

# Water Quality Parameters in Akola District, Maharashtra, Studied and Assessed

S. J. Patil

Department of Chemistry, Dr Manorama and Prof. H.S. Pundkar Arts, Commerce and Science College Balapur  
Dist Akola, Maharashtra, India

Correspondence: PatilSanjay59211@gmail.com

## ABSTRACT

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Open well water and ground water samples were collected from several sampling points within a 30-kilometer radius of the Akola district region between August 16 and December 16, 2021. Twenty water samples were tested in the lab for physical and chemical qualities. The laboratory conducted tests to analyze pH, EC, ORP, BOD, hardness, alkalinity, chlorides, TDS, DO, and other parameters. All of the data were compared to the drinking water quality standards set by the WHO (World Health Organization) and ISI. When the findings are compared, some of the water samples fail to meet one or more of the drinking water quality standards listed above. Many samples included excessive levels of TDS. The significance, utility, and ineffectiveness of these criteria in forecasting ground water surface water quality characteristics were discussed.

**Keywords :** Drinking Water, BOD, DO, BOD, Physicochemical study.

## I. INTRODUCTION

Water is an inorganic chemical compound that is odorless, tasteless, completely colorless, and completely transparent. The water can exist in a variety of natural states. It is responsible for the formation of aerosols in the form of fog and precipitation in the form of rain. Floating droplets of water are what make up clouds. Both steam and water vapours are examples of the gaseous states of water. In each place, the water is of a different quality than you would expect. This is due to the fact that differences in chemical contents and concentrations of chemicals exist across different regions. Polluted water lowers the quality of the water that is available. In other

words, it is not drinking water for people. The quality suffers as a result of the introduction of alien substances, such as microorganisms, chemicals, waste from industrial processes, or sewage [1-3].

There is always a difference in water quality that occurs according to the seasons. Regular monitoring is required in order to maintain control over the fluctuation, whether it be spatial or transient.

## II. EXPERIMENTAL

The collection of water samples took place between the dates of 16 August and 16 December 2021. We gathered all of the samples in glass bottles in

accordance with the standard from twenty different sources in the Akola district region. All of the procedures for presenting and transporting the water samples to the laboratory were of the standard variety. The bottles indicated for the purpose of determining the stability of ground water and surface water for drinking and other domestic purposes. At the location, a mercury thermometer was utilized in order to determine the temperature of the water. Potentiometer readings taken to determine the oxidation-reduction potential. using a conductometer to test the conductance. pH is determined with a pH meter. We utilized distilled water in addition to samples of A.R. grade. The parameters and the method that were utilized in the analysis of the samples are presented in tables 1 and 2 below.

There was a wide range in hardness over the landscape. From 83 ppm to 412 ppm, it was high. Magnesium carbonate, calcium carbonate, and bicarbonates are the components that contribute to the hardness of the material. To a certain extent. In situations when the rate of breakdown and the rate of evaporation both rise, the concentration of magnesium and calcium also increases[4-5]. The term "dissolved solids," also known as "total dissolved solids" (TDS), refers to the several kinds of

minerals that are present in water in the form of dissolved solids. The range of TDS was different in each of the different regions. The total dissolved solids (TDS) varied from 287.4 mg/L to 522 mg/L. The term "polluted water" may also refer to waste from industrial processes and organic chemicals. Additionally, it has an effect on the overall dissolved burden. Different regions had varying percentages of chlorine in their water. The formation of salt crystal occurs when there is a high rate of evaporation because sodium and chloride ions attract each other[6].

### III. RESULTS AND DISCUSSION

The table contains the outcomes of examinations of both the physical and chemical parameters. There was no odour or colour present in any of the samples. All of the water samples had pH values that fell somewhere in the range of 7.35 to 7.96. An alkaline character was present in the majority of the water samples. Depending on the water sample, the concentration of dissolved oxygen ranged from 6.01 to 8.33 mg/L. The concentrations of magnesium and calcium in the water samples range from 78 mg/L to 103.5 mg/ and 15 mg/L to 256 mg/L, respectively throughout the range of the samples[7-8].

