PHYSICO-CHEMICAL STUDIES ON TUBEWELLS WATER OF POPATPURA (GODHRA - GUJARAT)

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ABSTRACT:

Various samples of Tube well water collected from different areas in and around the Popatpura (Godhra) of Panchamahals district (India) and analyzed for their physico-chemical characterizations. The results of this analysis were compared with the water quality standards of WHO and CPHEEO. In this analysis the various physic-chemical parameters such as PH, Dissolve oxygen, TDS, Chloride, total alkalinity, calcium, magnesium hardness, sulphate, fluoride, nitrate and total hardness etc., were determined using standard procedures. The studies are was Adivasi area and a total of 10 water samples from different 10 locations were collected and analyzed.

Key Words : Physico-chemical parameters, Bore wall water, Water quality.

INTRODUCTION:

Water sources available for drinking and other domestic purpose must possess high degree of purity, free from chemical contamination and micro-organism. The potential and quality of Tube well water , is an economic resource and essential component of our life, is getting deteriorated in major rural centers due to pollution caused by population explosion, realization and industrialization.[1,2] Studies on Tube well water[3,4] hear, we report the physicochemical studies of Tube wells water of Popatpura (Godhra), Gujarat and its some interior Adivasi area. Because of the geographical isolation and remoteness, people residing in the interior Adivasi area, mostly not have access to safe drinking water. In the absence of fresh water supply, the people are forced to take water from any sources that lies near their village. In most of interior Adivasi area, the Tube well water is used for drinking purpose and other domestic purpose, Tube well water is generally good quality and it is difficult to pollute open well water.

The use of fertilizers, pesticides and insecticides in rural area manure, lime, septic tank, refuse dumps etc. are the main source of Tube wells water pollution.[5].

MATERIALS AND METHODS:

The study area, the Popatpura(Godhra) is situated in 3 km around Popatpura to Godhra city, Gujarat.Overall, 10 samples were collected from the Tube wells of various places around of Popatpura . Various samples were collected in clean and dry polyethylene bottle from Tube walls after running them from 5 minutes[6]. All the collection of samples are immediately preserved in dark boxes and processed for the different analysis within 6 to 12 hours after collection. In this present study various physical and chemical parameters of water samples were determined and the result were compared with the values of various water quality standards such as World Health Organization (WHO) and Central Public Health and Environment Engineering Organization. (CPHEEO) All the chemicals used were of AR grade. Double distilled water was used for the preparation of reagents and solutions. The major water quality parameters consider for the examination in this study are Temperature, PH , dissolve oxygen (D.O.), total alkalinity, total dissolve solid (T.D.S.), calcium and magnesium, sulphate, nitrate, fluoride contants.[7] The Temperature of the samples was noted at their sampling points itself. pH , T.D.S., D.O., Nitrate, values were measured by water analysis and manual method, calcium and magnesium hardness of water was estimated by complex metric titration method[8]. Chloride fluoride, nitrate sulphate content were determine by standard volumetric method[8,9].

RESULTS AND DISCUSSION:

The physic- chemical data of the Tube wells water samples collected in January-12 are presented in Table 1. The results of the samples with different collecting places because of the different nature off soil contamination.[8] In the present study temperature ranged from19-22° C. The Tube wells water have the alkaline PH range of 7.3 to 8.4 and the values are well within the safe limit for drinking.[10] The PH value of drinking water is an important index of acidic , alkalinities and resulting value of the acidic-basic interaction of a number of its mineral and organic components. In the Popatpura (Godhra) all water samples have normal pH, if below than 6 PH that prescribes by APHA.[11] The present study showed dissolve oxygen ranged from 4.6 to 8.6 mg/L. According to WHO and Indian standard, T.D.S. value should be less than 500 mg/L for drinking water but present study T.D.S. ranged from430 to 760 mg/L ,showing high values which may be attributed to the limestone area.

The chloride content ranges from 48 to 200 mg/L (mean-370 mg/L) natural water contains low chloride ions, i.e. finding indicates that most of samples are below the permissible limits of chloride in drinking water prescribed [12] by Indian Standard Index.

Alkalinities leads to corrosion and influences the chemical and biochemical reactions. Alkalinities was observed in the ranges 250 to 450 mg/L, within the permissible limit of 200 mg/L.The concentration of

calcium ranges from 22 to 76 mg/L with the maximum in the sample The high concentration of Ca may be due to deposits of limestone, dolomite.[11]

Water containing high calcium is not suitable for washing, bathing, and in the boilers and linked to the formation of concretion in the body and may cause gas to intestinal diseases and stone formation. So, calcium in needed for the body in small quantities though water provide only part of total requirement.[13]

Magnesium is a beneficial meta but toxic at high concentration, cause hardness of exerts a cathartic and diuretic action.[11] The concentration of magnesium range from 44 to 90 mg/L.Total Hardness, indicates calcium and magnesium content ranges 184 to 424 mg/L (mean- 138 mg/L) Hardness of water is not health hazards but its value should remain below permissible limit to restore the test of water.[10] Nitrate nitrogen is one of the major constituents of organism along with carbon and hydrogen as amino acids, protein and organic compounds, present in Tube wells water.[14] In the present study nitrate nitrogen level should lower values then the prescribed values. In the present study Fluoride ranged from 0.6 to 1.25 mg/L. Mostly sample having the permissible limits of fluoride in drinking water prescribed[12] by Indian standard Index. In the present study sulphate ranged from 12 to 44 mg/L. High concentration of sulphate along with sodium and magnesium in drinking water can leads to gastrointestinal irritation.

