Current World Environment Vol. **4**(1), 103-106 (2009)

Analysis of water quality of bore-wells of Kolar road area of Bhopal (M.P.) India

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(Received: February 28, 2009; Accepted: April 12, 2009)

ABSTRACT

Rapid and reliable monitoring and surveillance methods are essential for keeping a close watch on the water quality, human health and environment. Hence it becomes important to monitor and analyse water of bore-wells used for drinking and irrigational purposes. In the present study water quality of bore-wells of Kolar road area has been done seasonally during the year of 2008-09 for different parameters i.e., temperature, pH, EC, free CO_2, chloride, total alkalinity, T-H, Ca-H, Mg-H, D.O., B.O.D., C.O.D., Nitrate, Sulphate and bacteriological analyses has been done by multiple tube technique by Mac' Conkey Broth Soln, reported n Index/100mL, are found beyond the permissible limit of 10/100mL at some sampling station.

Key words: Monitoring, analysis, bore-wells, bacteriological, permissible, water quality.

INTRODUCTION

The present study is aimed to evaluate the effect of domestic sewage on water quality by percolation. Geochemistry and topography of the study area is also playing an important role in the ground water occurrence. The increase in population coupled with unplanned urbanization and industrialization have resulted into damage and deterioration in groundwater quality. Any shift in the naturally dynamic equilibrium exiting among the environmental segments: hydrosphere, atmosphere, lithosphere gives rise to the type and state of pollution and creates bad taste and odour and also changes the ecosystem i.e., aquatic fauna and flora disturb the public water supply.

Sampling Stations: Kolar Road

1	Chuna Bhatti
2	Janki Nagar
3	Sarva Dharma Colony-B
4	Sarva Dharma Colony-C
5	Mahabali Nagar
6	Sainath Hills
7	Amarnath Colony
8	Rajharsha Colony
9	Danish Kunj
10	Vineet Kunj
11	Lalita Nagar
12	Amra Bihar
13	Ganapati Enclave
14	Banjari
15	Fine Campus

Table 1: Analysis of water quality of Bore-wells of Kolar Road Area of Bhopal (M.P.) (2008-09)

Mean seasonal values (Winter, Summer and Monsoon) in ppm											
Parameters	**Units**	**$BW_{1,2}$**	**$BW_{3,4}$**	**$BW_{5,6}$**	**$BW_{7,8}$**	**$BW_{9,10}$**	**$BW1_{1,12}$**	**$BW_{13,14}$**	**$BW_{15,16}$**	**$BW_{17,18}$**	**$BW_{19,20}$**
Temperature	°C	24.0	22.3*	23.4	27**	25.8	26	24.6	23	24	25.2
Turpidity	N.T.U.	0.0	0.0	3.8	4.0	2.4*	0.0	6.0	6.8	7.0	8.2**
pH	-	7.0	6.8*	7.2	7.4	7.0	7.2	6.9	7.4	7.6	7.8**
Elect. Conductivity	Mhos/cm	119*	186	167	154	190	194	201**	160	155	168
Chloride	ppm	204	168*	224	236	230	178	228	238**	194	188
Total Alkalinity	“	240*	244	316**	278	308	286	254	272	280	288
Total Hardness	“	292	288	260	256*	390	394**	278	280	256	278
Ca – H	“	210	208	196	186	290	302**	203	206	180*	198
Mg – H	“	82	80	64*	70	100**	92*	75	74	76	80
D.O.	“	3.08	3.24**	1.14*	2.68	2.40	2.82	2.72	2.52	3.12	2.92
B.O.D.	“	3.02	3.12	2.0*	2.52	3.18	2.14	2.34	2.30	3.68**	3.04
C.O.D.	“	18.4	16.4	14.8*	18.8	16.5	18.4	20.4	21.6	20.8	24.6**
Phosphate	“	0.08	0.06*	0.07	0.09	0.10	0.09	0.12	0.14	0.09	1.0**
Nitrate	“	21.3**	12.08	18.4	12.4	11.6*	12.8	14.6	15.4	16.2	15.8
Iron	“	0.30	0.33	0.28	0.34	0.28	0.22*	0.40	0.28	0.36**	0.35
Copper	“	0.06	0.07	0.068	0.08	0.04*	0.64**	0.30	0.20	0.09	0.30
Zinc	“	0.20*	0.28	0.27	0.40	0.38	0.42	0.36	0.48**	0.29	0.38
Manganese	“	0.14*	0.18	0.21	0.60**	0.50	0.38	0.46	0.33	0.50	0.42
Fluoride	“	0.30*	0.50	0.48	0.49	0.38	0.52	0.48	0.42	0.44	0.90**
Sulphate	“	32.3	30.8*	36.9	48.0	52.4	60.3	70.2	70.6**	68.4	52.8