Table 1

| Parameters                             | Method         | Standard values (WHO 1993) | ISI 1991   |
|--|----------------|----------------------------|------------|
| Colour                                 | colorimeter    |                            | -          |
| Odour                                  | By smelling    |                            | -          |
| Temperature                            | Thermometer    | 100°C                      | -          |
| pH                                     | pH meter       | 7.5 to 8.5                 | 6.5 to 8.5 |
| D.O.                                   | Winkler method | < 5.0 mg/L                 | < 5.0      |
| Alkalinity                             | Titrimetric    | -                          | -          |
| Chlorides                              | Titrimetric    | 250 mg/L                   | 250        |
| TDS                                    | -              | 500 mg/L                   | 500        |
| Total hardness (as CaCO <sub>3</sub> ) | Titrimetric    | 100 mg/L                   | 300        |
| Total magnesium                        | Titrimetric    | 150 mg/L                   | 30         |
| Total Calcium                          | Titrimetric    | 100 mg/L                   | 75 mg/L    |

|     |               |                        |   |
|-----|---------------|------------------------|---|
| BOD | Titrimetric   | Not more than 8 mg     | - |
| COD | Titrimetric   | Not more than 250 mg/L | - |
| ORP | Potentiometer | -                      | - |

Table 2

| Sr.No | Location       | pH   | Conductance(Ω) | ORP (mv) | TDS (mg/L) | DO (mg/L) | Chlorides (mg/L) | TH (ppm) | Mg (mg/L) | Ca (mg/L) | BOD (mg/L) | COD (mg/L) |
|-------|----------------|------|----------------|----------|------------|-----------|------------------|----------|-----------|-----------|------------|------------|
| 1     | Umari          | 7.93 | 578.6          | 49.2     | 507        | 6.31      | 250.3            | 387      | 96        | 203       | 2.09       | 17.2       |
| 2     | Adsul          | 7.6  | 632            | 52.7     | 512.5      | 6.29      | 241.9            | 412      | 98        | 256       | 2.06       | 18.5       |
| 3     | Panchgavhan    | 7.9  | 618            | 44.8     | 499        | 6.48      | 355              | 368      | 103.5     | 224       | 2.11       | 17.1       |
| 4     | Khandala       | 7.96 | 483.5          | 54.8     | 501        | 6.58      | 209              | 300      | 111       | 184       | 2.10       | 17         |
| 5     | Gordha         | 7.7  | 464.7          | 51.5     | 512        | 6.48      | 185              | 336      | 98        | 216       | 2.11       | 16.1       |
| 6     | Deori          | 7.26 | 704.2          | 60.5     | 512        | 6.65      | 149.6            | 256      | 101       | 75        | 2.19       | 20.4       |
| 7     | Mundgaon       | 7.6  | 687.2          | 55.5     | 499        | 6.01      | 101              | 278.1    | 88        | 82        | 2.06       | 22.5       |
| 8     | GajananNursary | 7.93 | 731.5          | 65.9     | 465        | 6.11      | 231.8            | 246.2    | 95        | 60        | 2.16       | 20.8       |
| 9     | Pote Vidyalaya | 7.46 | 584            | 54.25    | 499        | 6.74      | 243.4            | 239      | 96.5      | 67        | 2.16       | 20.3       |
| 10    | Mahindra Akot  | 7.86 | 456            | 53.5     | 522        | 7.12      | 41.7             | 306      | 82.6      | 130       | 1.95       | 22.2       |
| 11    | Nakashi        | 7.57 | 425.5          | 51       | 489        | 8.1       | 267.4            | 98       | 88.5      | 15        | 2.09       | 20.7       |
| 12    | Mazod          | 7.7  | 417            | 52.5     | 411        | 8.27      | 69.7             | 186      | 101       | 55        | 2.21       | 20.62      |
| 13    | Indira nagar   | 7.35 | 416            | 51.17    | 512.5      | 8.33      | 43.5             | 258      | 92.5      | 50        | 2.21       | 20.52      |
| 14    | Wadegaon       | 7.65 | 400            | 52.5     | 512        | 8.08      | 93.1             | 300      | 97        | 84        | 2.09       | 21.0       |
| 15    | Channi phata   | 7.4  | 520.1          | 55.5     | 525        | 8.05      | 62.3             | 283      | 78        | 63        | 1.97       | 22.9       |
| 16    | Chikhalgaon    | 7.77 | 422            | 54.5     | 425        | 7.85      | 47.4             | 113      | 93        | 59        | 1.90       | 22.1       |
| 17    | Patur          | 7.45 | 520            | 53.2     | 375        | 7.85      | 36.1             | 98       | 73.5      | 31.2      | 2.11       | 22.25      |
| 18    | Pardi          | 7.4  | 477            | 60.7     | 462.5      | 8.05      | 33.6             | 83       | 101       | 31        | 2.09       | 22.57      |
| 19    | Khanapur       | 7.45 | 438.2          | 51.2     | 322        | 7.91      | 35.4             | 102      | 95        | 41.5      | 2.17       | 22.4       |
| 20    | Tapalpatur     | 7.39 | 528.6          | 54.2     | 287.4      | 7.95      | 41.7             | 106      | 88.6      | 32        | 2.09       | 22.2       |

#### IV. CONCLUSION

It has been determined, based on the many characteristics that were investigated, that the total dissolved solids (TDS) in certain regions is high. It is possible that gastrointestinal issues will arise from a high TDS value. The two different water sources are both suitable for human consumption.

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