



# STUDY OF WATER PARAMETERS LIKE DISSOLVED OXYGEN, TOTAL HARDNESS, ALKALINITY AND CHLORIDES FROM ETAPALLI CITY OF GADCHIROLI DISTRICT

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*Abstract* : Water is essential for all human being. Water has good taste for drinking if it contains all the required minerals in desired limit. The water parameters like Dissolved Oxygen, Total Hardness, Alkalinity and Chlorides are analysed. The sample of water taken from different places of Etapalli city of Gadchiroli District. These parameters are again comparing with standard parameters of WHO and ISI.

*Index Terms* - Dissolved Oxygen, Total Hardness, Alkalinity, Chlorides, Titration.

## I. INTRODUCTION

The oxygen is dissolved in water and its concentration in water depends upon temperature, salinity of water and atmospheric pressure. The oxygen in water is majorly vary with temperature i.e.at 20<sup>0</sup> C its concentration is 9 mg/L and at 0<sup>0</sup> C is 14.6 mg/L. (Tchobanoglous. et. al. 2003) The taste of water is depending upon the dissolved oxygen. There are mainly three methods by which the dissolved oxygen is calculated like calorimetric method, Winkler titration method and electrometric method. (APHA. 2005). Aquatic animals require dissolved oxygen to live. (Mueller et.al. 2011). The concentration of dissolved oxygen in water decreases from required level it directly affects on aquatic organism (Murphy, 2005).

Water which contains more amount of mineral is considered ad hard. (APHA. 2005). There are two types of hardness a) Temporary hardness-which occurs due to presence of bicarbonate and carbonate. b) Permeant hardness-which occurs due the presence of sulphate and chloride ions. (APHA. 2005) and (Tchobanoglous. et. al. 2003) When the water came from rain it is very pure and it does not contain any type of hardness, but the hardness is coming in water comes in contact of rocks, limestone and soil (McGhee, et. al. 1999) and (Tchobanoglous. et. al. 1985). The statistical evidence shows that if we drink water having hardness upto 175 mg/L reduces the heart problem (Tebbutt 1998). Magnesium is the most abundant element in body and t intracellular fluid. It is a cofactor for many cellular enzymes (Magee, et.al. 2011). Now a days e reverse osmosis and distilling devices are used to remove minerals from water but they are removed some essential nutrients from water due to this drinking-water has less amount of minerals. Therefore it is necessary to use proper instruments to remove excess amount of minerals from water (Caldwell, et.al. 1953).

The water is said to be alkaline if it contains lime and soda. The water is alkaline due to the pollution from industries and from natural like volcanoes. (Tchobanoglous. et. al. 2003) Alkalinity gives the major information of bases present in water by titration method. The major chemical compound i.e. calcium carbonate is responsible for alkalinity. The pure rain water does not contain any alkalinity but when it comes in contact of soil the presence of alkalinity is traced (Wilson, 2016). The Lime stone rocks, are responsible to introduce calcium carbonate in natural water. Some other components responsible for alkalinity are silicates, nitrates, phosphates, dissolved ammonia, etc. (Water Research Centre, 2014). Some other components responsible for alkalinity are silicates, nitrates, phosphates,

dissolved ammonia, etc. (Pradeep, et.al. 2014) Alkalinity is used to measure buffer capacity of water means how it resists the pH on addition of acid and bases. Bicarbonates are responsible for alkalinity in natural waters the formation of bicarbonate is due to minerals from soil/rock and CO<sub>2</sub> from atmosphere. To measure alkalinity, titration of known volume of strong acid with water sample upto the pH range 4 to 5. This Titration is divided into three types of alkalinity carbonate, bicarbonate, and total alkalinity. Now the Carbonate is calculated by titration of water by using phenolphthalein indicator upto endpoint having pH of 8.3. Similarly the Total alkalinity is calculated by titration water using methyl orange indicator upto end point having pH of 4.5. Bicarbonate alkalinity is calculated from difference between total alkalinity and carbonate alkanity. The higher percentage of total alkalinity, the lower is endpoint. (Snoeyink, et.al.1980).

