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Monitoring of Physiochemical Parameters of Water in Kinhi Village, Dist. - Yavatmal, in Maharashtra, India

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Abstract—*Water is the earth's eye, looking into which the beholder measures the depth of his own nature. Due to the current energy crisis, globally we have become increasingly aware of the fact that the resources we rely on are not boundless. Something much greater than the energy crisis that faced by us is the depletion and pollution of the planets limited supply of freshwater. Unlike the energy crisis, the water crisis is life-threatening since unlike oil, freshwater has no viable substitute. So this study was aimed to estimate current status of physio-chemical characteristics of rural area- Kinhi Village, Dist. Yavatmal, Maharashtra. The different sources for the monitoring of water was Wells, Hand Pumps, Tap. The seasonal variations was observed in physio-chemical parameters such as pH, Temperature, Hardness, Turbidity, Fluoride, Chloride etc , were checked. It is necessary to check the quality of water at regular interval because due to use of contaminated water, the human suffers from various waterborne diseases. The different physiochemical parameter were compared with WHO Standards.*

Keywords *: Physiochemical, Well, Tap.*

1. INTRODUCTION

Water is a transparent and nearly colourless chemical substances that is the main constituent of Earth's streams, lakes, and oceans and the fluids of most living organisms. Its chemical formula is H2O meaning that its molecule contains one oxygen and two hydrogen atoms, that are connected by covalent bonds. Water covers 71% of the earth's surface. On earth it is found mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifers and some amount of it in air in the form of vapours, clouds, etc. Oceans hold 97% of surface water, glaciers and polar ice caps 2.4% and other land surface water such as rivers, lakes and ponds 0.6%. After overall rainfall only 1% of water is available for use, such as drinking washing but this amount is not wholly pure or portable. The contaminated water cause many diseases like cholera, typhoid and also leads to born mosquitoes which will help to cause malaria. Throughout most of the world, most common contamination of raw water source is from human sewage and in particular human faucal pathogens and parasites. In 2006, waterborne diseases were estimated to cause 1.8 million deaths each year while about 1.1 billion people lacked proper drinking water.

1.1 CHARACTERISTICS OF WATER

1. Physical characteristics
2. Chemical characteristics
3. Biological characteristics

2. PHYSICAL CHARACTERISTICS

Physical analysis of water is carried out in order to determine the Physical characteristics of water. This includes tests for determining turbidity, colour, taste or odour, temperature, specific conductivity, etc. These tests are described below:

1. Colour
2. Taste and Odour
3. Temperature
4. Turbidity

1. Colour: Dissolved organic matter for decaying vegetation of some organic material such as colour soil etc. May impart colour of the water the excessive growth of algae & aquatic micro-organism may also sometime impart colour to the water. the of colour is not objectionable for health point of view, but may spoil the colour of cloth being washed in such water & it's also objectionable from aesthetic & psychological point of view as people may not liked to drink coloured water .The colour in water can be easily detected by naked eyes. It can be measured by comparing the water sample with other standard water tube containing solution of different standard colour intensities.

2. Taste and Odour: The dissolved organic material or the organic salts or the dissolved gases may impart taste & odour. Taste & odour may be caused by the presence of: dissolved gases such as H2S, CH4, CO2, etc. Combined with organic matter.The extend of taste or odour present in a particular

sample of water is measured by a termcalled odour intensity, which is related with the threshold odour.

3. Turbidity: Solids particles suspended in water absorb or reflect light and cause the water to appear cloudy. These particles are suspended inorganic minerals or organic matter picked up over or under the ground. Since the earth acts as an excellent filter, the water from deep well is usually clear without significant amounts of turbidity. This problem is more common in the water from surface supplies. The major problem with turbidity is aesthetic, but in some cases suspended matter can carry pathogens with it. Large amounts of organic matter can also produce stains on sinks, fixtures and laundry (WHO 1985).

4. Temperature: Testing the temperature of water has usually no practical significance in the sense that it is not usually possible to give any treatment to control the Temperature of water. Temperatures of about 10°C are highly desirable, while Temperature above 25°C is considered objectionable. The temperature of water can be measured using thermometer.

2.1 CHEMICAL CHARACTERISTICS

Chemical analysis of water is carried out in order to determine the chemical characteristics of water. This involves tests for determining the total solid and suspended solids, ph value hardness chloride content iron content and other metallic content, dissolved gasses etc. This test is described below.

1. pH
2. Total Hardness
3. Chlorides
4. Alkalinity
5. Fluorides
6. Dissolved Oxygen

1. pH: pH is most important in determining the corrosive nature of water. Lower the pH value higher is the corrosive nature of water. pH was positively correlated with electrical conductance and total alkalinity. The pH of most drinking water lies within the range 6.5–8.5. The pH value of water can also determine by pH meter .It can also measure with the help of colour indicators which are add to water, and the colour produced is compared with the standard colour of known pH value.

