

PHYSICO-CHEMICAL ANALYSIS OF DRINKING WATER JANKIPURAM EXTENSION (LUCKNOW, U.P) INDIA

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ABSTRACT

This research work is to check the various parameters of potable water of the selected sites by using reference IS 3025:2017 which gives the result of the sample to compare it with Standard values as per IS 10500:2012. The vital aspect of this research is to check the suitability of water for drinking purpose. The safety of drinking water is important for the health. The Comparison result says that, the water we tested is drinkable without any treatment or not. Intaking this water without any treatment may cause disease and may also affect human organs. The safety of drinking water is affected by various contaminants which included chemical and microbiological. Such contaminants cause serious health problems.

Keywords: Water Sample, Physio & chemical analysis, IS Code 3025:2017, TDS, Dissolved solid, Hardness, Ph, Chloride, Flouride, Conductivity.

I. INTRODUCTION

Water is an inorganic compound with the chemical formula H₂O. It is a transparent, tasteless, odourless, and colorless, and it is the main constituent of the earth.

Some parameters are given to check the purity of tap water. Water becomes due to pollution from leaky underground tanks that store gasoline, leaky landfill, or when people apply too much fertilizer, herbicides, or pesticides on their fields or lawns.

When pollutants leak, spread, or are carelessly dumped on the ground they can move through the soil. Some sources are contaminated to groundwater as well, such as industries would dump toxic wastes into ponds, rivers, or swampy areas, which is not realizing that the waste could get into someone's drinking water. Some agricultural areas have trouble with fertilizer, pesticides, and herbicides from farm runoff that contaminated seeps into the -drinking water.

II. MODELING AND ANALYSIS

SAMPLING METHODS:

To assess the level of groundwater contamination, Sampling of groundwater is done from hand pump sand bore wells located in residential, as per the standard procedure. Good quality narrow mouth screw-capped polypropylene bottles of one-liter capacity were used to collect the sample. Bottles first washed with dilute nitric acid and than thrice with DM water (De-mineralised). Before sample collection bottles were rinsed thrice with water to be sampled and then samples were collected.

Sampling Sites:

Three locations were selected for taking samples so that the drawn sample represent the real groundwater quality of that area.

Labeling of the samples:

Every sample was coded adequately and mark code on the sampling bottles with permanent marker in one place, recorded all the information regarding the name of the sampling location, source and date & time of collection is noted on the note-pad to avoid any confusion and error.

Collection of Samples:

Before the collection of the sample the pipeline of bore wells / hand pumps were flushed for a sufficient period, so that the actual sample can be collected which represents the actual quality of groundwater. The samples were

collected from three pots and then mixer. Sample bottles were rinsed thrice with the water to be collected and then filled completely to avoid encroachment of air bubbles. Sample bottles screw-caped tightly and brought to the laboratory.

III. EXPERIMENTAL AND MATERIAL DETAIL

Various chemicals are used for chemical examination of water. To check the water quality, Three different sites were chosen for sample collection. A number of sites as per your choice (Atleast 2-3 sites should be selected for accurate results). Water samples can be collected in polystyrene bottles of 1L capacity. Before sampling, all the bottles should be washed thoroughly with detergent, tap water, and distilled water. Chemical parameters were determined by using standard Data available as IS 10500:2012.

Temperature

The temperature of water samples taken at the time of collection were in the range of 22 to 24 °C. The maximum permitted standard of drinking water is 25°C.

SAMPLES	A1	A2	A3
TEMPERATURE	26.7	27	27.5

COLOUR-

Even pure water is not colorless but has a slight blue tint to it. In the natural world, you often see water that is definitely not clear. Sediment and organics color natural water shades of brown or green. And if too much iron is present, even your drinking water can have a brown hue.

Result- By visualization method of five samples of each of 3 samples were analyzed and the Conclusion states that Water is Colourless.

TASTE - The pleasant taste of drinking water is due to the presence of dissolved substances which includes – Air, carbon dioxide, and minerals.

Result- By tasting method of five samples of each 3 samples were tasted and Conclusion states that Water is Drinkable.

ODOUR- odour is caused by one or more volatilized chemical compounds that are generally found in low concentrations that humans and many animals can perceive via their sense of smell. An odor is also called a "smell" or a "scent", which can refer to either a pleasant or an unpleasant odour.

Result- By sniff method of five samples of each of 3 samples were analyzed and the Conclusion states that Water is Odourless.

pH of water

The pH value of water samples collected from the location were in the range of 7.00 to 7.30, and suitable for drinking purpose .

SAMPLES	A1	A2	A3
PH	7.272	7.292	7.267

Electrical conductivity

The results reveal that obtained value was not in accordance with the slandered value of drinking water.

SAMPLES	A1	A2	A3
EC	0.388 MEU S	7.292	7.267

Turbidity

Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particles.

SAMPLES	A1	A2	A3
Turbidity	0.27	3.8	2

Total dissolved solids (TDS)

SAMPLES	A1	A2	A3
TDS	380	520	440

Total hardness

Maximum and minimum total hardness of water was 190mg/l & 60mg/l.

These high values may be due to the addition of calcium and magnesium salts. Results revealed that bore well water is suitable for drinking in terms of total hardness.

