International e-Conference on New Horizons And Multidisciplinary Applications In Science And Technology
In Association withInternational Journal of Scientific Research in Science and Technology
Volume 9 | Issue 6 | Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)

Chemical Analysis of Drinking Water in Dhanki Region Ta- Umarkhed, Dist- Yavatmal

A. P. Mitake*[1], Wagmare S.B.[2], Dr. S. P. Rathod[3], Dr. T. M. Bhagat[3]

[1]Assistant Professor, Department of chemistry Gopikabai Sitaram Gawande Mahavidyalay, Umarkhed, Dist. Yavatmal, Maharashtra, India

[2]Professor, Department of chemistry Gopikabai Sitaram Gawande Mahavidyalay, Umarkhed, Dist. Yavatmal, Maharashtra, India

[3]Department of chemistry Gopikabai Sitaram Gawande Mahavidyalay, Umarkhed, Dist. Yavatmal, Maharashtra, India

ABSTRACT

The objectives of this study are to analyze the underground water quality of Greater Dhanki Region by water quality index. The most important 11 physico-chemical and biological parameters such as Calcium, Magnesium, Chloride, Sulphate, Total Hardness, Berium, Total Dissolved Solids, Alkalinity collected from 10 different locations since a period of 2021. In this study 80% water samples were found good quality and only 20% water samples falls under moderately poor category. The water quality index ranges from 15.47 to 62.65. Therefore there is a need of some treatment before usage and also required to protect that area from contamination.

Keywords: Water quality parameter, Underground water, Drinking water,

I. INTRODUCTION

Groundwater is a important source of water supply through the world. The ground water quality is still important to the communiy. Therefore it is important to ensure its high quality at all time so that the consumer health is not compromised. The three major activities of groundwater resource are affected 1]. The wxcessive use of fertilizer and pesticides. 2]. Untreated or Partioally treated waterwaste to the environment. 3]. Exessive pumping and improper management of aquiferes result. One of the most causes of ground water is the activity of solid waste disposal in open un-engineered landfill du to the lack of pollution control interventions such as water proof layer , leachte treatment pond , monitoring wells, etc.(Girija et al.,2007).
Ground water is a good source of fresh water resource which is the biggest issues in front of the policy makers for its sustainable utilization. Natural filtration through soil and sediments makes the ground water free from organic impurities (Karanth, 1989). Various major controlling ground water chemistry factors are regional geology, geochemically process and landuse patterns (Kumar, Ramanathan, Rao, & Kumar, 2006Kumar, M. , Ramanathan, A. L. , Rao, M. S. , & Kumar, B. (2006). Identification and evaluation

of hydrogeochemical processes in the groundwater environment of Delhi, India. *Environmental Geology* , *50* , 1025–1039.10.1007/s00254-006-0275-4 [Crossref], [Web of Science ®], [Google Scholar]; Liu, Jang, Chen, Lin, & Lou, 2008; Matthess, 1982; Rajesh, Brindha, Murugan, & Elango, 2012; Zhu & Schwartz, 2011). Major ion chemistry of ground water is also influenced by the evaporation and irrigation return flow (Guo & Wang, 2004; Hudak, 2000; Rajmohan & Elango, 2006; Stigter, van Ooijen, Post, Appelo, & Carvalho Dill, 1998). Over withdrawal of ground water is deteriorating the ground water quality (Karma, Lal, Singh, & Boonstra, 2002; Négrel, Lemière, Machard de Grammont, Billaud, & Sengupta, 2007; Singh, Sinha, Bisht, & Banerjee, 2002) achieving in the higher salinity, Nitrate, Iron, Fluoride, and other heavy metals in ground water. Excessive use of fertilizers and pesticides, untreated sewage treatment system (Gautam, Sharma, Tripathi, Ahirwar, & Singh, 2013) and mixing of non-treated municipal and industrial effluents with ground water (Rao, Reddy, & Nayudu, 1997; Vasanthavigar, Srinivasamoorthy, & Prasanna, 2012; Wen, Wu, Su, & Zhang, 2005) are deteriorating the ground water quality.

Literature Review

II. STUDY AREA

Dhanki is a large village located in Umarkhed Taluka of Yavatmal district, Maharashtra with total 3743 families residing. The Dhanki village has population of **17267** of which 8906 are males while 8361 are females as per Population Census 2011. The water supply in the area is done through overhead tanks, tube wells, trunks and other supply lines.

Country	India
State	Maharastra
District	Yavatmal
Taluka	Umarkhed
Location	Dhanki
Population(2020/2021) est.	16,749 - 18,994
Population(2011)	17267
Houses	3743
Lat.	19⁰ 34’ 0’’
Lag.	77° 51' 0"

Fig.1 Location of water sample in Dhanki region

III. SAMPLE COLLECTED

I have collected water sample in dhinki villege at 10 different places Shanti nagar, Sai Shradha Nagar, Mahanubhav upkhand, Hanuman mandir temple, Pochama temple, Chatrapati chauik, SBI Colony, Swami Pendse college,fule budh vihar, Datt mandir Temple, shown in the above map. The water sample is collected in plastic bottles in morning time between 7:00 am to 10:00 am from july to september 2021. The collected water sample is taken in to the laboratory for the pourpoes of analysis of physicochemical and biological parameter of the sample.

