Research Journal of Chemical Sciences _____ ISSN 2231-606X
Vol. **3(9),** 80-82, September **(2013)** *Res. J. Chem. Sci.*

Short Communication

A Concise Report on the Status of Groundwater of Babhnan Town, Basti, UP, India

Prasad R.V.[1], Tripathi D.R.[2] and Kumar Vinod[2]
[1]Deptt. of Chemistry, A.N.D. Kisan P.G. College, Babhnan Gonda, UP, INDIA
[2]Deptt. of Zoology, A.N.D. Kisan P.G. College, Babhnan Gonda, UP, INDIA

Available online at: www.isca.in
Received 7th August 2013, revised 26th August 2013, accepted 14th September 2013

Abstract

The Present study deals with the water quality index of ground water of various locations of Babhnan town during Feb-Apr. (2013). Ten water samples from hand pumps at various locations were collected using standard methods and analyzed for pH, turbidity, chloride, total hardness, nitrate, fluoride, iron, and free chlorine. The results shows that the ground water from all sampling sites is very hard and beyond permissible limit provided by WHO. Over all water quality of Babhnan town is very poor and unsuitable for drinking purposes.

Keywords: Ground water, babhnan town ,WHO, quality of water.

Introduction

Water is a precious gift of nature. It is essential for the existence of life[1]. It is found in different form on earth, like sea water, river water, pond water, well water and ground water. Today most of the population of our country depend on ground water for drinking and in other purposes of day today life[2]. But due to urbanization and heavy industrialization the ground water of our country becomes unpleasant for drinking[3-4]. So the Present study deals to assess the some physico-chemical parameter of ground water of Babhnan town.

In the present study, water samples were collected from hand pumps of different areas around Babhnan, Basti. Various physico-chemical parameters were determined and the results were compared with the values of various water qualities standards such as world health organization (WHO[5]), Bureau of Indian standard (BIS[6]). The main aim of the study was to report on the assessment of physico-chemical parameters of ground water of Babhnan town.

Material and Methods

Study Site: The study area Babhnan town is the border of Basti and Gonda district of UP, India. The Babhnan is located between 26.90^0N latitude and 82.80^0E longitude. It is 17 km north to NH 28. It is 30 km west to Basti and 60 km east to Gonda railway station.

Sample Collection: A total 10 samples from different places which were minimum one Kilometer between one and another location was maintained in order to carry out a broad study on the quality of water in this area.

The sample were collected in plastic bottles which were cleaned with acid water, followed by rinsing twice with distilled water. The analysis of water was done by using Himedia water testing kit.

Table-1
Sampling places in the Babhnan Towan

S.No.	Sampling Places	Sample No.
1.	Kalimandir	1
2.	A.N.D. Kisan P.G. College	2
3.	J. Devi Mahila P.G. College	3
4.	Near Power House	4
5.	Sugar Mill Gate No.5	5
6.	Near Railway station	6
7.	Market centre	7
8.	Bageshwar Nath	8
9.	Marwatiya Bazar	9
10.	Kabir Dharmshala	10

Results and Discussion

Various Physico-chemical parameters determined for the water samples are given in table-2. From the analyzed results it is clear that the quality of water considerably varies from location to locations.

The findings and their comparison with WHO health based drinking guide lines are presented in table-3. The data revealed a considerable variation in the water samples with respect to their chemical composition. pH varies from 7.1 to 7.6. This shows that all samples are under permissible limit of WHO. The water sample were found to be slightly basic in nature[7-9].

Turbidity varies from 10 to 15 NTU. Which are higher than the permissible limits as standard value of WHO is 5 NTU. It is may be due to presence of some dissolved particles in water.

Chloride varies from 20-285 mg/lit. Most of the samples are under the permissible limits as of WHO[10]. While sample no. 1 and 7 are exceeds the maximum permissible limits of 250 mg/lit. of WHO.

Total hardness is considered as the major character of drinking water. Hardness is defined as the concentration of calciun and magnesium ion. According to Durfor and Backer's[11] classification of total hardness, water was very hard at all the locations and varies from 325-675 exceeds the maximum permissible limits of 300 mg/lit. of WHO[12-16].

