



Assessment of Borewell Water Quality in and Around Badnapur Dist. Jalna

B R Agarwal^a, Vijay Mundhe^b, Sayyed Hussain^c and Vidya Pradhan^d

^aJ E S College, Jalna (MS) India

^bRashtramata Indira Gandhi College, Jalna,

^cSir Sayyed College, Aurangabad, (MS) India

^dDr Rafiq Zakaria College for women, Aurangabad (MS) India

ABSTRACT

Water quality parameters of ground water of Badnapur city and nearby villages were analysed to find out the extent of pollution and suitability of the water for domestic purposes. The results revealed that sampling station S10 showed high level of pollution and is not suitable for domestic purposes. At other sites all the parameters studied were in the normal range of WHO and quality of groundwater of the area selected is found better.

Keywords: Water quality parameters, groundwater, Badnapur

INTRODUCTION

The ground water is the largest source of freshwater on this planet earth excluding the polar ice caps and glaciers. In most developing countries as ours, most of the groundwater sources of drinking water in cities and villages are polluted. For instance, trans-yamuna areas of Delhi faces drinking water pollution problem at regular intervals. There had been epidemic cholera, dysentery and other diseases in last couple of years. This is mainly due to the inadequate water supply systems in these areas (Sharma, 1998). The groundwater quality is normally characterized by different physical and chemical parameters. These parameters are affected by the various types of pollution, ground water extraction, agriculture, seasonal fluctuation, etc.

The site selected for study is now getting densely populated. One of the reasons may be the industrialization which is growing day by day in this area. The groundwater is withdrawn for agricultural, municipal and industrial use by constructing and operating bore wells and dug wells. Badnapur and near by villages receives drinking water for irrigation mainly from minor irrigation tank constructed on Dudhana river. But most of the residents depends upon common public dug wells and bore wells. Badnapur and nearby area consists of about 560 bugs wells and 1300 bore wells.

EXPERIMENTAL SECTION

The ground water samples from Badnapur and nearby villages is collected from ten different sites in November, 2008 in clean one litre plastic bottles and immediately transported to the laboratory for the estimation of various parameters like temperature, pH, electrical conductivity, total hardness, total dissolved solids, total alkalinity, chlorides, sulphate, calcium, magnesium, sodium, potassium, dissolved oxygen, turbidity and fluoride.

Temperature was recorded using standard centigrade thermometer in degree Celsius. pH was recorded by digital pH meter. Turbidity is measured by Nephelo turbidity meter. The other parameters were estimated in the laboratory by using standard methods as prescribed by Trivedi and Goel (1986), APHA (2008).

Table 1. Borewell Water Quality of ground water of Badnapur Dist Jalna

Water Quality Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Temperature	28.3	28.5	24.4	28.1	24.0	23.8	28.0	27.8	27.5	27.5
pH	7.08	6.85	7.10	7.24	7.63	7.61	7.69	7.70	7.26	6.71
Elec cond	1041.29	985.39	839.61	1121.51	1031.46	484.47	564.49	598.47	1043.48	1896.45
TDS	750	586	399	497.	386	19	287	306	406	1620
Total alka (TA)	444	347	395	460	477	237	312	316	483	616
TH	512	580	500	386	436	662	202	204	478	1162
Chloride	157.044	131.874	74.440	149.590	114.500	35.090	46.080	48.210	160.580	626.040
Sulphate	22	28	47.50	39.90	25.60	25.70	52	44.50	25.20	24
Calcium	24.08	62.52	20.04	22.44	8.81	54.50	14.42	7.21	44.08	152.30
Magnesium	55 .05	51.64	54.81	40.19	60.16	27.52	20.21	22.41	44.82	95.24
Sodium	20.35	5.65	10.65	25.05	20.25	5.25	15.45	15.40	15.95	25.30
Potassium	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
DO	5.120	6.030	6.640	6.090	7.360	7.120	5.280	5.080	6.640	4.700
Turbidity	3.81	4.40	0.46	0.69	0.48	1.04	3.09	5.86	2.33	5.32
Fluoride (F ⁻)	0.29	0.20	0.11	0.15	0.30	0.09	0.08	0.13	0.63	0.33

RESULTS AND DISCUSSION

The results for the borewell water quality of Badnapur Dist. Jalna are tabulated in Table 1. The temperature recorded fluctuates between 24.0°C to 28.5 °C which is below the desirable limit of WHO. The higher water temperature may result in decline of dissolved oxygen concentration of water (Kulkarni et al, 2009). The pH ranges from 6.71 to 7.70 at stations S10 and S8 respectively. The pH values indicate that water is slightly alkaline in the selected areas. The electrical conductivity ranges from 484.57µmhos/cm to 1121.51 µmhos/cm indicating that conducting materials are not present in large amount. The total dissolved solid has range from 193ppm to 1620 ppm. The minimum value is for site S6 and maximum is for S10. The sites S1 and S10 only have the total dissolved solid range above the desirable limit of WHO.

The total alkalinity ranges from 237ppm to 616ppm. Only the station S10 has total alkalinity above the permissible limit. The main sources of natural alkalinity are rocks containing carbonate, bicarbonate and hydroxide compounds that are abundantly present in this area. The range for total hardness is from 202ppm to 1162ppm. The maximum value is at S10 indicating pollution level of this station. The hardness in water is mainly due to its calcium and magnesium contents. Chloride range in the bore well and dug wells of Badnapur and nearby villages fluctuates between 35.090ppm and 626.040ppm. Generally the concentration of chloride imparts a salty taste to water. For people who are not accustomed to high chloride content, it may cause a laxative effect (Rao et al., 2002). The sulphate content ranged between 22ppm and 52ppm which is well within the range of permissible limit.

Calcium ranges from 8.81ppm to 152.30ppm. The minimum value is at station S3 and maximum at S10. Magnesium has range between 20.21ppm to 95.24ppm. The station S5 has minimum value and S10 has maximum value for magnesium in the study area. The sodium and potassium contents are well within the range of permissible limit. The potassium has constant value at all stations i.e. 2.25ppm. The dissolved oxygen is one of the important parameters that measure the extent of organic as well as biological pollution load to a water body. Dissolved oxygen values varied between 7.360ppm to 4.70ppm at stations S5 and S10 respectively. Indicating the pollution level of station S10. The turbidity and fluoride contents in the ground water of study area is below the desirable limit.

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