



International Journal of Chemistry and Pharmaceutical Sciences

Journal Home Page: www.pharmaresearchlibrary.com/ijcps



Research Article

Open Access

Physico-Chemical studies of bore wells drinking water Quality Investigation in middle Gujarat of Kathlal Taluka: I

P. R. Mevada¹, Dr. G.R. Jani² and Dr. N.K. Prajapati*³

¹Research Scholar, Pacific University, Udaipur, India.

²Shri U.P. Arts, Smt. M.G. Panchal Science College, V.L. Shah Commerce Pilvai, Gujarat, India.

³M.N. College, Visnagar, Mehsana, North Gujarat, India.

ABSTRACT

This study is to assess the quality of bore wells drinking water of Kathlal, tehasil (taluka), district-Kheda. In middle Gujarat. Samples were tested from Jan-Feb: 2013. The tests such as temperature, p^H, EC, total dissolved solids(TDS), dissolved oxygen(DO), alkalinity, Calcium, Mngesium, Sodium, Potassium, Chloride, Fluoride, Sulphate and Nitrate. The water samples are from bore wells was carried out in a brown glass bottles from ten sampling station (villages) of middle Gujarat state of Kathlal tehasil.

Keywords: Bore wells drinking water, Dissolved salt, TDS, Kathlal tehasil.

ARTICLE INFO

CONTENTS

1. Introduction	1630
2. Materials and Methods.	1631
3. Results and Discussion.	1631
4. Conclusion	1632
5. References	1652

Article History: Received 15 January 2015, Accepted 18 March 2015, Available Online 27 April 2015

*Corresponding Author

Prajapati
Department of Chemistry
M.N. College, Visnagar, Mehsana,
North Gujarat, India.
Manuscript ID: IJCPS2498



PAPER-QR CODE

Citation: Prajapati, et al. Physico-Chemical studies of bore wells drinking water Quality Investigation in middle Gujarat of Kathlal Taluka: I. *Int. J. Chem, Pharm, Sci.*, 2015, 3(4): 1630-1632.

Copyright © 2015 Prajapati, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

1. Introduction

Pollution of ground water is an important aspect of environmental pollution with the fast Industrialization and International Journal of Chemistry and Pharmaceutical Sciences

urbanization in the world. The main sources of contaminants of ground water are mines, petroleum

processing units, steel, smelter plants, pulp paper, textile, pharmaceutical and agriculture industries etc. When the waste water of an industry is dumped into streams, it gets into natural sources and causes change in physico-chemical composition of ground water which ultimately becomes unsuitable for use. Many different chemicals and various synthetic products we use today are usually the main causes of ground water pollution [1-5]. The problems of ground water quality are more acute in low lying area like Kathlal, as the water level is within 350ft to 510ft. The major source

2. Materials and Methods

Ten different villages bore wells water sample collected in brown glass bottles from different areas located in Kathlal (taluko) tehsil. All the chemicals used water of AR grade. Double distilled water was used for the preparation of reagents and solutions. The major water quality parameters considered for the examination in this study are temperature, pH, EC, Dissolved oxygen (DO), Total dissolved solid (T.D.S), Alkalinity, Calcium and

3. Result and Discussion

The average results of the physicochemical parameters for water samples are shown in given Table.

PH:

The pH values of water samples varied between 7.02 to 7.88. PH is a term used universally to express the intensity of alkaline condition of a solution. Most of the waters are near about measurement of pH level. Only two samples are slightly alkaline due to carbonates & bicarbonates.

Electrical conductivity (EC):

Electrical conductivity is a measure of water capacity to convey electric current. It signifies the amount of total dissolved salts¹¹. EC values were in the range of 1.7 micromhos/L to 3.8 micromhos/L.

Total dissolved solids (TDS) :

Total dissolved solids indicate the salinity behavior of groundwater. Water containing more than 500 mg/L of TDS is not considered desirable for drinking water supplies, but in unavoidable cases 1500 mg/L is also allowed¹². TDS values varied from 440 mg/L to 842 mg/L.

Dissolved oxygen (DO) :

Dissolved oxygen parameter is important in water quality assessment and reflects the physical and biological processes prevailing in the water. In the present study dissolved oxygen (D.O) ranged from 5.9 mg/l to 8.5 mg/l. The minimum tolerance range is 4.0 mg/l for drinking water.

Alkalinity:

Alkalinity of water is its capacity to neutralize a strong acid and it is normally due to the presence of bicarbonate, carbonate and hydroxide compound of calcium, sodium and potassium. Total alkalinity values for all the investigated samples were found to be greater than the value prescribed by WHO. In the present study total alkalinity range was from 328 mg/l to 590 mg/l.

