International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 06 | June - 2021 ISSN: 2582-3930

Underground Water Analysis of Butibori Area (Nagpur)

Lalitkumar R. Turkar [1]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Kalyani Raut [2]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Arpit Mendhule [3]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Kiran Bhange [4]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Ravindra Kumari [5]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Manisha Bodele [6]
U.G. Student, Dept. of Civil Engineering
TGPCET, Nagpur, India

Prof. Mohitsingh Katoch [7]
Assistant Professor, Dept. of Civil Engineering Treasurer, TGPCET, Nagpur, India

***Abstract*— Water quality information is needed to assess the state of water contamination in a variety of community, including those that rely primarily on unimproved underground sources of drinking water. The study will be carried out to assess the quality of groundwater in particular sites of the domestic area of Butibori. The groundwater samples will be collected from a shallow well, tube well and bore wells located at specific places within the domestic area of Butibori. The research was focused on the physicochemical and bacteriological analysis of underground water from domestic sites.**

***Keywords*—** physical test, colourimetric test, laboratory test

1. INTRODUCTION

In the Nagpur region, Central Ground Water Board (CGWB) is monitoring the groundwater quality of the district for the last four decades through its established monitoring wells. Groundwater trace and exploration has become a cumbersome task in central India due to irregularities in annual rainfall. The objectives behind the monitoring are to develop an overall picture of the groundwater quality of the district. Hydrological traces and possibilities are sought with the help of natural landscape elements like topographical landforms, drainage patterns and watersheds, vegetative land use, soils patterns etc. by image interpretation techniques. In this case of our project, we will elaborate on the quality of underground water in the domestic region.

2. Importance of the project

- The objective of this project is to determine the level of safety of underground water used for domestic purposes in residential areas of Butibori.
- To evaluate the toxic components in various samples of domestic underground drinking water by using different colourimetric techniques as well as laboratory testing.

3. METHODOLOGY

- In this paper, most of the method is based on a survey and experiment as a laboratory test.

- In this project, We were collected 3 litres of Underground water in clean plastic bottles from the domestic area of Butibori for further testing in a laboratory.

- As per the World Health Organization standard for drinking water the value of physical and chemical parameters of testing doesn't exist as given below table:-

Table 1: World Health Organization standard for drinking water

Substances and characteristics	*Undesirable effect that may be produced*	*Highest desirable level*	*Maximum permissible level*
Substances causing discolouration	Discoloration	5 unit	50 units
Substances causing taste	Taste	Unobjectionable	Unobjectionable
Substances causing odour	Odour	Unobjectionable	Unobjectionable
Suspended matter	Gastro intestinal irritation turbidity	5unit	25umt
Total solid	Taste, gastro intestinal irritation	500mg / l	1500mg/ l
Ph	Taste, corrosion	7.0 – 8.5	6.5 – 9.2
Total hardness	Excessive scale formation	100mg/$caco_3$	500mg/l $caco_3$
Calcium	Excessive scale formation	75mg/l	200mg/l
Chloride	Taste corrosion in hot water system	200mg/l	600mg/l
Copper (cu)	A stringent taste, discoloration, corrosion of pipes & utensils	0.05mg/l	1.5mg/l
Iron (fe)	Taste, discouloration, deposit and growth of iron bacteria turbidity	0.1mg/l	1.0mg/l
Manganese	Taste, discouloration, turbidity	0.05mg/l	0.5mg/l
Sulphate	Gastro intestinal irritation when ca and mg are present	200mg/l	400mg/l
Magnesium	Hardness / gastro intestinal irritation if S_{04} is present	Not more than 3 0mgl with so_4	150mg/l
Fluoride		0.7mg/l	<10.0
Nitrate and nitrite		Absent	0.5
Ammonia		Absent	17mg/l
Arsenic		<0.01	0.05
Barium		Absent	1.0
Boron		Absent	1.0
Manganese		Absent	0.05
Dissolved oxygen		Air Saturation	<4.0
Lead		Absent	0.05
Phosphorous		10mg - 50mg/l	10mg/l
Selenium		Absent	0.01
Silver		Absent	0.01

Source: Edo State Water Corporation, Benin City.

