ANALYSIS OF BOREWELLS DRINKING WATER IN VIDISHA (M. P.)

BHAVNA CHAUHAN[*]

Department of Chemistry, Ramakrishna Memorial P.G College, VIDISHA (M.P.) INDIA

ABSTRACT

Fresh water, its availability and quantity is an important part of the ecology which has become scarce due to frequent drought situations and increased human activity leading to water pollution. Bore well water is expected to be good in quality and less polluted. The use of fertilizers, pesticides and insecticides in rural areas and lime, bleaching powder, refuse dumps etc in urban areas are the main sources of soil and underground water pollution.

The present study deals with the investigation of borewells drinking water quality of sample collected from different areas in Vidisha (M.P.). Ten sampling point were selected on the basis of their importance. The water analysis was carried out for the parameters namely pH, temperature, total alkalinity, total hardness, dissolved oxygen, BOD, turbidity, sulphate, nitrate and fluoride.

Key words: Physico-chemical analysis, Borewells drinking water.

INTRODUCTION

Vidisha, almost centrally located district, one of the important historical places of M.P., lies between 23^0 21' and 24^0 22' N latitude and 77^0 30' and 78^0 18' E longitude forming eastern part of Malwa region.

Here we report the physico-chemical analysis of borewells drinking water in Vidisha. Borewells water is generally used for drinking and other domestic purposes in this area. Borewell water get polluted to receive heavy flux of sewage, industrial effluents, domestic and agricultural wastes. The use of fertilizers and pesticides, manure, lime, bleaching powder, septic tank etc. is the main sources of borewells water pollution.

In the absence of fresh water supply, people residing in this area use borewells water for their domestic and drinking purposes.

_____

[*]Author for correspondence

EXPERIMENTAL

Sampling

In the present study borewells water samples from ten different locations in Vidisha were collected and analyzed. The major water quality parameters considered for the examination in this study are pH, dissolved oxygen, total dissolved solids, chlorides, total alkalinity, calcium and magnesium hardness, sulphate, nitrate and chemical oxygen demand.

Method of determination

pH and D.O, total dissolved solids, nitrate values were measured by water analysis kit and manual methods. Chloride content were determined by silver nitrate titrimetric method. Sulphate contents were determined by volumetric method. Other parameters total hardness, turbidity, BOD, Fluoride were analyzed in the laboratory.

Table 1: Physico-chemical data of different borewell water samples

Sample point	Temp. (^{0}C)	pH	D.O (mg/L)	Total alkalinity (mg/L)	Total hard-ness	BOD (mg/L)	Tur-bidity (NTU)	Sulp-hate (mg/L)	Nitrate (mg/L)	Fluo-ride (mg/L)
Rangai village	26.3	7.8	7.0	190	180.0	1.7	14	43.2	0.0683	1.10
Industrial area	23.0	8.6	6.5	183	115.0	2.0	8	54.3	0.049	1.62
Indira complex	31.0	7.6	5.05	159	182.0	8.6	27	60.5	0.0855	0.92
Keliander	26.75	8.0	3.8	254	180.0	9.3	65	58.76	0.052	0.95
Galla mandi	32.2	7.7	6.65	345	208.0	7.5	9	75.62	0.862	0.705
Haripura	28.3	7.65	6.23	331	158.0	7.3	13	85.81	1.628	0.613
Krishna colony	27.6	7.8	7.05	286	155	3.6	8	80.26	0.051	0.73
Tilak chowk	28.5	7.4	5.50	300	189	7.8	9	90.45	0.078	1.03
Madhavganj	27.5	8.1	6.63	303	180	8.3	23	73.3	1.326	0.70
Indraprasth colony	28.3	7.6	6.9	198	134	8.0	28	61.46	0.068	0.93

RESULTS AND DISCUSSION

The physico-chemical data of the borewells water samples collected from different areas in June 2010 are given in Table 1. The results of the samples changes with different collecting places because of the different nature of soil contamination.

Temperature: In the present study temperature ranged from 23.0 to 32.2^0C.

pH: In different sample pH ranged from 7.34 to 8.6.

D.O: The desirable limit of D.O in drinking water is 4.0 mg/L. In the present study the D.O ranged from 3.8 to 7.05 mg/L.

Total alkalinity

Alkalinity in the borewells water is caused by bicarbonate and carbonates in all the samples. The total alkalinity content in the sample is in between 159 to 345 mg/L.

Total hardness

The desirable limit for total hardness in drinking water according to I.S.I. is 300 mg/L. Its values in borewells water samples varied from 115.0 mg/L to 208.0 mg/L.

B.O.D: In the present study the B.O.D ranged from 1.7 mg/L to 9.3 mg/L.

Turbidity: In the present study the turbidity ranged from 8 NTU to 65 NTU.

Sulphate: In the present study the sulphate ranged from 43.2 to 90.45 mg/L. The tolerance limit for sulphate is 200 to 400 mg/L.

Nitrate: The tolerance limit for nitrate is 20 to 45 mg/L. In the present study nitrate ranged from 0.049 to 1.628 mg/L.

Fluoride: In the present study fluoride ranged from 0.70 mg/L to 1.62 mg/L. The desirable limit for fluoride in drinking water is 0.70 to 1.62 mg/L.

REFERENCES

1. E. Brown, M. W. Skovgstd and M. J. Fishman, Method for Collection and Analysis of Water Samples for Dissolved Minerals and Gases, **5** (1974).

2.   N. Manivasagam, Physico-chemical Examination of Water, Sewage and Industrial Effluents, Pragati Prakashan, Meerut (1984).

3.   APHA: American Public Health Association Standard Methods for Examination of Water and Waste Water, 16th Edition, APHA-WPCF-AWWA, Washington (1985).

4.   International Standard for Drinking Water, 3rd Edition, WHO, Geneva (1971).

5.   A. J. Dhembare, G. M. Pondhe and C. R. Singh, Poll. Res., **17**, 87 (1998).

6.   IS10500, Indian Standard Drinking Water Specification Bureau of Indian Standards, New Delhi, **5** (1991).

7.   Kalyani Ram Krishnan, S. Shrinivasan, Indian J, Chem., **32A**, 873-876 (1993).

8.   K. M. Gangotri, Om Prakash Regar, Chhagan Lal, Krishna Ram Genwa, Prashant Kalla and Rajni Meena, Arab J. Sc. Engg., **22**, 115-118 (1997).

9.   K. M. Gangotri, Om Prakash Regar, Int. J. Energy Res., **21**, 1345-1350 (1997).

10. APHA Standard Methods for Examination of Water and Waste Water 19th Edition. APHA, New York (1995).

11. NRC (National Research Council), Drinking Water and Public Health, Volnol, Safe Drinking Water Committee, National Academy Press, Washington D.C (1997).

12. V. K. Garg et al., Indian J. Environ. Toxicol., **11**, 58 (2001).

13. A. K. Rana et al., Asian J. Chem., **14**, 1209 (2002).

14. Prashant Shrivastava et al., Environment and Pollution Technol., **5(01)**, 111-117 (2006).