Generally chlorides present in all naturally occurring sources of water. The desired limit of chloride ion in water is 250 mg/l given by (IS:10500 1991). The chlorine is found in nature in salt form like Sodium chloride (NaCl), Potassium Chloride (KCl) and Calcium Chloride (CaCl<sub>2</sub>). The use of NaCl is used to produce caustic soda in industry, CaCl<sub>2</sub> is used in ice Control and KCl is used fertilizer. The chloride ion has very vital role in osmotic activity in human. Chloride ion in human body is taken in the form of salt (NaCl) it makes electrolytic balance and helps in working of kidney and dietary system. If 100% chlorine is taken by body then nearly 95% is removed in urine, 2% removed in sweat form and nearly 4% can be absorbed by human body (Department of National Health and Welfare 1978). However, if water contains chlorine level higher than 2.5 g/lit then causes hypertension (Fadееva, 1971). Due to electrical conductivity carrying capacity of chloride ions it produces corrosion in metal pipelines (Copenhagen, 1978).

## II. MATERIAL AND METHODS

**2.1 Dissolved Oxygen (DO):** The dissolved oxygen meter is measured by Dissolved Oxygen Model AM-DO-01 which works on electrometric method. Deep the Dissolved Oxygen meter in water sample upto mark and taking the reading.

**2.2 Total Hardness:** The total hardness is addition of temporary hardness and permanent hardness. The total hardness is determined by titration method. In this method when Eriochrome black-T added in water sample, it turns in red complex which on titration with EDTA gives blue colour. Note down this reading and after calculation total hardness of water. The classification of wate according to presence of hardness as For Soft Water hardness is less than 50 mg/L as CaCO<sub>3</sub> , For Moderately Hard Water hardness is Between 50-150 mg/L as CaCO<sub>3</sub> , For Hard Water hardness is Between 150-300 mg/L as CaCO<sub>3</sub> , For Very Hard Water hardness is greater than 300 mg/L as CaCO<sub>3</sub> (APHA. 2005).

**2.3 Alkalinity:** The alkalinity is calculated by titration of water sample having P<sup>H</sup> less than 6.0 with sulphuric acid having normality 0.02N. After titrating with sulphuric acid note down the reading and calculate alkalinity.

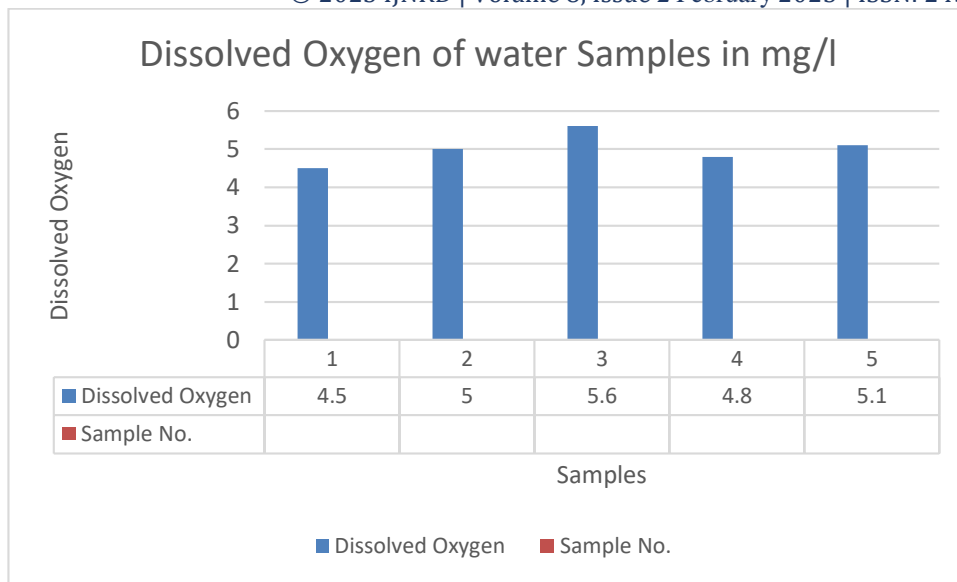
**2.4 Chlorides:** When rain water is contaminated with soil, rock which contains chloride ion. If percentage of chloride ion is higher than 250 mg/l in water then its taste will be salty, such water is drink anyone will be suffer from disease related to heart and kidney. To calculate percentage of chloride ion in water titration method using silver nitrate is used. (APHA. 2005).

