

Comparative Assessment of Physico-Chemical Parameters of Puliampatti Pond Water and College Drinking Water

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Abstract- Water quality plays a critical role in ensuring human health and well-being. This study compares the physico-chemical quality of water collected from Puliampatti pond (near P.A. Educational Institution) and the treated drinking water supplied within the college campus. The parameters examined include pH, Total Dissolved Solids (TDS), chlorine content, and hardness. Results revealed that pond water exhibited higher TDS (489 ppm), hardness (3.6 mg/L), and lower chlorine (0.173 mg/L) compared to college drinking water, which showed a lower TDS (37 ppm), lower hardness (0.45 mg/L), but higher chlorine (1.3 mg/L). Both samples maintained pH within acceptable limits. The findings indicate that untreated pond water is unsuitable for direct consumption without treatment, while the treated college water meets desirable drinking water standards.

Index Terms- Water Quality, Ph, TDS, Chlorine, Hardness, Pond Water, Packaged Drinking Water

I. INTRODUCTION

Water is one of the most essential natural resources, and its quality directly impacts public health. In rural and semi-urban regions, surface water bodies such as ponds are often used for domestic activities and sometimes as a drinking water source. However, such water sources are frequently contaminated by agricultural runoff, sewage discharge, and human activities, making them unsafe for consumption.

In contrast, drinking water supplied in educational institutions is generally treated before distribution to ensure compliance with quality standards.

Puliampatti pond, located near P.A. Educational Institution, is an important water body used by the local community. However, its suitability as a potable water source has not been scientifically evaluated. Therefore, the objective of this study is to compare the physico-chemical quality of pond water with the college's treated drinking water, focusing on parameters that are crucial for human consumption—pH, TDS, chlorine, and hardness.

II. MATERIALS AND METHODS

Sample Collection

- **Pond water:** Collected from Puliampatti pond, near P.A. Educational Institution.
- **College drinking water:** Collected from the treated water facility within the college campus.

Parameters Tested

- **pH:** Measured using a calibrated digital pH meter.

- **Total Dissolved Solids (TDS):** Determined using a TDS meter (ppm).
- **Chlorine content:** Tested using standard chlorine testing kits (mg/L).
- **Hardness:** Determined by titration with EDTA (mg/L).
- **Observed Values**

Parameter	Puliampatti Pond Water	College Drinking Water
pH	7.3	7.7
TDS	489 ppm	37 ppm
Chlorine	0.173 mg/L	1.3 mg/L
Hardness	3.6 mg/L	0.45 mg/L

III. RESULTS AND DISCUSSION

Project Life Cycle Overview

3.1.Ph

Both water samples fall within the acceptable pH range of 6.5–8.5 as prescribed by BIS and WHO standards. Pond water showed a pH of 7.3 (neutral), while college drinking water recorded 7.7 (slightly alkaline), both suitable in terms of



Figure 3.1 pH Test

Total Dissolved Solids (TDS)

Pond water contained significantly higher TDS (489 ppm) compared to college drinking water (37 ppm). The permissible limit for TDS in drinking water is 500 ppm. While pond water is close to the upper permissible limit, it can affect taste and palatability. The low TDS in college drinking water indicates effective treatment.



Figure 3.2. Total Dissolved Solids (TDS)

Chlorine Content

The chlorine level in pond water (0.173 mg/L) was very low, suggesting the absence of disinfection and potential microbial contamination. In contrast, the college drinking water contained 1.3 mg/L chlorine, which falls within the permissible range (<2 mg/L), ensuring microbial safety for consumption.

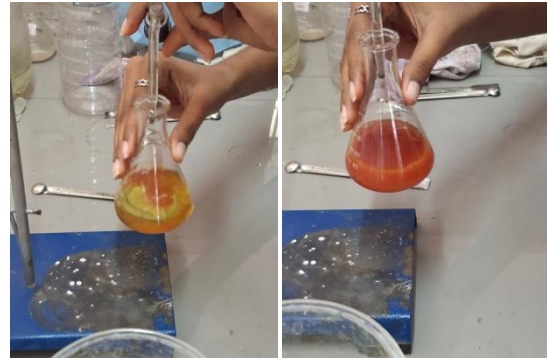


Figure.3.3.Chlorine Content Test

Hardness

The hardness of pond water (3.6 mg/L) was higher than that of college drinking water (0.45 mg/L). However, both values are far below the permissible limit of 200 mg/L, indicating no hardness-related issues in either sample.



Figure.3.3.Hardness Test

Comparative Assessment

Pond water is **high in TDS and hardness** and lacks sufficient chlorine.

College drinking water is **low in TDS and hardness** and adequately disinfected.

College drinking water meets drinking water standards, whereas pond water requires proper treatment before use.

IV. PUBLIC HEALTH SIGNIFICANCE

Safe drinking water prevents waterborne diseases such as cholera, dysentery, and typhoid. The higher TDS and absence of adequate chlorine in pond water indicate possible contamination by organic matter and microorganisms. This may lead to gastrointestinal problems if consumed untreated. The presence of chlorine in the college drinking water ensures microbial safety, which is a vital parameter in preventing outbreaks

V. RECOMMENDATIONS AND FUTURE SCOPE

Based on the findings of this study, the following recommendations are proposed:

1. **Treatment of Pond Water:**
 - ✓ Pond water should undergo treatment before human consumption. Techniques such as chlorination, boiling, sand filtration, or reverse osmosis are recommended.
2. **Regular Monitoring:**
 - ✓ Physico-chemical and microbial testing should be conducted periodically for both pond and college water supplies to ensure consistent quality.
3. **Awareness Programs:**
 - ✓ Local communities should be educated about the risks of consuming untreated pond water and the importance of using treated water for drinking.
4. **Further Research:**
 - ✓ Additional parameters such as heavy metals, biological oxygen demand (BOD), chemical oxygen demand (COD), and microbial analysis should be included in future studies.
 - ✓ Seasonal variations in pond water quality (monsoon vs. summer) can also be explored to provide a more comprehensive water quality profile.
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VI. CONCLUSION

The comparative analysis highlights that Puliampatti pond water, though neutral in pH, contains higher TDS and hardness and shows inadequate chlorine disinfection. This makes it unsafe for direct human consumption without treatment. College drinking water, on the other hand, exhibits better quality with low TDS, low hardness, and sufficient chlorine, meeting BIS and WHO standards.

The study emphasizes the importance of water treatment for community water sources like ponds and suggests implementing purification methods such as chlorination, sedimentation, and filtration before consumption. Such comparative studies provide valuable insights for local water management and public health safety.

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