2. Total Hardness: Total hardness in water is the sum of the concentrations of alkaline earth metals cations, Hardness is generally governed by calcium and magnesium salts which largly combines with bicarbonates and carbonates giving temporary hardness and with sulphates, chlorides and other anions of a minerals acids causing permanent hardness.

3. Chlorides: It is measured by titrating a known volume of sample with standardized silver nitrates solution using potassium chromate solution in water as indicator. The latter indicator is an adsorption indicator while the former makes a red colour compound with silver as soon as the chlorides are precipitated from solution.

4. Alkalinity: The values of pH higher than 7, shows alkalinity. The alkaline species in water can neutralize acids. The major constituents of alkalinity are OH, HCO3 ions. Alkalinity in water is usually caused by bicarbonate ions.

5. Fluorides: Fluoride is present naturally in low concentration when drinking water and foods are based on surface water such water supplies generally contain between 0.01-0.3 ppm. Ground (well water) concentration vary even more, depending on the composition of the local ground.in some location drinking water contains dangerous high levels of fluoride, leading to serious health problems.

6. Dissolved oxygen: It is the amount of oxygen dissolved in water. Most aquatic organisms need oxygen to survive and grow. Some species require high DO such as trout and stoneflies. Other species do not require high DO, like catfish, worms and dragonflies.

If there is not enough oxygen in the water the following may happen:

- Death of adults and juveniles,
- Reduction in growth,
- Failure of eggs/larvae to survive,
- Change in species present.

3. COLLECTION OF SAMPLES

Before testing water samples were collected from the sources of water. These samples were collected from such places that they represent the body of the water from which they were collected.

1. If the water is to be collected from a tap, the sufficient quantity of water should be allowed to pass through the tap, before collecting sample from it because it will eliminate the stagnant water.

2. If the water is to be collected from the ground sources i.e. through wells or tube wells, sufficient quantity of water should be pumped out before collecting the samples.

3.1 METHODS OF COLLECTION OF SAMPLES

1. For physical examination water was collected in fully cleaned ordinary buckets or plastic bottles.

2. For chemical test, the container usually glass bottles of more than 2 litres capacity was thoroughly washed with distilled water, cleaned and the water was collected in it.

3. For bacteriological test the person who collect the water must be free from any diseases the container must be cleaned with sulphuric acid or alkaline permanganate. After the

collection of sample, bottles should be closed and covered with cloth.

4. RESULTS AND DISCUSSIONS:

Table 1

Sr No.	Test	Places Of Sample	Result mg/lit			WHO std	
			Rainy	Winter	Summer	Des. limit	Per. limit
1	pH	Well 1	7.3	7.45	6.46	6.5	8.5
		Well 2	8.0	8.5	6.88		
		Tap 1	7.20	7.18	6.84		
		Tap 2	7.21	7.19	6.88		
2	Turbidity	Well 1	0.64 N.T.U.	0.70 N.T.U	2 N.T.U	5 N.T.U	10 N.T.U
		Well 2	0.68 N.T.U.	0.76 N.T.U	1 N.T.U		
		Tap 1	0.43 N.T.U	0.52 N.T.U	1 N.T.U		
		Tap 2	0.42 N.T.U.	0.51 N.T.U	3 N.T.U		
3	Chloride	Well 1	20	25	560	250	1000
		Well 2	21	23	45		
		Tap 1	60	65	520		
		Tap 2	62	63	45		
4	Total Hardness	Well 1	140	146	144	200	600
		Well 2	155	160	165		
		Tap 1	210	223	227		
		Tap 2	200	220	212		
5	Alkalinity	Well 1	180	210	550	200	600
		Well 2	200	220	460		
		Tap 1	100	108	516		
		Tap 2	98	109	520		
6	Fluoride	Well 1	0.06	0.08	1.78	0.6	1.5
		Well 2	0.18	0.2	1.5		
		Tap 1	0.08	0.10	1.8		
		Tap 2	0.09	0.10	1.58		
7	Dissolved Oxygen	Well 1	8	5.8	4.2	500	2000
		Well 2	7	4.2	6.4		
		Tap 1	7	4.4	6		
		Tap 2	8	5.8	4.2		