## III. RESULTS AND DISCUSSION

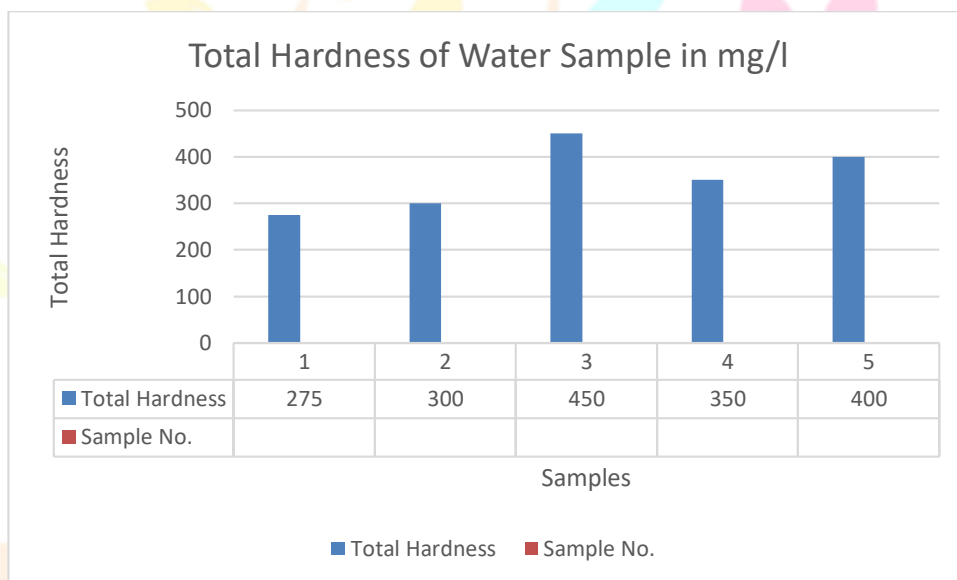
The water parameters given by different Standards are as.

Sr. No.	Parameters	Standards by ISI	Standards by WHO
1	Dissolved Oxygen	3-10 mg/l	5.0 mg/l
2	Total Hardness	300-600 mg/l	200-600 mg/l
3	Alkalinity	300-600 mg/l	200 mg/l
4	Chlorides	250 mg/l	250 mg/l