Nitrate varies from 7 to 85 mg/lit. The sample no.2,3,4,5,6 and 10 are under permissible limits but sample no.1,7,8 and 9 are exceeds the maximum permissible limits of 50 mg/lit. of WHO.

The concentration of fluoride in drinking water is critical considering health problems related to teeth and bones. High fluoride concentration causes dental fluorosis and skeletal fluorosis whereas the absence or low concentration of fluoride in drinking wter results in dental caries in children particularly when the fluoride conecentration is less than 0.5 mg/lit[17]. The concentration of fluoride ion in study area are within tolerance limit except sample no.2 and 8 are slightly lower than the specific value.

The fluoride ion concentrations of most of the samples are fall well within that expected for good quality potable water[7,17].

Iron is the more frequent contaminants in the water supplies. It is a non hazardous element that can be nuisance in a water supply. The value of iron in study area varies from 0.3 to 1.2 mg/lit. Which are higher than the tolerance value except sample no-2. This may be due to soil origin and age old iron pipes used in the area. The shortage of iron causes a disease called "anaemia" and prolonged consumption of drinking water with high concentration of iron may be lead to liver disease called as haermosiderosis[7,18]. Free chlorine was found to be absent in all the samples.

Conclusion

Table-3 and above discussion shows that some of the parameters have the concentration level greater than the permissible limit. The observed standard deviation for the parameters shows that the deviation in the total hardness (110.75), chloride (99.83) and nitrate (34.09) are of moderately high range. From this it is concluded that various parameter concentration are varying highly in different location of Babhnan town.

Our results suggest the following: i. The hand pump attached study area should with filter based on activated alumina adsorption might be solution for filtering drinking water. ii. Water should be filter by iron remover resin. iii. Environmental awareness of the health implication of fluoride is emphasized through education of public aid community participation.

Table-2
Water Quality Parameters of Babhnan Town

Sample No.	1	2	3	4	5	6	7	8	9	10
pH	7.5	7.6	7.5	7.3	7.6	7.2	7.3	7.2	7.1	7.4
Turbidity (NTU)	10	15	10	10	15	10	10	10	12	10
Chloride (mg/lit.)	280	30	20	70	45	105	285	180	180	205
Total Hardness(mg/lit.)	675	400	325	490	510	525	640	610	500	625
Nitrate (mg/lit.)	60	10	7	15	10	18	85	80	80	10
Fluoride(mg/lit.)	1.5	0.3	0.4	0.6	0.8	1.1	0.8	0.5	0.5	0.6
Iron (mg/lit.)	0.7	0.3	0.4	0.4	0.9	1.0	1.2	0.6	1.0	0.6
Free Chlorine (mg/lit.)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Table- 3
Different Chemical Parameters of Hand pump water in and Around Babhnan Town, Basti (U.P.) and their comparison with WHO Guidelines

S.No.	**PARAMETERS**	**WHO**	**RANGE**		**MEAN**	**SD**
			MIN .	**MAX.**		
1	pH	6.5-8.5	7.1	7.6	7.4	0.17
2	Turbidity (NTU)	5	10	15	11.2	2.09
3	Chloride (mg/lit.)	250	20	285	140	99.83
4	Total Hardness (mg/lit.)	300	325	675	530	110.75
5	Nitrate (mg/lit.)	50	7	85	37.5	34.09
6	Fluoride (mg/lit.)	1.5	0.3	1.5	0.7	0.3
7	Iron (mg/lit.)	0.3	0.3	1.2	0.71	0.30
8	Free Chlorine	Nil	Nil	Nil	Nil	Nil

Acknowledgements

The authors are thankful to Dr. Ram Prasad Ex-vice chancellor, Barkatullah University, Bhopal (M.P.), for providing academic inputs. Also thankful to Dr. T.A. Qureshi, (Ex.H.O.D) Deptt. Of Applied Aquaculture, Barkatullah, University, Bhopal, M.P. and to Prof. V.B. Upadhayay, D.D.U. Gorakhpur University, Gorakhpur (U.P.), for their valuable suggestions.

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