16 Nayapura
17 Fine Avenue Phase-I
18 Fine Avenue Phase – II
19 Yashoda Parishar
20 Soumitra Bihar

MATERIAL AND METHODS

Bhopal is situated at $23^0$16' N Latitude and 77°25' E Longitude. The average rainfall recorded is 1152mm/yr. Sampling of 20 bore-wells prescribed as above has been taken in 2 litre clean Jerry canes in 2008-09. The methods for analysis has applied as prescribed by APHA (1986), NEERI (1986), Trivedi and Goel (1986) and Adoni et al (1985).

RESULTS AND DISCUSSION

In the present study, temperature ranges from 22.3-27.0°C, temperature of water influences the biological reaction in water. Higher values of turbidity can make water unfit for drinking as anesthetic point of view, although groundwater is les turbid. Turbidity here ranges from 0-8.2 NTU. Normal pH of water has no adverse effect on human health. Lower pH of 5.0 produces sour taste of water. pH in the present study ranges from 6.8-7.8, WHO has prescribed permissible limit for pH is 5-7. Electrical conductivity measures the dissolved ions, it ranges from 119-201 mhos/cm. In this study chloride, Total alkalinity T-H, Ca-H and Mg-H ranges from 168-238, 240-316, 256-394, 180-302 and 64-92 ppm, respectively. Chloride concentration in groundwater is due to dissolution of salts discharge of untreated domestic sewage. Higher value of total alkalinity is due to leaching of soil during natural filtration of water from sewage. Hardness of water has not adverse effect on human health.

D.O., B.O.D. and C.O.D. ranges from 1.14-3.24, 2.0-3.68 and 14.8-24.6 ppm respectively. D.O. reflects the water quality, Depletion D.O. is due to high temperature in Summer and increased microbial activity. B.O.D. is the amount of oxygen utilized by micro organisms while COD indicates the carbonaceous fractions of organic matter. The findings are similar with Kataria (1990, 1195, 2000, 2008).

Phosphate, Nitrate varies from 0.006-1.0 and 11.6-21.3ppm, respectively. Total Iron, fluoride, Cu, Zn and Mn ranged from 0.22-0.36, 0.04-0.64, 0.20-0.48, 0.14-0.6 and 0.30-0.90 ppm respectively. Maximum permissible limit for Iron is 0.01-1.0 ppm ISI 1983 is 1.0ppm (ISI 10,500), Zn 0.05 – 5.0mg/L (WHO 1979) and Mn 0.05 – 0.50 ppm. As results are summarized in Table 1.

Sulphate is this study ranges from 30.8-70.6ppm. The findings are similar with Katria (2000, 2008).

Most of the parameters are found well within the permissible limits in the present sudy, recommended by WHO while alkalinity and hardness have higher values due to MIC leakage in 1984. Untreated sewage water are percolated and contaminated into groundwater, i.e. creating pollution in groundwater bodies. So it is recommended for water treatment before public use.

REFERENCES

1. Standard methods for analysis of water and waste water APHA, AWWA and WPCF, 13th ed, New York (1975).
2. IS; 10500; Indian Standard Specification fro drinking water ISI, New Delhi IS; 105000 (1983).
3. Haynes, R., Environment methods, Chapman and Hall London (1982).
4. Kataria, H.C. Bio-chemical analysis of drinking water of Raisen district of M.P., *Asian J. Chem., Revs.* **5**(182): 66-68 (1990).
5. Kataria, H.C., Biochemical analysis of bore-wells of Bhopal city, *Orient J. Chem.,* **11**(1): 78 (1995).
6. Kataria, H.C. Preliminary Study of drinking water of *Pipariya township Poll Res*., **19**(4): 645-649 (2000).
7. Kataria, H.C., *et al.*, Physico-chemical analysis of bore-well water of Bairagarh area of Bhopal city, *Oriental J. Chemistry,* **22**(1): 175-176 (2006).
8. Klein, Aspects of water pollution, Butterworth

scientific publication, Landon (1957).
9. NEERI, Manual on water and waste water analysis national environmental engineering research institute, Nagpur 340-42 (1986).
10. Kataria, H.C. Analysis of fluoride concentration in grondwarter in and around Bhopal city, M.P. India, *J. Biosience, Biochemistry Research Asia* (BBRA) **5**(2): 699-700 (2008).
11. Trivedi, R.K. and Goel, P.K. Chemical and biological method for water pollution studies environment pub. Karad (1986).
12. WHO World Health Criteria, 5 Geneva (1978).