Table-1: Analysis Results of the samples collected in January-2012 Popatpura(Godhra)

Temp. - 19-22°C

Source : Tube well

Sr. No.	Sampaling Station	P^H	TDS	DO	Cl	Total Alkli.	Ca	Mg	Total Hard.	Nitrate	Florid	sulphate
1.	Kakri Khan falia	7.78	510	4.60	88	320	67	44	352	4.76	0.6	12
2.	H.P. Modi Prathmicshala	7.62	430	8.20	48	248	26	29	184	8.86	1.08	22
3.	H.P. Modi Vankarwas	7.65	720	5.30	104	396	22	89	424	6.20	1.1	44
4.	H.P. Modi Ranjitbhai	7.70	760	4.60	200	320	42	60	352	7.97	1.25	22
5.	H.P.Imran Kesri House	8.13	685	4.60	80	440	74	36	336	7.08	0.89	28
6.	H.P.Nayak Kirtanbhai	8.15	600	8.20	112	360	76	44	376	6.20	0.65	26
7.	H.P. Chakda Kaderbhai	8.29	610	6.40	64	380	45	44	296	5.31	0.68	34
8.	H.P.Opp. Dr.sajid Man.	7.72	764	6.40	176	296	48	69	408	6.20	0.82	20

Sr. No.	Sampaling Station	P^H	TDS	DO	Cl	Total Alkli.	Ca	Mg	Total Hard.	Nitrate	Florid	sulphate
9.	H.P.Near Gamtal	7.80	712	8.20	200	312	51	72	424	3.54	0.62	22
10.	Popatpura Gamtal	7.7	720	4.60	128	296	54	66	408	4.43	1.08	20

Water containing high calcium is not suitable for washing, bathing, and in the boilers and linked to the formation of concretion in the body and may cause gas to intestinal diseases and stone formation. So, calcium in needed for the body in small quantities though water provide only part of total requirement.[13]

CONCLUSION:

The important physico-chemical parameters of Tube well water samples collected from 10 locations in Popatpura (Godhra).It was observed that the PH ,Fluoride are normal in mostly sampling station, but T.D.S., total alkalinity , total hardness, chloride, nitrate, sulphate, calcium, magnesium are high for the water samples from many sampling stations. Only very few samples showed values above the desirable limits by Indian standard Index.

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REFERENCES:

[1] Ramakrishnaiah C R, Sadashivaia C, and Ranganna G, E Journal of Chemistry, **2009**, **6**(**2**), 523.

[2] Nageswara Rao K, Swarna Latha P and Ramesh Kumar P V, Indian T Environ Prot., **2007**, **27** (**11**), 996.

[3] Rajankar P N, Gulhane S R, Tambeker D H, Ramteke D S and Wate S R, E Journal of chemistry, **2009**, **6**(**3**), 905.

[4] Sekar P, Hariprasad S and Deccaraman M, J Appl Sci Res., **2008,4**(**11**),1526. [5] Hamilton P and Helsel D R, Ground Water, **33**(**2**), **1995**.

[6] Brown E, Skovgstd M W and Fishman M J, Method for Collection and Analysis of Water Samples for Dissolveed Minerals and Gases, **5**, **1974**.

[7] Manivasagam N, Physico-Chemical Examination of Water , Sewage and Industrial Effluents, Pragati Prakashana, Meerut, **1984**.

[8] Vogel A I, Text Book of Quantitative Inorganic Analysis, 4th Edn., ELBS,London,**1978**.

[9] Gupta R K, Text Book of Methods in Environmental Analysis Water, Soil, Air. Second Edn., **2007**.

[10] WHO, Guidelines for Drinking Water Quality, Geneva,**1984**.

[11] Standard Methods for Examine nation of Water and Waste Water,16th Edn., APHA,AWWA, and WPCF, Inc., New York, **1985**.

[12] The Gazette of India: Extraordinary Part- II, **3**(**1**), 11, **1991**.

[13] Dhembare A J, Ponde G M and Singh C R, Pollution Research, **17**,(87) **1998**.

[14] Miller D G, Nitrate in Drinking Water ,Water Research Centre, Medmenham, **1981**.