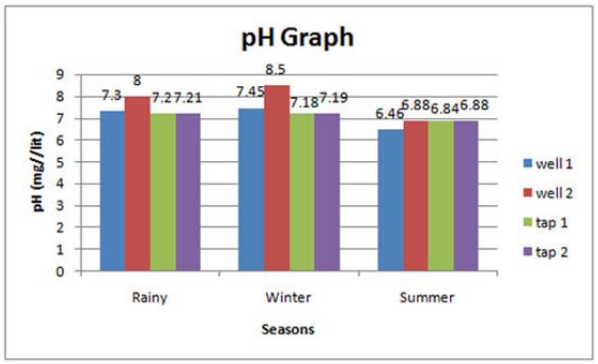

Fig. 4.1.1 Graphical representation of pH

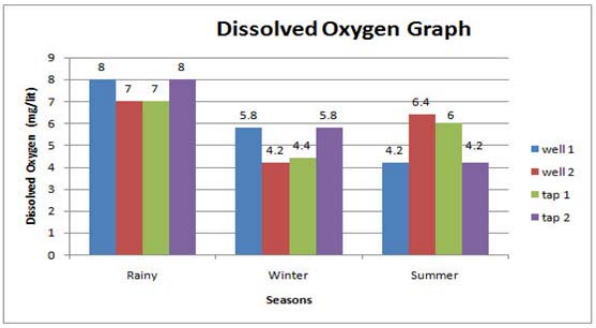

Fig. 4.1.2 Graphical representation of DO

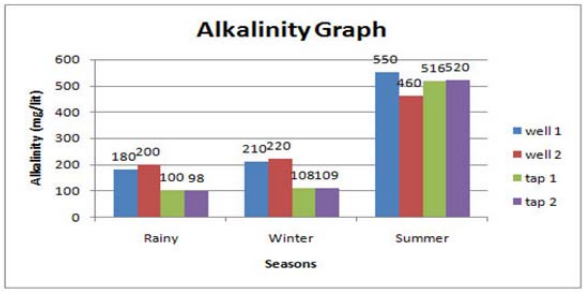

Fig. 4.1.3 Graphical representation of Alkalinity

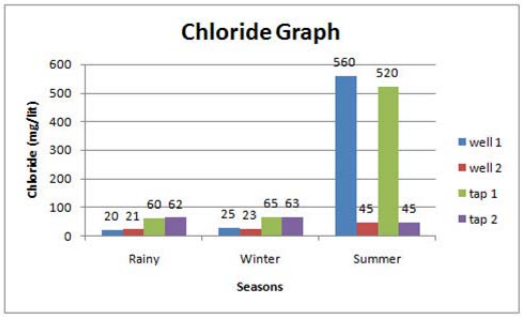

Fig. 4.1.4 Graphical representation of Chloride

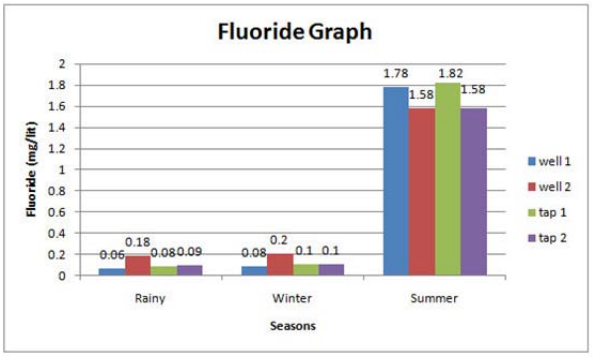

Fig. 4.1.5 Graphical representation of Fluoride

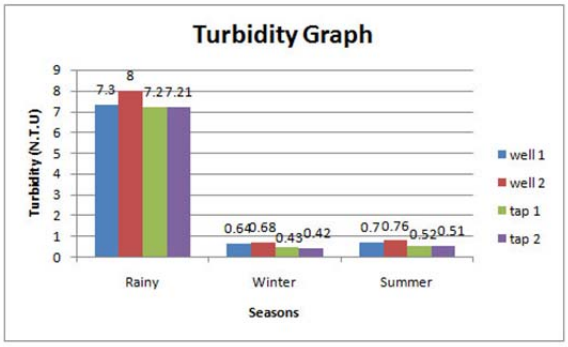

Fig. 4.1.6 Graphical representation of Turbidity

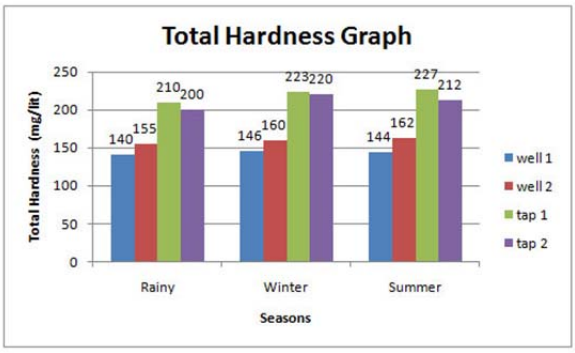

Fig. 4.1.7 Graphical representation of Total Hardness

5. CONCLUSION

As per the objective all the parameters checked and it can be concluded from the result the drinking water of the sources polluted except well no 2 and tap water results are satisfactory as compared with other sources.

No treatment facility is provided in the drinking water only bleaching powder is added in water without any proper way due to this reason the villagers are affected by various diseases. such as fluorosis, jaundice, cholera, diarrhea, joints pain etc..

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