



## Physico-Chemical Analysis of Water Sample from Kiramiti Mendha Village Tah-Nagbhid (M.S.)

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**Abstract:** Present study aim to describe concentration of various water sample from village Kiramiti Mendha Tah-Nagbhid, Dist-Chandrapur. The work is carried out during the year 2022. The variables are analyzed such as pH, EC, Alkanility, Total Dissolved salts as per slandered method. Sample were collected from various sources like well, bore, pond. Obtained result were compare with World Health Organization slandered. The present study will be useful to identify the places where water-quality standards are met and will be indicative of the places where the water-quality is below standards. The adverse effect of the elements concentration on the health of the humans is also discussed. The data reported in this report will be extremely useful from the public health point of view.

**Index Terms** – Water Analysis, Quality of Water.

### I. INTRODUCTION

Water is essential element in survival of life on earth. Increasing access of safe drinking water can result in substantial benefit to human health. . Humans depend on water resources for all their needs of existence and survival. Ground water and other water sources become contaminated by various polluting things and making the water unfit for human use.

Majority of the groundwater comes from rain that soaks into the soil and passes down to the aquifer. Different rocks, for example, basalt, sandstone and limestone all have different minerals and thus groundwater in contact with these different geological materials will have different compositions. Some of the constituents found in groundwater, however, are not abundant in common rocks and minerals, for instance, sulfate (SO<sub>4</sub><sup>-2</sup>) and chloride (Cl<sup>-</sup>). The possible source for these chemicals is rainwater.

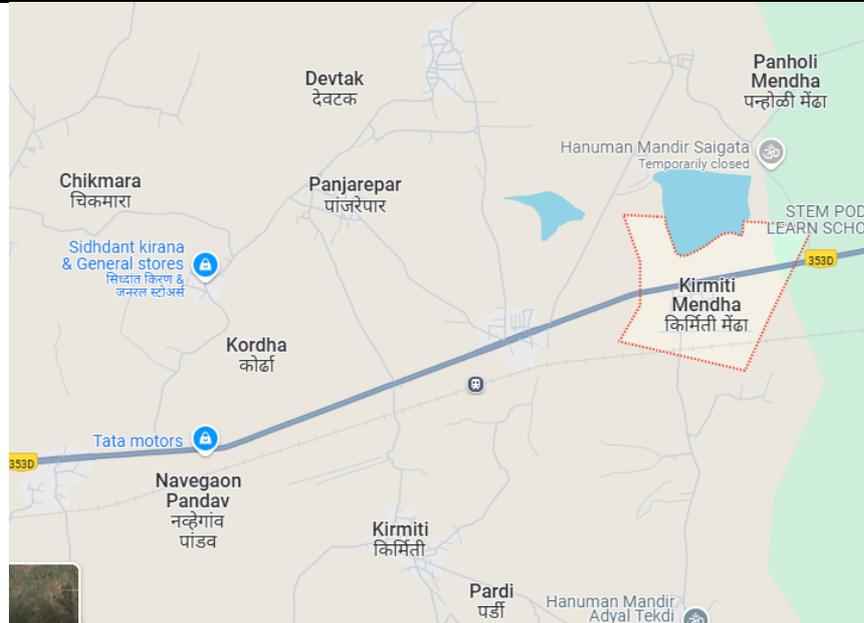
Fecal coli microorganisms which are used as an indicator in measuring the sanitary condition and to determine quality of drinking water (Michigan water science center, 2007; EPA, 2007). The presence of heterotrophic bacteria and fecal colifo may raise concern on its safety for human consumption (Oram, 2011). The village Kiramiti Mendha, Tahsil- Nagbhid is dependent on various water sources for drinking purpose so it is necessary to assess the water quality and to check either it is fit for consumption o not. Hence, the present investigation was undertaken.[1,2]

### II. MATERIALS AND METHOD

#### Study Area

Six water samples were collected from Kiramiti Mendha Village, Tahasil-Nagbhid, Dist-Chandrapur. The collected samples were grouped under three categories on the basis of its source: (a) well water (W1, W2) , (b) bore well water (B1, B2) and Pond (P1,P2). Study area is located at Latitude:20.58193, Longitude:79.763049, Elevation:239.46 m, Accuracy:8.9m.

Sample ID	Sample Name
W 1	Choudhari
W 2	Dadmal
B 1	ZP School
B 1	Radake
P 1	Gram Panchayat
P 2	Morande



### Collection of Sample

A sample were collected in Clean 100ml plastic bottle, in month of December 2022 and analyzed in Laboratory Immediately after Collection. Well and Bore sample is used for drinking water in village where ponds are used for washing cloth and other purpose. Sample were collected with team of departmental students and college staff, as shown in fig2.

### **III. RESULTS AND DISCUSSION:**

The standard methods recommended by WPCF (2005) and Trivedi and Goel (1984) were used for analyzing physico-chemical parameters. Results are given in Table 1 & 2.



### Total Hardness

Total hardness of water refers to the concentration of dissolved minerals, primarily calcium ( $\text{Ca}^{2+}$ ) and magnesium ( $\text{Mg}^{2+}$ ) ions. It is quantified by summing the molar concentrations of these ions in the water, typically measured in mol/L. The presence of soluble bicarbonates, chlorides, and sulfates of calcium and magnesium contributes to this hardness.[3,4]

Hardness of water prevents lather formation with soap and increases its boiling point. Calcium and Magnesium are the principal cations which imparts hardness. In the present study, the content of total hardness for bore well and Well are in range of drinking water but Pond water range is high.