SAMPLES	A1	A2	A3
Hardness	190	60	90

Chloride Content

Chloride ion content is the concentration or amount of chloride ions in a solution. Studies regarding iron corrosion in sulfuric acid media with a pH near 3.0 have found that the concentration of ions can either accelerate or decelerate the rate of corrosion.

SAMPLES	A1	A2	A3
Chloride	23.82	28.66	55.68

Flouride Content

According to World Health Organization, the standard rate of fluoride in drinking water is 0.5–1 ppm. And our result says that Flouride is <1.0.

SAMPLES	A1	A2	A3
Flouride	<1.0	<1.0	<1.0

PHYSICO-CHEMICAL PARAMETERS OF DRINKING WATER

Electrical conductivity

The reason that the conductivity of water is important is because can tell you how much dissolved substances, chemicals, an minerals are present in the water.

Higher amount of soft the impurities will lead to a higher conductivity. The Drinking water conductivity is 200to800µS/cm.

Total hardness

Total hardness is the sum of the calcium and magnesium concentrations, both expressed as calcium carbonate, in milligrams per liter (mg/L).

You can determine your water's hardness based on these concentrations of calcium carbonate: below 75 mg/L- is generally considered soft. 76 to 150 mg/L-moderately hard.

Chlorides

Chloride is a naturally occurring ion that is present in both fresh and salt water. Chloride is most commonly derived from dissolved salts such as sodium chloride or magnesium chloride.

Chloride is essential in small amounts for normal cellular function in plants and animals.

Colour

Colour is produced by suspended matter and dissolved matter. Colour is measured by TINTOMETER.

True Colour Dissolved Solids Apparent colour Suspended Solids

Taste and odor

- 1) It may be due to the presence of one or more of the following:
- 2) Domestic and industrial wastes and decomposing organic wastes.

- 3) Dissolved gases like carbon dioxide, hydrogen sulphide, methane, etc.
- 4) Chemical compounds like phenol, sodium chloride, iron compounds, carbonate sand sulphates of some elements
- 5) Odour concentration is measured as a threshold odour number. This number is the dilution ratio at which the odour is hardly detectable. It is measured by an instrument known as "Osmoscope".

Turbidity

Turbidity is caused by particles suspended or dissolved in water that scatter light making the water appear cloudy or murky. JTU is used for groundwater. The maximum permitted standard of drinking water is 25°C. The pH value of water samples collected from the well and bore well water were in the range of 6.5 to 8.5

Total dissolved solids (TDS)

The water of high TDS is not suitable for use in boilers and hence restricted industrial use. The TDS of groundwater samples mg/L with an average value of 500 mg/L.

Temperature and pH of the water

According to IS 10500:2012, limits of Characteristics of water are given below need water to survive. Water makes up to 70 percent of our bodies weight

Characteristics	Acceptable limits	Permissible limits in Absence of an Alternate source
Physical Parameters		
Temperature	10° C	25° C
Colour	5 hazen	15
Taste & Odour	Agreeable	---
Turbidity	1ppm	5ppm
Conductivity		
Chemical Parameters		
PH	6.5-8.5	No Relaxation
Hardness	200ppm	600ppm
Total Dissolved Solid	500ppm	2000ppm
Dissolve Oxygen		
Chloride Content	250	1000
Fluoride Content	1	1.5

IV. RESULTS AND DISCUSSION

Physical parameters like Temperature, Odour, Taste & Colour were agreeable in Process and Municipal water. The general ISI standard for Drinking water's Turbidity is <0.1 NTU. Turbidity >5NTU is considered unhealthy. In Different are a of Municipal water the Turbidity

Ranging from 0.27 NTU to 3.8 NTU.

Maximum and minimum total hardness of water was 190mg/l & 60mg/l. These high values may be due to the addition of calcium and magnesium salts. Results revealed that water is suitable for drinking in terms of total hardness.

According to World Health Organization, the standard rate of fluoride in drinking water is 0.5–1 ppm. And our result says that Flouride is <1.0.

The values of water quality should follow the range of IS 10500:2012. For this, results are compared with standard parameters. Parameters such as Ph value, Turbidity, Conductivity, TDS etc. Freshwater is a finite and

limited resource on Earth and increasingly much of it is polluted, by both pathogenic micro be sand chemical contaminants. Demand for freshwater is increasing day by day, to fulfill the requirement in particular, water is used by examining various parameters. At the end of all we would say that , drinking water is a very important thing to our bodies health. It is not only important humans, but also all of the organisms.

V. CONCLUSION

The study reveals that Temperature, Colour, Taste & Odour, Turbidity, Conduivity, PH, Hardness, Total Dissolved Solid, Dissolve Oxygen, Chloride Content & Fluoride Content were within prescribed permissible limit as Indian Standard 10500. In this study it was found that Samples A1, A2 & A3 area water is safe for drinking purpose.

A1	Rasoolpur kayastha ,Shukla Chauraha Jankipuram , Lucknow
A2	Janki vihar colony ,Mulayam Tiraha Jankipuram , Lucknow
A3	Akانشا Parisar Pocket A (CPWD) , Jankipuram Lucknow

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