# Physicochemical Analysis of Water Samples in Pandharpur Tehsil, Maharashtra (India)

## Rohan Shivling Lokhande<sup>1</sup>, Atul Shahaji Dune<sup>2</sup>

Lecturer, Department of Science and Humanities, Karmayogi Institute of Technology, Shelve - Pandharpur, Maharashtra, India

Abstract: The current work is focused on the measurement of physic - chemical parameters in water samples from several sampling sites including temperature, pH, hardness, turbidity and alkalinity. An increase in pollution concentration indicates an increase in the pollution load brought on by anthropogenic activities, the discharge of wastes into rivers, and home sewage and industrial effluents in the Pandharpur tehsil, Maharashtra. The vital purpose of the current study is to check the physical and chemical properties of water samples from different location of the Pandharpur city and separated into four sections for efficient sampling and analysis. The analysis's results showed that the average pH value was 8.87, total suspended solids were 690 mg/l, total hardness were 340 mg/l, average turbidity of water were 13.47 NTU and total solids were 1580 mg/l were analyzed from 5 Apr 2023 to 20 Apr 2023 From this study it can be concluded that some water samples are not suitable for drinking, domestic use, industrial purpose and irrigation.

Keywords: temperature, pH, hardness, turbidity, alkalinity

## 1. Introduction

Pandharpur lies between 17 degree 40 min and 28.39 second north and 75 degree 19 min 25.40 second East and 450 m above mean level it has an area of 20.2 square kilometers. Pandharpur is known for Shree Vital Temple and pilgrims were come for taking blessing from Pandurang they are coming in large numbers i. e. about 10 lakh per year. Water is immensely required for all the organisms. Water is the most critical resource of human life. Our health is depends on water. The water we drink or mineral water is not pure as we want it contains contaminations, chemicals and other dissolved impurities. Water is most abundant and most useful natural compound it is essential for all living being. Moreover it also enjoys a unique position in industry. It's important uses as engineering material and electricity generation. [1] The main sources of water are surface water and underground water. From this sources water got impurities from the ground or soil which it comes into contact water becomes impure when it comes in contact with sewage or industrial waste organic impurities in water are generally introduced by decomposition of plants and animals remains. Certain microorganisms and bacteria are also responsible for organic impurities in water. We collected different water samples from different places of pandharpur and the samples are analyzed by using experimental methods in chemistry lab.

## 2. Experimental and Material details

Analytical grade chemicals are utilized for all chemical tests. Five distinct locations from Pandharpur Tehsil were selected for sample collection in order to determine or investigate the water quality. The samples were gathered in a 1L plastic bottle. All the bottles were carefully cleaned with soap, tap water, ethanol, and then distilled water before to sampling. After bringing the chemicals into the lab, they were immediately measured using normal procedures. The samples were preserved using customary preservation methods. The samples were examined as quickly as possible. Five different water samples in total were taken. Table 1 lists the locations and sources of the water samples.

#### 2.1 pH and water temperature measurement

At the moment of collection, water samples' pH and temperature were recorded. The HANNA pHep (model HI 98107) was used to measure the pH of the water sample. Thermometer measurements of the temperature of water samples were made. After the suggested value had remained consistent for approximately one minute, readings were obtained.

#### 2.2 TDS or total dissolved solids

Matter suspended or dissolved in water is referred to as a solid. Solids can have a negative impact on water quality in a number of different ways. At room temperature, a TDS meter was used to measure the TDS of each water sample. The TDS meter was cleaned with tissue paper and distilled water after each measurement. The TDS of the water sample was carried out by using HANNA (model HI 98301)

#### 2.3 Total hardness

The hardness of water is determined by using complex metrictitration. Total hardness of water samples were carried out by using titration method with EDTA solution. By using Erie - chrome Black - T indicator. The temporary hardness of water is due to presence of carbonate and bicarbonates ions of calcium and magnesium salts while permanent hardness due to chlorides and sulphates of calcium and magnesium salt the total hardness is sum of permanent hardness and temporary hardness.

#### 2.4 Alkalinity

Alkalinity is the measure of hydroxide and carbonate ion content of water sample. Water sample is titrated with standard HCl using phenolphthalein and methyl orange indicator. Water becomes alkaline due to presence of hydroxide, carbonate and bicarbonate ions of calcium and magnesium.

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#### 2.5 Turbidity

Turbidity is measurement of suspended solids in water. It is measured by using instrument named as nephelometer or turbidity meter. The units of turbidity are i) standard turbidity unit (mg/lit) ii) Jackson turbidity unit (J. T. U.) iii) nephelometric turbidity unit (N. T. U.)

Sr. No	Parameter	Method used	WHO standard	Actual Reading
1	Temperature	Thermometer	-	-
2	Colour	Visual/colour kit	-	Yellowish green
3	Odour	Physical sense	Acceptable	Acceptable
4	pН	Digital pH meter	6.5 - 9.5	10.3
5	Total Hardness	Complexometric titration	200ppm	300ppm
6	Alkalinity	Acid – Base titration	30 - 400 mg/l	112.2 mg/l
7	Chloride	Argentometric titration	250ppm	192ppm
8	Turbidity	Nephelometer	1 NTU	447 NTU

**Table 2:** Observations for well water

Sr. No	Parameter	Method used	WHO standard	Actual Reading
1	Temperature	Thermometer	-	-
2	Colour	Visual/colour kit	-	-
3	Odour	Physical sense	Acceptable	Acceptable
4	pН	Digital pH meter	6.5 - 9.5	8.5
5	Total Hardness	Complexometric titration	200ppm	190ppm
6	Alkalinity	Acid - Base titration	30 - 400 mg/l	71 mg/l
7	Chloride	Argentometric titration	250ppm	110ppm
8	Turbidity	Nephelometer	1 NTU	8.3 NTU

Sr.	Parameter	Method used	WHO	Actual
No	1 arameter	Wienioù useu	standard	Reading
1	Temperature	Thermometer	-	-
2	Colour	Visual/colour kit	-	-
3	Odour	Physical sense	Acceptable	Acceptable
4	pН	Digital pH meter	6.5 - 9.5	8.4
5	Total	Complexometric	200000	250ppm
	Hardness	titration	200ppm	
6	Alkalinity	Acid- Base titration	30 - 400 mg/l	51.24 mg/l
7	Chloride	Argentometric titration	250ppm	280 ppm
8	Turbidity	Nephelometer	1 NTU	21.5 NTU

Table 3: Observations for bore well water

<b>Table 4.</b> Observations for (Chandrabhaga) fiver water				
Sr. No	Parameter	Method used	WHO standard	Actual Reading
1	Temperature	Thermometer	-	-
2	Colour	Visual/colour kit	-	-
3	Odour	Physical sense	Acceptable	Acceptable
4	pН	Digital pH meter	6.5 - 9.5	10.1
5	Total Hardness	Complex ometrictitration	200ppm	240ppm
6	Alkalinity	Acid- Base titration	30 - 400 mg/l	63.32 mg/l
7	Chloride	Argentometric titration	250ppm	200 ppm
8	Turbidity	Nephelometer	1 NTU	4 NTU

Table 1. Observations for (Chandrabhaga) river water

3. Conclusion

From the physical and chemical properties of bore water, well water, river water and Ujani canal water of different places from Pandharpur Tehsil Maharashtra (India) following finding are recorded.

- Water samples from studied area were not suitable for drinking
- Both the bore and well water samples are quite suitable for drinking after boiling
- Ujani canal water is not suitable for agricultural usage

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