Fig. 3.1

4. PARAMETERS

4.1 Physical Parameters:-

- **Colour**:- The colour of the water samples performing as Apparent colour as lite green. In which this sample consisted of dissolved and suspended components. The watercolour unit of this sample is 10. we found this value by adding platinum (potassium chloroplatinate (K2PtCl6)) as a 1 mg/L solution of water samples

- **Taste and odour**:- The taste and odour of water samples calculated by Threshold Odor Numbers applying the formula as TON = (A + B)/ A. In which A is the Volume of Sample with odour and B is the Volume of Pure Water with no odour Added. we found the value of TON as 2.

- **Temperature**:- The temperature of the water samples we found was 10^0 C.

4.2 Chemical Parameters:-

4.2.1 Colorimetric Test:-

- The colourimetric analysis is a method of determining the concentration of a chemical element or chemical compound in a solution with the aid of a colour reagent.

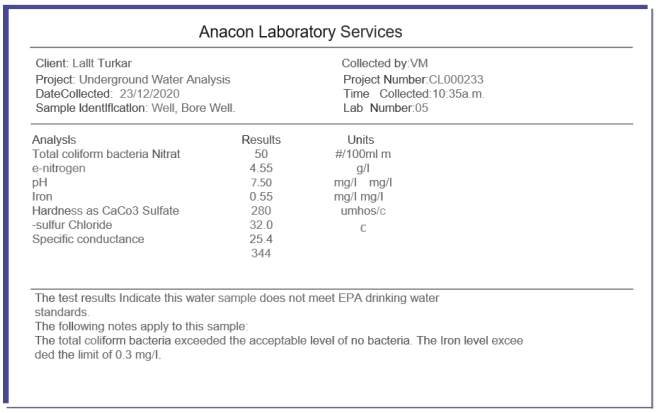
- It applies to both organic compounds and inorganic compounds and may be used with or without an enzymatic stage.

- The method is widely used in medical laboratories and for industrial purposes, e.g. the analysis of water samples in connection with industrial water treatment

- By litmus paper test the red litmus paper turns light blue as we found the value of pH is 7.5 which is alkaline.

4.2.2 Laboratory Test:-

This test determines the chemical parameters of underground water quality such as shown in the reports



Anacon Laboratory Services

Client: Lallt Turkar
Project: Underground Water Analysis
DateCollected: 23/12/2020
Sample IdentIfIcatIon: Well, Bore Well.

Collected by:VM
Project Number:CL000233
Time Collected:10:35a.m.
Lab Number:05

Analysis	Results	Units
Total coliform bacteria Nitrat	50	#/100ml m
e-nitrogen	4.55	g/l
pH	7.50	mg/l mg/l
Iron	0.55	mg/l mg/l
Hardness as CaCo3 Sulfate	280	umhos/c
-sulfur Chloride	32.0	c
Specific conductance	25.4	
	344	

The test results Indicate this water sample does not meet EPA drinking water standards.
The following notes apply to this sample:
The total coliform bacteria exceeded the acceptable level of no bacteria. The Iron level excee ded the limit of 0.3 mg/l.

Fig. 4.2.1

6. RESULT IN ANALYSIS

- After analysis, we found as the underground water quality of this area is exceeded the limit of EPA drinking water. It is required to treat for further use of domestic purposes.

- Various parameters are analyzed in the laboratory and some parameters are tested at field levels such as colour, test, odour and temperature.

- All these tasks recorded are utilized for preparing the Test Report by performing some specific exercise.
- This data is considered to specify the quality of water at each location.
- This also helps to determine the pollution level or concentration of pollutant particles in each source of water at each station.

5. CONCLUSION

- In this paper, we studied domestic and industrial underground water concept separately. In that case, the domestic underground water polluted by regular generating the wastewater of washing kitchenware and cloth which flow through the pipe to the underground as well as industrial underground water polluted by wastewater of chemical and textile factory which flow through the pipe to the river.
- We found that Toxins in industrial wastewater are the major cause of immune suppression, reproductive failure and acute poisoning. Infectious diseases, like cholera, typhoid fever and other diseases gastroenteritis, diarrhoea, vomiting, skin and kidney problem are spreading through polluted water as well as also in case of domestic wastewater including chemical contaminants of soaps and waste food contains which harmful to human health.