### Calcium Hardness

Calcium is one of the most abundant cation present in freshwater which imparts hardness. It is essential for cardiac function, nervous system and in the coagulation of blood. The high amount of calcium present in drinking water leads to the encrustation in water supply structure and it affects adversely on domestic use. The level of calcium for dig well and ore well is safe for drinking while pond range is not permissible for drinking [5]

**Magnesium Hardness**

Magnesium is essential for photosynthesis as the component of chlorophyll molecule present in some plants. Generally magnesium is associated with calcium in all types of water and its concentration remains lower than the calcium. Monthly variations in magnesium values for all water sample are safe for drinking.

**Chloride**

Chloride is an important parameter for assessing the drinking water quality. It controls salinity of water. Chloride plays an active role in photolysis of water and phosphorylation in green plants.[6] The chloride values for bore Dig well ranges from 100 mg L<sup>-1</sup> to 120 mg L<sup>-1</sup>, for bore well it decrease to 90mg L<sup>-1</sup> to 100 mg L<sup>-1</sup> and pond water it rang from 180mg L<sup>-1</sup> to 200mg L<sup>-1</sup>.

**Total Alkalinity**

Alkanility in water is due to carbonate, bicarbonate and hydroxide ion Total Alkalinity (TA) is the amount of dissolved alkali in water that can both give and take Hydrogen ions. Because of this interference with Hydrogen, alkalinity serves as a buffer against the reduction in pH. Both pH and TA are important in water chemistry. Total alkanility value for Bore Well and all water sample is range from 40 to 70 mgL<sup>-1</sup>.

**pH**

Pure water has a pH value of 7. This value is considered neutral—neither acidic or basic.pH is an important indicator which shows acidic and alkaline nature of water. It is positively correlated with photosynthetic activity. pH value of all sample is in acidic range means below 7. But according to WHO standard it in 7 to 8 range.

**Electric Conductivity**

EC is an important physical parameter. It explains the ionic state of water. EC is a measure of solubility and it is an excellent indicator of total dissolved solids. The variation in electrical conductance, ranges for dig well from 0.28 mho cm<sup>-1</sup> to 1.15 mho cm<sup>-1</sup>, for bore well 0.25 mho cm<sup>-1</sup> to 0.56 mho cm<sup>-1</sup>, for pond reservoir 0.43 mho cm<sup>-1</sup> to 0.81 mho cm<sup>-1</sup>.

Parameters	WHO	BIS
Total Hardness	500	500
Calcium	75	75
Magnesium	50	50
Chloride	200	200
Alkalinity	75	75
pH	6.5 – 8.5	7-8
E.C.	0.300	0.300

**Table 2 Drinking Water Standered of World Health Organization (WHO) and Bareau of Indian Standered (BIS). [7,8]**

**Total Coliform and Fecal coliform**

The standard Plate Count, Total Coliform, Fecal Coliform and most probalized number were analysed in sample were presented in Table 4. The SPC was ranged from 12,200 to 1,64,300 (x 10<sup>5</sup>) cfu/ml. Total coliforms ranged from 16 to 127 cfu/100 ml of water sample. The fecal coliforms ranged from 07 to 43 /100 ml while MPN ranged from 23 to 140 /100 ml of water sample. Significant number of fecal coliforms was found in all the samples and it was significantly higher than the WHO limit (0) for drinking water. So the all samples may raise concern about the safety.

Sample Code	Source	Mg Hardness	Ca Hardness	Total Hardness	Chloride	Total Akalinity	pH	E.C.
W 1	Dig Well	45	50	270	120	72	6.7	0.280
W 2	Dig Well	50	56	285	100	73	6.8	0.20
B 1	Bore Well	55	85	390	90	70	6.6	0.180
B 1	Bore Well	57	93	387	95	69	6.5	0.210
P 1	Pond	60	40	670	205	40	5.9	0.310
P 2	Pond	75	42	690	185	45	6.2	0.305

Table No -3

Sample Code	Source	SPC/ml	FC/100ml	MPN/100ml
W 1	Dig Well	35200*10 <sup>5</sup>	13	38
W 2	Dig Well	33800*10 <sup>5</sup>	26	32
B 1	Bore Well	30100*10 <sup>5</sup>	32	14
B 2	Bore Well	28600*10 <sup>5</sup>	31	18
P 1	Pond	90400*10 <sup>5</sup>	53	146
P 2	Pond	120400*10 <sup>5</sup>	62	152

Table No- 4

#### IV. CONCLUSION

It is always necessary to monitor the environment for toxic as well as for essential elements in order to understand the correlation of the environment with the biological system. This survey will surely help to have a better idea in taking further steps for possibly enhancing the quality of drinking water in Kirmiti Mendha Village.

Physico-chemistry of all water samples revealed that the water from Dig well and Bore Well is suitable for drinking and domestic purposes while, a significant presence of fecal coliform may raise concern on the safety for its consumption. But Pond water is totally unsafe for Drinking and Domestic purpose.[9]

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