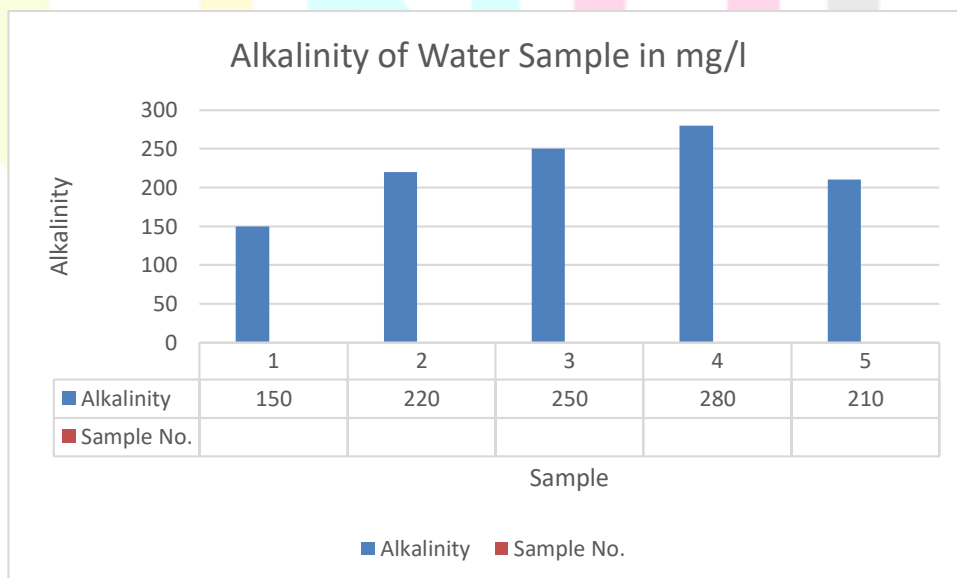
**3.1 Dissolved Oxygen (DO):** The is measured by using Model AM-DO-01 which shows the reading between standards given by ISI and WHO. The Dissolved Oxygen range is from 4.5mg/l to 5.1mg/l.



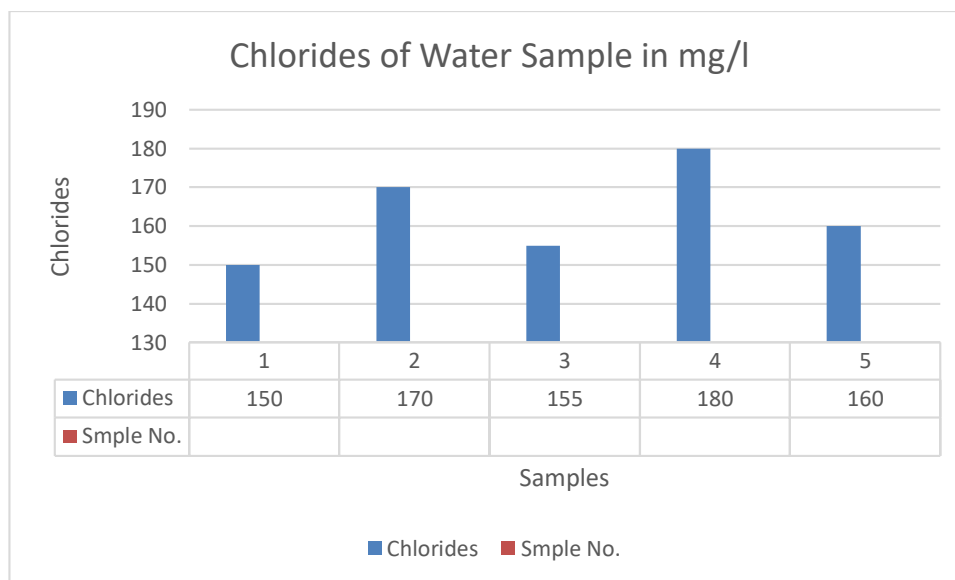
**3.2 Total Hardness:** The Total Hardness is analysed by using titration method. Its value for given sample is from 275mg/l to 450mg/l. the variation in Total hardness is due to the different location.



**3.3 Alkalinity:** The alkalinity of the given sample is measured by titration method and its value obtained between range 150mg/l to 280/mg/l.



**3.4 Chlorides:** The chlorine in the water samples is evaluated by using titration method. The range of values is from 150mg/l to 180mg/l.



**IV. Conclusions:** The water parameters analyzed shows the results in given the range of Standards of ISI and WHO. The Value of Dissolved Oxygen range is from 4.5mg/l to 5.1mg/l, Total Hardness is from 275mg/l to 450mg/l, alkalinity is between range 150mg/l to 280/mg/l and chlorides is between 150mg/l to 180mg/l.

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