Calcium Hardness: The calcium hardness range is from 17.33 mg/l to 52.90 mg/l. The tolerance range for calcium hardness is 75 to 200 mg/l. Calcium contents in all samples

of drinking water from bore wells and it also uses in agriculture. There exists strong correlations among different parameters and a combined effect of their inter-relatedness indicates the water quality. Ground water quality in the industrial areas is determined by measuring the concentration of some physico-chemical parameters and comparing them with drinking water standards [6]. It is well known that no straight forward reasons can be advanced for the deterioration of water quality, as it is dependent on several water quality parameters.[7]

Magnesium hardness, Sulphate, and Nitrate contents [8-10]. Temperature, pH, Dissolved oxygen (DO), Total dissolved solid (T.D.S), Nitrate values were measured by water analysis kit and manual methods. Calcium and magnesium hardness of water was estimated by complexometric titration method. [11] Chloride contents were determined volumetrically by silver nitrate titration method using potassium chromate as an indicator.

collected fall within the limit prescribed. Calcium is needed for the body in small quantities, though water provides only a part of total requirements.

Magnesium Hardness: Magnesium hardness ranged from 14.61 to 76.94 mg/l. The tolerance range for magnesium is 50 to 100 mg/l.

Sodium (Na⁺): Sodium concentrations were found in between 122 mg/L to 337 mg/L.

Potassium (K⁺): The major source of potassium in natural fresh water is weathering of rocks but the quantities increase in the polluted water due to disposal of waste water. Potassium content in the water samples varied from 0.86 mg/L to 2.96 mg/L.

Chlorides: The chlorides contents in the samples between 27.68 mg/l to 148.30 mg/l natural water contain low chloride ions. The tolerance range for chloride is 200 to 1000mg/l.

Fluoride:

The permissible limit of fluoride in drinking water is 1.0 mg/L, which can be extended to 1.5 mg/L in case of nonavailability of other water sources. Higher fluoride level in drinking water gives rise to dental decay and physical deformation. The dreaded disease "fluorosis" is a result of intake of high fluoride laden in drinking water. It has been observed that ground water fluoride content ranged from 0.58 to 1.97 mg/L.

Nitrate:

In the present study nitrate ranged from 85 mg/l to 252 mg/l. The tolerance range for nitrate 20mg/l to 45 mg/l. Nitrate nitrogen is one of the major constituents of organisms along with carbon and hydrogen as amino acid, protein and organic compounds present in the bore wells water. In the present study nitrate nitrogen levels show higher values than the prescribed values. This may be due the excess use of fertilizers and pesticides in this area.

Sulphate: Sulphate ranged from 86.21 mg/l to 345.35 mg/l. The tolerance range for sulphate is 200 to 400 mg/l.

4. Conclusion

The important physico-chemical parameters of bore well water samples collected from 10 locations in Winter-Kathlal Tehasil. The Sample was taken in Jan-Feb: 2013. It was observed that the pH, Fluoride, T.D.S., Total alkalinity,

Total hardness, Chloride, Nitrate, Sulphate, Calcium, Magnesium are normal for the water samples. Only very few samples showed values above the desirable limits by Indian standard Index.

5. References

1. A. A. Ammann, E. Hoehn and S. Koch, Ground Water Pollution by Roof Runoff Infiltration Evidenced with Multi-Tracer Experiments, *Water Research*, 2003, 37(5), 1143-1154.
2. WBCSD Water Faacts Trends, <http://www.wbcd.org/includes/getTarget.asp>, Retrieved **2010**, 7-25.
3. D. Smith, Jared, D. Cappa Christopher, R. Kevin, R. Wilson and C. Ronald. Unified Description of Temperature-Dependent Hydrogen Bond Rearrangements in Liquid Water, *Proc. Natl. Acad. Sci.*, **2005**, 102(40), 14171-14174
4. WHO, Guidelines for Drinking-Water Quality, **1984**, Vol. 2, Health Criteria and Other Supporting Information, World Health Organization, Geneva.
5. W.H.O. Guidelines for Drinking Water Quality, **1997**, Volume. 3, Surveillance and Control of Community Supply, Geneva, Arul Antony, *Indian Journal of Science and Technology*. **2008**, 1(6), 1.
6. J. R. Prajapati and B. V. Raol *Poll Res.* **2004**, 23(1), 165-168.
7. B Shrinivasa Rao and P Venkateswaralu, *Indian J Environ Prot.*, **2000**, 20 (3): 161
8. Sudhir Dahiya and Amarjeet Kaur, *J Environ Poll.* **1999**, 6(4): 281.
9. WHO **1958**. International Standard for Drinking Water, Geneva.
10. M.B.Mehta, Drinking Water Quality of Ground Water From Selected Sample Points Around Thane District of Maharashtra *J. of Industrial Pollution control*, **2003**, 19(2), 153-157.
11. BIS, Indian standards specifications for drinking water, Bureau of Indian Standards, **1991**, IS:10500.