



## **PHYSICO-CHEMICAL PARAMETERS OF BORE WELL WATER NEAR PRAVARA CANAL, LONI (M.S), INDIA**

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### **ABSTRACT**

The cations and anions must be equal to maintain the quality of water. Cations such as  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^+$  and  $\text{K}^+$  are present in ground water in the form of hardness and salinity. The major ions responsible to maintain the quality of ground water are carbonate, bicarbonate, chloride, sulphates, nitrates, phosphates and fluoride. Physico-chemical parameters of borewell near the pravara canal, Loni were studied. The study was made in the month of May - 2007 and Sept. 2007. Eight sampling points were selected for the study.

**Key words:** Hardness, DO, COD, pH, EC, Physico-chemical

### **INTRODUCTION**

Ground water is the most important source of water supply for the irrigation, industries and drinking purposes. The natural quality of ground water tends to be degraded by human activities. Physico-chemical parameters of ground water of different parts of countries are studied.<sup>1-12</sup> The main causes for the pollution of water near the pravara canal are washing of clothes, cleaning of animals, domestic waste, land drainage etc. All metabolic and physiological activities and life processes of aquatic organisms are generally influenced by such a polluted water and hence, it was essential to study physico-chemical parameters of water, ground and surface water.

### **EXPERIMENTAL**

The samples were collected during the month of May 2007 from different locations. Water samples were collected in cleaned polythene containers and preserved according to standard method<sup>13</sup>.

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**Table 1. Analysis data of bore-well water samples from different locations**

<b>Samples Parameters</b>	<b>S<sub>1</sub></b>	<b>S<sub>2</sub></b>	<b>S<sub>3</sub></b>	<b>S<sub>4</sub></b>	<b>S<sub>5</sub></b>	<b>S<sub>6</sub></b>	<b>S<sub>7</sub></b>	<b>S<sub>8</sub></b>
Temperature( <sup>0</sup> C )	30.4	31.0	30.6	30.1	30.8	30.9	31.1	31.2
pH	7.90	7.92	8.24	8.70	8.89	8.85	7.81	8.91
Total hardness (mg/L)	402	410	470	508	511	485	564	560
Alkalinity (mg/L)	460	472	505	530	542	497	572	580
Chloride (mg/L)	40.2	56.3	62.4	82.6	97.7	102.8	104.3	106.7
Sodium (mg/L)	32.4	36.7	39.6	42.3	36.4	47.3	49.1	56.7
Potassium (mg/L)	17.0	17.3	18.4	19.5	20.6	23.7	24.9	27.7
Calcium (mg/L)	86.2	91.3	93.4	115.7	116.8	112.2	94.4	113.6
EC (micromhos/cm)	1336	1340	1411	1407	1359	1460	1480	1452
DO (mg/L)	6.3	6.6	7.2	7.4	7.8	6.3	6.4	7.4
COD (mg/L)	2.3	2.1	1.3	1.9	2.4	2.6	1.7	2.6
TDS (mg/L)	462	530	470	482	630	640	520	532
NO <sub>3</sub> <sup>-</sup> (mg/L)	4.20	4.25	5.10	5.13	4.17	4.87	5.22	6.15
SO <sub>4</sub> <sup>2-</sup> (mg/L)	46.13	52.10	60.15	62.20	64.42	70.13	62.85	63.36
Turbidity (NTU)	161	165	160	172	187	184	181	167
Fe (mg/L)	0.042	0.032	0.031	0.044	0.046	0.041	0.037	0.036
Cu (mg/L)	1.86	1.91	2.02	2.12	1.97	1.93	2.02	2.11

Temperature of the water was measured at the sampling place by Celsius thermometer. pH value of ground water sample under investigation was measured using Elico pH meter Model No.LI-120. The pH was standardized by buffer of 4.0 pH and 9.2 pH. Total alkalinities of the bore well water samples were determined by titrating with N/50 H<sub>2</sub>SO<sub>4</sub>, using phenolphthalein and methyl orange as indicators. The total hardness of the water sample were determined by complexometric titration with EDTA using erichrome black T as an indicator. The chloride ions were generally determined by titrating

the water samples against standard solution of silver nitrate using potassium chromate as indicator. Sodium, potassium and calcium were estimated using flame photometer techniques.  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$  were estimated using UV-Visible spectrophotometers.

EC values of the bore well water samples under investigation were measured using Digital Conductometers Model-DI-909. DO and COD of bore well water samples were determined using titration method. The turbidity of the bore well water samples were measured using Nephelo-turbidometry. TDS of bore well water samples were measured using gravimetric method. Metals Fe and Cu were estimated by titrating with potassium dichromate using sodium diphenyl sulphonate indicators and iodometric method respectively. The results are summarized in Table 1.

## RESULTS AND DISCUSSION

The pH of the water body indicates the degree of determination of water quality<sup>14</sup>.

- (i) The pH value of the water sample in the study area ranged from 7.81 to 8.91. The pH of water sample was slightly alkaline.
- (ii) The total hardness of water sample is larger than desirable limit (300 mg/L)<sup>15</sup>.
- (iii) The desirable limit for alkalinity is 200 mg/L and the value of bore well water samples varied from 460 mg/L to 580 mg/L.
- (iv) The chloride content of bore well water sample varied from 40.2 mg/L to 106.7 mg/L.
- (v) The sodium content of bore well water samples varied from 32.4 mg/L to 56.7 mg/L. In large concentrations it may affect a person with cardiac problems.
- (vi) The potassium content of bore well water samples varied from 17.0 mg/L to 27.7 mg/L.
- (vii) The calcium content of bore well water samples varied from 86.2 mg/L to 116.8 mg/L. WHO permissible limit of calcium in the ground water is 100 mg/L<sup>16</sup>.
- (viii) EC value of the bore well water sample in the study area varied from 1336 to 1480 micro mho/cm at 25°C.
- (ix) The dissolved oxygen content of bore well water samples varied from 6.3 mg/L to 7.8 mg/L.

- (x) The COD content of bore well water samples were in the range of 1.3 mg/L to 2.6 mg/L.
- (xi) The TDS content of bore well water samples in the study area ranged from 462 mg/L to 640 mg/L.
- (xii) The  $\text{NO}_3^-$  content of bore well water samples varied from 4.20 mg/L to 6.15 mg/L.
- (xiii) The sulphate value for bore well water samples in the range of 46.13 mg/L to 70.13 mg/L.
- (xiv) The turbidity content of bore well water samples varied from 160 NTU to 191 NTU.
- (xv) Iron value varied 0.031 mg/l to 0.046 mg/L while Copper value varied between 1.85 mg/L to 2.12 mg/L.

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