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# PHYSICOCHEMICAL CHARACTERIZATION OF BORE WELL WATER IN SHIRPUR VILLAGE OF CHIMUR (M.S.) INDIA

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**Abstract**

The water pollution and contaminant present in water is a burning issue, so it may affect the ground water which drilled out as Bore well water. A study has been carried out to get its physicochemical characteristics of bore well water which are collected from Shirpur in Chimur Taluka. Water samples were collected from different zones Shirpur village and analyzed for PH, conductivity, turbidity, TDS, bicarbonate, carbonate, sodium, chloride, fluoride, sulphate, TH, calcium, magnesium, potassium etc. The study indicates the need for periodic monitoring and GIS based study of ground water in the study area.

**Key Words:** pH, Conductivity, TDS, TH and Chloride.

## Introduction

Water is one of the most important and abundantly occurring commodities for living things. About 70% of earth is covered by water. Out of 97% water is locked in ocean, 2% glacier ice. Only 1 % fresh water is accessible for use of domestic and industrial purpose. It is one of the most essential requirements of life. Without water there cannot be life. Unfortunately water gets contaminated by chemicals as well as microorganism[1-3]. Sources of chemical pollution is industrial waste where as that of microbial pollution is domestic and storm waste. Polluted water is responsible for spread of water borne disease[4-6]. So it is necessary to analyze the present environment. Bore well water are examined to locate the suitable sources of water and to determine the extent of treatment necessary to make it potable. Ground water sources are the single largest supply for serving drinking water to the community.

## Materials and Methods:

The water samples of bore well were collected from different area in Shirpur Village of Chimur. The water sample collected in clean, air dried one liter polyethelene bottle. All water samples were labeled as sample A, B, C, D and E. It was then brought into laboratory for physicochemical analysis. All water samples was analyzed for physicochemical analysis using standard procedure recommended by IS specification.

## Result and discussion:

The physicochemical parameters of all water samples and their analytical values comply with WHO and BIS standard are summarized in **Table 1**. The quality of water is influenced by various factors. The water quality result in terms of physicochemical analysis is discussed as follow. All the samples are colorless and odorless.

### pH:

It is one of important parameter in tasting water quality. It measure hydrogen ion concentration of water sample. The permissible limit of pH in drinking water is within 6.5 to 8.5 according to BIS. In the present study pH values are ranging from 7.6 to 8.8.The maximum pH was reported for E samples.

**Electrical conductivity (EC):**

The electrical conductivity of water sample was found to be varying from205 µS/cm to 350 µS/cm. The sample C, D and E was found to have EC above permissible value. The low value of electrical conductivity of samples indicates presence of lower total dissolved salts in water.

**Turbidity:**

All water samples shows below 1 NTU turbidity.

**Total dissolved solid (TDS):**

The total dissolved solids in water mainly composed of chlorides, sulphate and bicarbonate of Ca and Mg ions. The TDS of water samples lies in the range of 517 to 690 mg/l. A, B and E samples showed permissible limit whereas the sample C and D shows above standard level.

**Bicarbonate:**

Bicarbonate values of all samples were found in range from 1mg/l to 2mg/l. The sample B, C, D and E are not in range except sample A.

**Carbonate:**

A carbonate value of all samples was found in the range.

**Sodium:**

A sodium value of all samples was found in the range.

**Chloride:**

A chloride value of all samples was found in the range from 1.60 mg/l to 5.60 mg/l. The chloride values of all samples are within range except sample E.

**Fluoride:**

The standard value of fluoride in drinking water is 1.5 mg/l. The values of chloride found in all the samples below 1 mg/l.

**Sulphate:**

The standard value of fluoride in drinking water is 500 mg/l. The values of sulphate found in all the samples below 2 mg/l.

**Total hardness (TH):**

The standard value of TH in drinking water is 60 mg/l. In present study total hardness is ranges from 190 to 220 mg/l. The total hardness values of all samples shows in above limit.

**Calcium, Magnesium and Potassium:**

The concentration of calcium, magnesium and potassium in all water samples shows normal range.

**Table 1: Physico-chemical analysis of water samples**

| Sr. No. | Parameters (Unit) | Different areas of Shirpur (Chimur) | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| 1 | Color | colorless | colorless | colorless | colorless | colorless |
| 2 | Odor | odorless | odorless | odorless | odorless | odorless |
| 3 | PH | 7.6 | 7.8 | 8.3 | 8.0 | 8.8 |
| 4 | EC (µS/cm) | 350 | 300 | 205 | 266 | 294 |
| 5 | Turbidity | 0.2 | 0.5 | 0.1 | 0.3 | 0.1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **(NTU)** | | | | | |
| **6** | **TDS mg/l** | 517 | 560 | 654 | 690 | 550 |
| **7** | **Bicarbonate(mg/l)** | 1.0 | 1.60 | 1.60 | 2.0 | 1.60 |
| **8** | **Carbonate (mg/l)** | 0.80 | 0.80 | 0.80 | 0.40 | 0.80 |
| **9** | **Sodium (mg/l)** | 0.67 | 0.72 | 0.61 | 0.44 | 0.79 |
| **10** | **Chloride (mg/l)** | 2.40 | 1.60 | 2.80 | 2.80 | 5.60 |
| **11** | **Fluoride (mg/l)** | 0.71 | 0.42 | 0.79 | 0.35 | 0.54 |
| **12** | **Sulphate (mg/l)** | 1.22 | 1.60 | 0.10 | 0.80 | 00 |
| **13** | **TH (mg/l)** | 210 | 216 | 220 | 190 | 200 |
| **14** | **Calcium (mg/l)** | 2.60 | 2.52 | 2.76 | 2.90 | 2.10 |
| **15** | **Magnesium (mg/l)** | 1.62 | 1.76 | 1.34 | 2.04 | 1.36 |
| **16** | **Potassium (mg/l)** | 0.53 | 0.60 | 0.58 | 0.61 | 0.67 |

## Conclusion:

In the present work the physicochemical analysis of most of sample are within limit. Some ground water samples are show variation of pH, Turbidity and TDS. This may be due to different soil texture[7]. Some water samples show higher pH and some higher hardness. In all samples total hardness **(**TH) are above the range. The all samples are used for drinking purposes. Therefore rapid and suitable preventive measures are essential for keeping good water quality and health of human beings[8].

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