.

## Study Area

Mandawa is a small town in the Jhunjhunu district, known for its Forts and Havelis. It is situated 190 km off Jaipur in the north. The town lies between latitude 28°.06' in the north and longitude 75°.20' in the east.

## II. EXPERIMENTAL

A survey was conducted in Mandawa town and surrounding 11 villages of Jhunjhunu district, Rajasthan. Samples were collected from tubewells and open wells present in this area. Samples were collected in clean polythene bottles and rinsed three to four times with the water samples before the samples were before analysis in the laboratory. Physical and chemical parameters such as pH, TDS, EC, Cl<sup>-</sup>, NO<sub>3</sub><sup>-</sup> and F<sup>-</sup> were calculated by standard methods. Specific chemicals were used for the analysis and double distilled water was used for preparation of solutions.

## III. RESULT AND DISCUSSION

The groundwater from Mandawa and surrounding areas of Jhunjhunu district has no colour and odour. The result of physico-chemical analysis of groundwater is presented in Table-1.

**pH** : pH is considered as most important environmental factor. pH values of water samples were in range of 7.8 to 8.8, which is unobjectionable as per WHO standards.

**Electrical Conductivity (EC)** : The electrical conductivity is an indicator of the degree of mineralization of water and it is correlated with TDS. EC values were in the range of 1470 to 2702  $\mu$ S/cm. According to IS, prescribed limit of EC is 2100  $\mu$ S/cm.

**Total Dissolved Solids (TDS)** : TDS is an important parameter for drinking water and water to be used for other

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purposes. TDS values of water samples were in the range of 1050 to 1930 mg/L, which is in the permissible limits.

**Alkalinity :** In ground water, most of the alkalinity is caused due to carbonates and bicarbonates. The values of water samples varies from 370 to 850 mg/L. The prescribed limit of Alkalinity according to IS is 600 mg/L.

**Total Hardness (TH) :** The hardness of water generally depends upon the quantity of calcium or magnesium salts or both. In the study TH differ from 90 mg/l to 280 mg/l. The desirable limit for total hardness is 300 mg/L. (ICMR).

**Chloride (Cl<sup>-</sup>) :** The origin of chloride in water is due to the different source such as weathering and leaching of sedimentary rocks and soils etc. Chloride values of water

samples were in the range of 260 to 500 mg/L, which is in permissible limits.

**Fluoride (F<sup>-</sup>) :** 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 01.1 to 2.3 mg./L.

**Nitrate( NO<sub>3</sub><sup>-</sup> ) :** The presence of nitrate in drinking water has adverse effects on health above 50 mg/l. The nitrate content in the study area varied in the range 10 mg/l to 254 mg/l.

**Table-1 : Physico-chemical analysis of ground water for Mandawa and surrounding areas**

S. No.	Village Name	pH	EC μS/cm	TDS mg/L	Alka linity mg/L	TH mg/L	Cl <sup>-</sup> mg/L	F <sup>-</sup> mg/L	NO <sub>3</sub> - mg/L
1	PHOOSKHANI	8.6	2352	1680	660	200	430	1.6	155
2	BHAROO	8.4	1470	1050	440	160	300	1.3	156
3	BHOJASAR	8	1470	1050	410	90	260	1.4	130
4	CHoori AJEETGARH	8.7	1666	1190	450	210	400	1.2	121
5	HANUMAN PURA	8.4	2646	1890	700	200	500	1.6	197
6	KUHAROO	8.7	2695	1925	850	200	420	2	133
8	MAHRADASI	8.4	2058	1470	620	180	480	2.3	89
9	NOOAN	8.4	1568	1120	600	200	350	1.1	115
10	KUMAS	8.4	2002	1430	430	200	410	1.9	254
11	SEEGRA	8.6	2212	1580	630	250	380	1.2	108
12	WAHIDPURA	8.8	1715	1225	510	90	410	1.5	51
13	NP MANDAWA	8.1	2520	1800	400	230	390	2.1	59
14	NP MANDAWA	7.9	2128	1520	460	280	330	1.7	10
15	NP MANDAWA	7.8	2702	1930	370	260	400	1.8	84

### CONCLUSION

Ground water is the only source for the people in the Mandawa town and it's surrounding area and the result of the chemical analysis of ground water indicates considerable variation. In maximum locations it is contaminated Chloride, nitrate and alkalinity are higher at some places of study area. Hence, it suggested that underground water source in the study area be monitored before the use for domestic and

drinking purposes. It also suggested that more emphasis should be given to reduce F<sup>-</sup> contents and NO<sub>3</sub><sup>-</sup> contents, where ever these crosses the limits of IS standards.

### REFERENCES

- [1] P.K.Goel, Water pollution- cause ,effects and control, New Age Inter.(P) Ltd., New Delhi(2000).
- [2] A. Abdul Jameel, Poll. Res., 17(2), 111 (1998).

- [3] A. G. Sirkar, JIWWA, Oct.-Dec., 215 (1996).
- [4] Mehta K.V., Physicochemical and statistical evaluation of groundwater of some places of Deesa taluka in Banaskantha district of Gujarat state (India), *Int. J. of Chem. Tech. Research*, 3(3), 1129 (2011)
- [5] Shahbazi A., Esmaceli-Sari A., Groundwater Quality Assessment in North of Iran: A CaseStudy of the Mazandaran Province, *World Applied Sci. J.*, 5, 92(2009)
- [6] Konstantopoulou F., Lin S., Papageorgion L.G., Gikas P., Water resources management for Paros. Island, *Int. J. Sustainable Water and Environmental System*, 2(1), 1(2011)
- [7] Nwidu L.L., Oveh B, Okoriye T., Vaikosen N. A., Assessment of the Water Quality and Prevalence of Water Borne Diseases in Amassoma, Niger Delta, Nigeria, *African J. Biotechnology*, 7(17), 2993 (2008)
- [8] WHO, Guidelines to drinking water quality. World Health Organisation, Geneva, 1983, pp186.
- [9] Indian standard drinking water, Specification (First Revision) IS-10500:2012. BIS, New Delhi, India.