



# Comparitive Study of Water Sample of Alwar City and Village

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## Abstract:

The control of water pollution is necessarily requires quantitative measurement of water pollution. So different types of examinations (such as physical, chemical biological) are necessary for providing pure water for drinking, domestic, and industrial purposes. In this paper some common water quality tests were performed on different water samples (Alwar city and Villages) to check the quality of water. This research helps to check efficiency, uniformity, and consistency of drinking water available in Alwar city and village.

**Key words:** pH, total solids, conductivity, hardness.

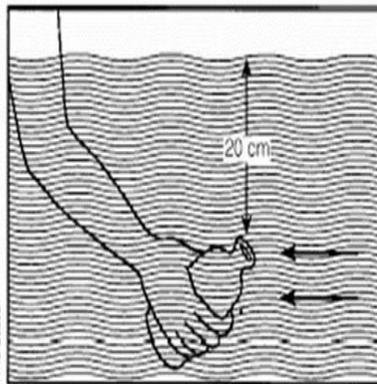
## I. INTRODUCTION

Water is vital natural resource which is essential for multiplicity of purposes. About 80% of the earth surface is covered by water. Out of the estimated 1011 million Km<sup>3</sup> of the total water present on earth, only 33400m<sup>3</sup> of water is available for drinking, domestic, agriculture, power generation, industrial consumption, and transportation and water disposal. Addition of excess of undesirable substances to water that makes it is harm full to man, animals and aquatic life, so it is important to find out the quality of drinking water. As the safe and potable drinking water is needed, various methods are adopted to raise the quality of drinking water. The quality of water may be described in terms of the concentration and state (dissolved or particulate) of some or all of the organic and inorganic material present in the water, together with certain physical characteristics of the water. It is

determined by in situ measurements and by examination of water samples on site or in the laboratory. The main elements of water quality monitoring are, therefore, on-site measurements, the collection and analysis of water samples, the study and evaluation of the analytical results, and the reporting of the findings

## II. MATERIALS AND METHODS:-

**1). Sampling of water:** - Sampling generally means the sample of water which we use to analyse, or taking a portion of water for analysis or testing. In this we required sample container (glass container having 1 liter capacity to protect samples from changes in composition, deterioration with ageing, retarding biological action, reduction of volatility of constituents and for accurate results).



### TYPES OF SAMPLES

- Grab – use when a source is known to be constant in composition over a considerable period of time or over a substantial distance in all directions
- Composite samples (time composite) – most useful for determining average concentrations, usually over a 24 hr period.
- Integrated samples – most useful when you need a maxima and minima

For collecting the water sample of Alwar city and villages we use the GRAB SAMPLING method from the government tap, because it is the homogenous liquid in tap water accept metal ion concentration.

## 2). Water analysis for physical parameters:-

• **TEMPERATURE:** In natural water system temperature is a very important physical factor that determines water quality. Rise in temperature increases the growth rate of aquatic organisms, so they consume dissolved O<sub>2</sub> faster and level of

dissolved O<sub>2</sub> decreases. As hot and cold are both arbitrary terms, temperature can further be defined as a measurement of the average thermal energy of a substance<sup>5</sup>. Thermal energy is the kinetic energy of atoms and molecules, so temperature in turn measures the average kinetic energy of the atoms. Water temperature must be taken in the field. Temperature should be sampled at various depths using a recording Celsius thermometer. For deep lakes temperatures can be measured at 5 ft intervals, shallower lakes should have reading taken at lesser intervals, 2-3 ft. Streams and rivers, should have readings taken

at intervals relative to the water depths. Location of temperature reading also needs to be considered, edge, middle, inlet, etc. The thermometer will need to be weighted and tied to a strong cord or light rope. Determining the depth of the thermometer can be

accomplished by placing knots in the rope or cord at appropriate intervals. A data table detailing location of reading relative to land marks, depth and the temperature reading will need to be devised.