Table: 1- Details of Sample Sources.

Sr. No	**Sample Station**	**Type of Source**	**Depth in Feet**
1.	Shanti nagar,	Bore well	200
2.	Sai Shradha Nagar	Bore well	240
3.	Mahanubhav upkhand,	Open well	60
4.	Hanuman mandir temple	Bore well	170
5.	Pochama temple	Bore well	280
6.	Chatrapati chauik	Bore well	300
7.	SBI Colony	Bore well	150
8.	Swami Pendse college	Bore well	220
9.	fule budh vihar	Open well	70
10.	Datt mandir Temple	Bore well	180

IV. MATERIAL AND METHOD

The several physicochemical and biological parameter of water sample of drinking water collected for the study, thee parameter like pH, turbidity, Alkalinity, BOD, DO, COD, TDS, Cloride, fluride, Sulfate, Berium, magnesium, hardness, calcium,

4.1 Test of water sampls:

Water quality test	Discription	instrument
pH	The major acidity (Hydronium ion +H) in the water.	pH meter
Temp.	Laboratory method	0.1^0c thermometer
Test	The test of water ranging from agriable to disagriable.	By testing
Odour	Odour is recognizing as a quality factor affecting acceptability of drianking water.	Wide mouth glass stoped bottle
Hardness	Measurment of calcium and magnecium in water.	Titrimetric methor (Complex metric)
Magnesium	Measurment of magnesium in amount of water.	Titrimetric method
Calcium	Mesurment of calcium in amount of water.	Titrimetric method
TDS	The measure amount of perticular solid that are in water.	Gravimetric method
DO	The amount of Oxygen availabe in the water.	Titrimetric

		method(Iodometric)
BOD	It is the amount of dissolved oxygen needed by aerobic biological organism.	Titrimetric method

4.2 Physiochemical and Analysis of water sample :

Sr. No	Test	Sample1	Sample2	Sample3	Samples4	Sample5
1.	Temp	28	30	27	29	33
2	pH	6.5	7.1	7	7.3	6.4
3	Turbidity(NTU)	0.5	0.7	0.4	0.6	0.5
4	Alkalinity	7	9	8	9	7
5	COD (mg/L).	39	36	38	30	37
6	DO(mg/L.)	6.3	6.1	6.0	6.2	6.1
7	TDS (mg/L.)	154	160	152	163	153
8	Chloride	36	40	38	34	31
9	Sulfate	10	9	11	14	16
10	Berium	Nil	Nil	Nil	Nil	Nil
11	Magnesim	3.4	2.2	2.7	3.6	3.4
12	Calcium	6.2	8	7.1	6.6	8.2
13	hardness	5.1	4.1	5.0	3.9	3.6

4.3 Physiochemical and Analysis of water sample :

Sr. No	Test	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10
1.	Temp	29	30	33	27	28
2.	pH	6.8	7.0	6.4	6.9	6.5
3.	Turbidity	0.4	0.7	0.5	0.7	0.5
4.	Alkalinity	6	9	7	10	7
5.	BOD					
6.	COD	37	38	37	41	39
7.	DO	6.5	6.1	6.1	5.0	6.3
8.	TDS	156	166	153	162	154
9.	Chloride	39	41	31	33	36
10.	Sulfate	12	9	16	13	10
11.	Berium	Nil	Nil	Nil	Nil	Nil
12.	Magnesim	3.1	3.2	3.4	3.7	3.4
13.	Calcium	6.1	7.2	8.2	7.3	6.2
14.	hardness	6.1	3.1	3.6	5.4	5.1

4.4 Color, Odor, and Temperature:

The collected all samples colourless and odourless that's why the all sample indicates colloidal substances and decomposed vegetative matter is absent in the samples. The temperature of all sample is range between

27.9°C and 33.4°C due to increases in the sessional temperature in the Dhanki village during the July to September because it is directly related to the climatic condition during the session.

V. RESULT AND DISCUSSION

The temperature of underground water samples collected from the different open wall and bore well in Dhanki region at water temperature range 27.9°C to 33.4°C. The maximum temperature was observed at Swami Pendse college and Pochama temple and the minimum temperature was recorded at Mahanubhav upkhand and fule budh vihar during the july to suptember 2021 session. The pH values varies from 6.4 to 7.4 including alkline nature of underground water study area. The maximum pH was recorded in the area of Hanuman mandir temple ie. (7.3) The value of chloride were found in range 31 to 41 ml/lit.The maximum value was recored in SBI colony Dhanki ie.(41) .while the minimum value was found in Pochama temple and Swami Pendse college 31. The maximum hardness was observed at Chatrapati chauik Dhanki ie.(6.1) . Berium are absent in all water sample in Dhanki area.The maximum magnesium ion are found in fule budh vihar Dhanki 3.7.The maximum turbidity of water sample ia 0.7 (NTU) Sai Shradha Nagar,

VI. CONCLUSION

From the above paper in the present study 75% water found good quality and remaining 25% water sample under moderate and poor category because of due to increasing in water pollution, industrialization, water quality of drinking water get decreases and hence there is a need of proper analysis of water and prior treatment.

