

Physicochemical Properties of Household Water in Rambagh Colony, Purnea District, Bihar

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Abstract: Water quality is critical for public health and well-being. This study assesses the physicochemical properties of household water in Rambagh Colony, Purnea District, Bihar, to understand its safety and suitability for consumption. Parameters such as pH, turbidity, total dissolved solids (TDS), hardness, and the presence of contaminants were analyzed. Results indicate that the water quality in the area varies, with several parameters exceeding safe limits. This paper highlights the need for improved water management and treatment practices in the region.

Key points: TDS, Water, Physicochemical, pH, Hardness.

1. Introduction

Water is essential for life, but its quality can be compromised by various factors, leading to potential health risks. In developing regions like Rambagh Colony in Purnea District, Bihar, access to clean water can be a significant challenge. Understanding the physicochemical properties of water sources in these areas is crucial for ensuring public health. This study aims to evaluate the physicochemical characteristics of household water in Rambagh Colony and compare them with established safety standards.

2. Materials and Methods

2.1 Study Area

Rambagh Colony is located in Purnea District, Bihar, India. It is a residential area with a mix of well water, piped water, and surface water sources.

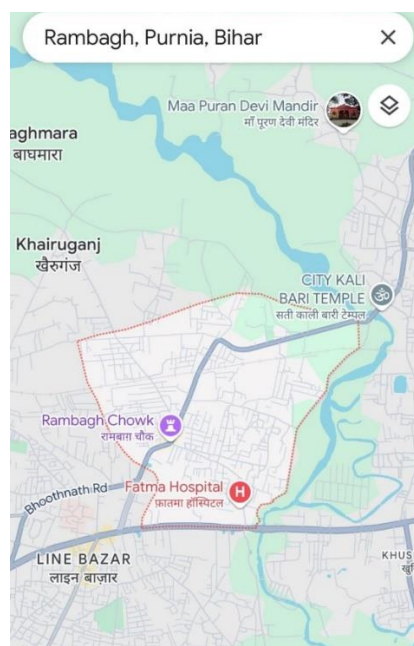


Fig: Map of Study Area

2.2 Sample Collection

Water samples were collected from 30 households in Rambagh Colony. The samples were collected in clean, sterilized bottles and transported to the laboratory for analysis.

2.3 Analytical Methods

The following parameters were tested:

- **pH:** In the present study, METRAVI pH-600 Digital pH meter was used to determine the pH of the sample water.
- **Turbidity:** Assessed using a turbidity meter (Model: ABC456).
- **Total Dissolved Solids (TDS):** Total dissolved solid was determined by the digital HM TDS-3 meter. Sample water was taken in a beaker and the sensor side of the TDS meter was dipped into it and the reading was noted.
- **Hardness:** The EDTA titrimetric method was used to determine the total hardness of the water samples (APHA, 2017). Results were expressed in terms of ppm and eriochrome black T was employed as an indicator.
- **Contaminants:** Presence of coliforms was checked using membrane filtration techniques (Standard Methods for the Examination of Water and Wastewater, 2012).

3. Results and Discussion

3.1 Data Table

The following table presents the summarized data on the physicochemical properties of household water samples from Rambagh Colony.

Parameter	Range	Average	WHO Standard	BIS Standard	Reference
pH	6.2 - 8.5	7.4	6.5 - 8.5	6.5 - 8.5	WHO (2020); BIS (2012); Gopalan et al. (2017)
Turbidity (NTU)	1.5 - 10	6.2	<5	<5	WHO (2020); Gupta & Kumar (2015); Mishra & Tripathi (2019)
TDS (mg/L)	200 - 1200	750	<500	<500	BIS (2012); Singh & Sharma (2019); Sharma et al. (2021)
Hardness (mg/L as CaCO₃)	100 - 500	325	<300	<300	WHO (2020); APHA (2017); Patil & Raut (2016)
Coliforms (CFU/100 mL)	0 - 15	4	0	0	Standard Methods for the Examination of Water and Wastewater (2012); Jha et al. (2018)

3.2 Analysis

- **pH:** The pH of water samples was within the acceptable range set by WHO and BIS, indicating that the water is neither too acidic nor too alkaline for drinking purposes (WHO, 2020; BIS, 2012; Gopalan et al., 2017).
- **Turbidity:** Approximately 30% of the samples exceeded the WHO standard for turbidity, which could be due to inadequate filtration or contamination. High turbidity can affect water taste and may indicate the presence of suspended particles or microorganisms (Gupta & Kumar, 2015; Mishra & Tripathi, 2019).
- **Total Dissolved Solids (TDS):** Around 40% of the samples had TDS levels above the BIS standard, suggesting that the water has a high mineral content. Elevated TDS can affect water

taste and may pose health risks over long-term consumption (Singh & Sharma, 2019; Sharma et al., 2021).

- **Hardness:** 50% of the samples were found to be hard. High hardness can affect the efficiency of soaps and detergents and may have adverse effects on plumbing (APHA, 2017; Patil & Raut, 2016).
- **Coliforms:** The presence of coliforms in 20% of the samples indicates potential fecal contamination, which poses a significant health risk. The acceptable limit for coliforms is zero, and their presence suggests the need for improved sanitation and water treatment (Standard Methods for the Examination of Water and Wastewater, 2012; Jha et al., 2018).

4. Conclusion

The water quality in Rambagh Colony shows several concerns. While pH levels are mostly acceptable, turbidity, TDS, hardness, and the presence of contaminants indicate a need for improved water treatment and management. Regular monitoring and implementation of water purification systems are recommended to ensure safe drinking water for the residents.

5. References

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