Temperature (C)	Examples of Life
Greater than 20C (warm water)	Much plant life, many fish diseases Most bass, crappie, bluegill, carp, catfish , caddis fly
Middle range (12-20C)	Some plant life, some fish diseases Salmon, trout, stone fly, mayfly, caddis fly, water beetles
Low range (cold-less than 12C)	Trout, caddis fly, stone fly, mayfly

• **TOTAL DISSOLVED SOLIDS:-** The term solids refers to the matter that remains as residue upon evaporation. Total solids include both dissolved solids and suspended solids. Total Dissolved Solids (TDS) are the total amount of mobile charged ions, including minerals, salts or metals dissolved in a given volume of water, expressed in units of mg per unit volume of water (mg/L), also referred to as parts per million (ppm). Potable water contains mineral matter in dissolved conditions whereas industrial effluents and sewage contains huge amount of undissolved matter. In this we calculate the TDS of water sample by using TDS meter.

• **CONDUCTIVITY:** Conductivity is a measurement of the ability of an aqueous solution to carry an electrical current. An ion is an atom of an element that has gained or lost an electron which will create a negative or positive state. Conductivity of water varies directly with the temperature and is proportional to its dissolved mineral matter content. Specific conductivity can be measured by conductivity meter using Dip-Type cell. The instrument and cells are calibrated with 0.005M KCL solution. After that we repeat the process for calculating the conductivity of water samples.

Parameters	Analytical Methods	Instruments
Temperature	Instrumental Analyse on site	Thermometer
Total Dissolved solids	Instrumental Method	TDS Meter, Probe
Conductivity	Instrumental Method	Conductivity Meter, Probe
Acidity	Volumetric Analysis	Titration
Alkalinity	Volumetric Analysis	Titration
Hardness	Volumetric Analysis	Titration

### 3). Water analysis for Chemical parameters:-

• **ACIDITY:**

Acidity is a measure of the effects of combinations of compounds and conditions in water. It is the power of water to neutralize hydroxyl ions and is expressed in terms of calcium carbonate. Water attain acidity from industrial effluents, acid mine drainage, pickling liquors and from humic acids.

Acidity of water can be determined by titration with NaOH solution. The amount of NaOH is required to reach pH 4.5 is a measure of mineral acidity (Methyl Orange End Point), while the

amount of NaOH to reach pH 8.3 is a measure of total acidity (Phenolphthalein End Point).

• **ALKALINITY:** Alkalinity of water is due to the presence of Carbonate, bicarbonates and hydroxide ions. Generally it is a capacity to neutralize strong acids. Alkalinity of water is determined by titration with 0.02 N H<sub>2</sub>SO<sub>4</sub> using Methyl Orange and Phenolphthalein as indicator.

• **HARDNESS:** Hardness indicates water quality, mainly in terms of Ca<sup>+2</sup> and Mg<sup>+2</sup> expressed as CaCO<sub>3</sub>. It is the characteristic property of water which prevents the leathering of

soap. Temporary hardness is due to the presence of bicarbonates of  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$ , it may be removed by after boiling. Permanent hardness is due to the presence of Sulphates and Chlorides of  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$ . For hardness determination we use the EDTA method. During titration with EDTA, metal ion ( $\text{Ca}^{+2}/\text{Mg}^{+2}$ ) first reacts with indicator (Eriochrome Black –T indicator) and

forms indicator-metal complex. After that metal ions breaks and form stable metal-EDTA complex at the end point.

**RESULTS:-** The results of Physical- Chemical analysis are indicated in table. Here sample 1 represents the water sample of Alwar city and sample 2 for Alwar village water sample.

S.NO	PARAMETERS	WHO LIMIT	WATER SAMPLE 1	WATER SAMPLE 2
1	TDS	50ppm	152	112
2	Conductivity	100 $\mu$ mhos cm-1	335	342
3	Acidity	–	129ppm	106ppm
4	Alkalinity	120-600ppm	180	190
5	Hardness	100 ppm	196 ppm	168 ppm
6	Temperature		17 <sup>0</sup> C	17 <sup>0</sup> C
7	pH	6.5-8.5	7.83	7.56

The quality of drinking water and the water pollution status were evaluated according to the standards suggested by WHO in order

to calculate the number of samples that did not comply with guideline values.

### III. CONCLUSION:-

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**TDS**, along with other contaminants that cause aesthetic, cosmetic and technical effects, High amount of hardness means this type of water sample is not good for health such as hair damage, skin problem, and digestion problem. In compare to both sample high TDS, hardness represents the bad quality of sample 1.

### IV. REFERENCES:-

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