VII. REFERENCES

[1] . Kumar, M. , Ramanathan, A. L. , Rao, M. S. , & Kumar, B. (2006). Identification and evaluation of hydrogeochemical processes in the groundwater environment of Delhi, India. Environmental Geology , 50 , 1025–1039.10.1007/s00254-006-0275-4.

[2] . Liu, C. W. , Jang, C. S. , Chen, C. P. , Lin, C. N. , & Lou, K. L. (2008). Characterization of groundwater quality in Kinmen Island using multivariate analysis and geochemical modelling. Hydrological Processes , 22 , 376–383.10.1002/(ISSN)1099-1085.

[3] . Zhu, C. , & Schwartz, F. W. (2011). Hydrogeochemical processes and controls on water quality and water management. Elements , 7 , 169–174.10.2113/gselements.7.3.169

[4] . Guo, H. , & Wang, Y. (2004). Hydrogeochemical processes in shallow quaternary aquifers from the northern part of the Datong Basin, China. Applied Geochemistry , 19 , 19–27.10.1016/S0883-2927(03)00128-8.

[5] . Hudak, P. F. (2000). Sulfate and chloride concentrations in Texas aquifers. Environment International , 26 , 55–61.10.1016/S0160-4120(00)00078-7.

[6] . Rajmohan, N. , & Elango, L. (2006). Hydrogeochemistry and its relation to groundwater level fluctuation in the Palar and Cheyyar river basins, southern India. Hydrological Processes , 20 , 2415–2427.10.1002/(ISSN)1099-1085.

[7] . Stigter, T. Y. , van Ooijen, S. P. J. , Post, V. E. A. , Appelo, C. A. J. , & Carvalho Dill, A. M. M. (1998). A hydrogeological and hydrochemical explanation of the groundwater. composition under irrigated land in a Mediterranean environment, Algarve, Portugal. Journal of Hydrology , 208 , 262–279.10.1016/S0022-1694(98)00168-1.

[8] . Karma, S. K. , Lal, K. , Singh, O. P. , & Boonstra, J. (2002). Effect of pumping on temporal changes in groundwater quality. Agricultural water management , 56 , 169–178.

[9] . Négrel, Ph. , Lemière, B. , Machard de Grammont, H. , Billaud, P. , & Sengupta, B. (2007) Hydrogeochemical processes, mixing and isotope tracing in hard rock aquifers and surface waters from the Subarnarekha River Basin, (east Singhbhum District, Jharkhand State, India). Hydrogeology Journal , 15 , 1535–1552.10.1007/s10040-007-0227-4.

[10] . Singh, R. V. , Sinha, R. M. , Bisht, B. S. , & Banerjee, D. C. (2002). Hydrogeochemical exploration for unconformity- related uranium mineralization : example from Palnadu sub-basin, Cuddapah Basin, Andhra Pradesh, India. Journal of Geochemical Exploration , 76 , 71–92.10.1016/S0375-6742(02)00218-2.

[11] . Gautam, S. K. , Sharma, D. , Tripathi, J. K. , Ahirwar, S. , & Singh, S. K. (2013). A study of the effectiveness of sewage treatment plants in Delhi region. Applied Water Science , 3 , 57–65.10.1007/s13201-012-0059-9.

[12] . Rao, Y. S. , Reddy, T. V. K. , & Nayudu, P. T. (1997). Groundwater quality in the Niva River basin, Chittoor district, Andhra Pradesh, India. Environmental Geology , 32 , 56–63.10.1007/s002540050193.

[13] . Wen, X. , Wu, Y. , Su, J. , & Zhang, Y. (2005). Hydrochemical characteristics and salinity of groundwater in the Ejina Basin, Northwestern China. Environmental Geology , 48 , 665–675.10.1007/s00254-005-0001-7.

[14] . Kasthuri, R., Lalitha, S., Kalaivani, D., Banumathi, K., & Nitha (2005). Essay of ground water quality at Kothattai of Tiruchirappalli. Indian Journal of Environmental Protection, 25(3), 245–248.

[15] . Khare, A., Lall, E. P., Bharose, R., & Kumar, U. (2013). Physico-chemical and microbial analysis of tap water of Allahabad region. International Journal of Bioassays, 3(2), 1797–1802.

[16] . Lalitha, S., Kalaivani, D., Selvameena, R., Santhi, R., & Barani, A. V. (2004). Essay on quality of water samples from medical college area in Thanjavur. Indian Journal of Environmental Protection, 24, 925–930.

[17] . Lohani, T. K. (2005). Statistical approach to physico-chemical and trace element analysis of groundwater samples in Athgarh area, Orissa. Indian Journal of Environmental Protection, 25(6), 535–545.