6. REFERENCE

- **M. Prasad, V. Sunitha, Y. Sudharshan Reddy, B. Suvarna, B. Muralidhara Reddy and M. Ramakrishna Reddy, Data on water quality index development for groundwater quality assessment from Obulavaripalli Mandal, YSR district, A.P India, 2352-3409/© 2019 Published by Elsevier Inc.**
- **Najeeb Khatian, Qurratul Ain Leghari and Hammad Ahmed, Evaluation of toxic components in underground drinking water and its effects on the health of the rural people of Hyderabad, Pakistan, IJBABN 2019; 10(03): e5049**
- **Chandrashekhar, S B Ankesh, Venugopal M L, Sumanth S, Abhishek BS, Vinodkumar, GROUNDWATER ANALYSIS IN AND AROUND PEENYA INDUSTRIAL AREA, IRJET Volume: 06 Issue: 08 | Aug 2019**
- **Jyoti Bansal & A.K. Dwivedi, ASSESSMENT OF GROUNDWATER QUALITY BY USING WATER QUALITY INDEX AND PHYSICOCHEMICAL PARAMETERS: REVIEW PAPER, IJESS7 7(2): February 2018**
- **Sanigdha Acharya n, S.K. Sharma, Vinita Khandegar, Assessment of groundwater quality by Water Quality Indices for Irrigation and drinking in South West Delhi, India, Guru Gobind Singh Indraprastha University May 2018**
- **Ketan S. Kimmatkar and Prof. A. J. Sanyal, ASSIGNING RANK AND WEIGHTAGES TO LANDSCAPE PARAMETERS TO WORK GROUNDWATER POTENTIAL - CASE OF MIDC, BUTIBORI, NAGPUR, Int. J. Adv. Res. 5(2), 1122-1125 Copy Right, IJAR, 2017**
- **Munal Subedi1, Mamata Gharti Magar, Gita Shrestha, Assessment of Quality of Underground Drinking Water: Very near (≤20 meters) and Far (>50 meters) from the River, Nepal Journal of Biotechnology. Dec. 2017 Vol. 5, No. 1:21-26**
- **Ahmad Ashfaq and Faizan Ahmad, Study on Assessment of Underground Water Quality, IJCMAS ISSN: 2319-7706 Volume 3 Number 9 (2014) pp. 612-616**
- **M.INAYATHULLA & JAI M. PAUL, WATER QUALITY INDEX ASSESSMENT OF GROUNDWATER IN JAKKUR SUB WATERSHED OF BANGALORE, KARNATAKA, INDIA, (IJCSEIERD) ISSN 2249-6866 Vol. 3, Issue 1, Mar 2013**
- **K. Ansari, N. M. Hemke, Water Quality Index For Assessment Of Water Samples Of Different Zones In Chandrapur City, (IJERA) Vol. 3, Issue 3, May-Jun 2013, pp.233-237**
- **Shaik Rameeza, V.N.V. Srikant, D.Mallikarjuna Rao and Ch. Ramakrishna, Study of Ground Water Quality In Industrial Zone Of Visakhapatnam, Advances in Applied Science Research, 2012, 3 (4):2463-2467**
- **Jonathan YISA, Tijani Oladejo JIMOH, and Ohiemi Michael OYIBO, Underground Water Assessment using Water Quality Index, Leonardo Journal of Sciences ISSN 1583-0233 Issue 21, July-December 2012 p. 33-42**
- **D. S. Malik, Pawan Kumar and Umesh Bharti, A study on groundwater quality of industrial area at Gajraula (U.P.), India, JANS 1(2): 275-279 (2009)**
- **S. I. Omofonmwan and J.O. Eseigbe, Effects of Solid Waste on the Quality of Underground Water**

in Benin Metropolis, Nigeria, J Hum Ecol, 26(2): 99-105 (2009)

- **H. V. Vyas and V. A. Sawant, STUDY OF UNDERGROUND WATER QUALITY FROM INDUSTRIAL AREA OF KOLHAPUR CITY, Nature Environment and Pollution Technology © Technoscience Publications Vol. 6 No.4 pp. 685-688 2007**