

WATER QUALITY STUDIES ON VISAKHAPATNAM REGIONS

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ABSTRACT: The main objective of the project is to investigate the ground water quality in Visakhapatnam region which includes field analysis of physical characteristics (pH, colour, temperature, turbidity, conductivity) as well as chemical characteristics (hardness, alkalinity, acidity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD)). The study of physical and chemical characteristics of ground water sample suggests the evaluation of water quality parameters as well as water quality management practices should be carried out periodically to protect the water resources.

Key words: *Ground water quality, Indian standard water specifications, physical parameters and chemical parameters.*

1. INTRODUCTION:

Water is a prime and precious natural resource. Water sources may be mainly in the form of rivers, lakes, glaciers, rain water, ground water etc. Groundwater is an alternative water resource for the development of urban and rural areas with the increasing needs. Water is the second most important need for life to exist after air. Water quality is a measure of condition of water relative

to the requirements of one or more biotic species and to any human need or purpose.

OBJECTIVES:

- To check whether the water could be used for construction and drinking purposes within the range of Indian Standards.
- To understand about the requirements of water and to have a healthy life to people by providing a clean and safe water.

2. LITERATURE REVIEW:

Shweta Tyagi, The study states that Water quality index (WQI) is valuable and unique rating to depict the overall water quality status in a single term that is helpful for the selection of appropriate treatment technique to meet the concerned issues.

J Sirajudeen, The paper concentrated on the work on ground water for evaluating WQI Samples collected an Ampikapuram. For Evolution of water quality index, following parameters are examined: pH, Electrical Conductivity, T.D.S., Total hardness, Dissolved Oxygen, Chemical Oxygen Demand, Biochemical Oxygen Demand, Cl⁻, NO₃ and Mg.

COLLECTION OF SAMPLES:

- Sample: 1 at Gajuwaka
- Sample: 2 at Madhurawada
- Sample: 3 at NAD junction
- Sample: 4 at Pendurthi
- Sample: 5 at Sontyam



Figure: 1 Collection of samples

3. METHODOLOGIES:

PHYSICAL PARAMETERS

1. pH:

Buffer Solution is used to standardize the equipment to the nearest pH. The pH value of the water sample is measured by using pH meter.

2. Colour:

The colour of water sample is determined with Platinum Cobalt method or Spectrophotometric method.

3. Temperature:

The temperature of water samples are determined by using thermometer.

4. Turbidity:

Turbidity is measured by an instrument called Nephelometric turbidimeter, which expresses turbidity in terms of NTU or TU.

5. Electrical Conductivity:

It is measured by equipment called Conductivity meter.

CHEMICAL PARAMETERS

6. Total hardness:

Hardness is determined by using EDTA method. The sample is titrated with ammonia buffer and ECB-T is titrated again with EDTA solution (Red wine - Sky Blue)

7. Alkalinity:

Alkalinity is determined by titrating the water sample with a standard acid solution (H₂SO₄ of 0.02 N) using selective indicators (methyl orange or phenolphthalein).

8. Acidity:

Acidity is determined by titrating the water sample with standard acid solution (NaOH of 0.02 N) using selective indicators (methyl orange or phenolphthalein).

9. Dissolved Oxygen:

The iodometric method. The sample is taken in a BOD bottle (300ml) and all the chemicals are added and shaken. The brown precipitate is formed and after adding starch solution, the sample is titrated against sodium thiosulfate solution.

10. Biochemical Oxygen Demand:

The Iodometric method, follows same steps as DO.

RESULTS

	Gajuwaka	Madhurawada	NAD	Pendurthi	Sontyam
pH	6.65	6.52	6.43	6.77	6.82
Temperature, °C	28.60	29.20	28.80	30.10	27.01
Colour, CU	13.00	15.00	11.00	10.0	7.00
Turbidity, NTU	8.00	18.30	11.80	9.60	7.00
Conductivity, S/m	0.62	0.63	0.58	0.93	0.95
Hardness, mg/l	430	565	360	325	295
Alkalinity, mg/l	180	210	165	175	205
Acidity, mg/l	1230	1270	1245	1160	1315
DO, mg/l	12.70	16.10	11.80	15.00	14.10
BOD, mg/l	3.60	4.80	3.60	8.70	5.40

4. REMEDIES:

1. pH of water:

- Neutralizing filters
- Soda ash / sodium hydroxide injection
- Acid injection.

2. Temperature of water:

The temperature of water can be decreased or increased by heating or cooling. The normal temperature of drinking water ranges from 15°C to 30°C.

3. Colour of water:

Colour in the water is manifested due to organic, inorganic and dissolved solids present in water. The colour in the water can be removed by

- Nano filtration System
- Activated Carbon Filter

4. Turbidity of water:

To remove the turbidity of water, various process include:

- Cloth and sand filtration
- Settling & Decanting

5. Electrical Conductivity of water:

EC can be reduced by diluting system with fresh water, and increased by adding fertilizer. Take measurements while adding water until it is mixed to correction level.

6. Total hardness:

- The hard water can be treated by lime
- Calcium and magnesium ions removal through precipitation with caustic soda.

7. Alkalinity:

- Biological nitrification
- Chemical coagulant addition

8. Acidity:

The acidity of your water will dictate the method of acid neutralization required to raise your pH to a neutral value.

- Calcite

9. Dissolved Oxygen:

Dissolved Oxygen is defined in biological treatment as the relative measure of oxygen dissolved in wastewater available to sustain life, including living bacteria.

10. Biochemical Oxygen Demand:

- Install a modern plate pack DAF made of stainless steel or plastic.
- Use a regenerative turbine air dissolution pump. Get a DAF that cleans itself.

5. CONCLUSION:

- The physical and chemical test that we performed on each of the water samples did not provide any conclusive evidence of high pollution levels in any of the locations.
- Hence, it was proved that there wasn't any pollution in the water.
- True some waters may be cleaner than others, but unfortunately, there will always be some form of water pollution, so this is not a viable option.

6. REFERENCES:

- Srajan Shrivastava "Water Quality Analysis of Water Bodies of Kantajhar Basti" National Institute of Technology.
- Nayla Hassan Omer "Water Quality Parameters" Department of Environmental Engineering, College of Water and Environmental Engineering.