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Original Research Paper

Microbiology

MICROBIOLOGICAL AND BIOCHEMICAL ANALYSIS OF COIMBATORE'S WATER RESOURCES

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ABSTRACT Water resources are essential for domestic, agricultural, and industrial activities in Tamil Nadu, with increasing demand placing significant pressure on groundwater and other water sources. Coimbatore district relies on the Siruvani and Pillur water supply schemes, along with the Bhavani, Noyyal, and Aliyar rivers and the Parambikulam–Aliyar Project, to meet its water requirements. This study evaluates the quality of potable water samples collected from Markkadai, Avarampalayam, Town Hall, Ganapathy, and Singanallur to assess drinking water safety and promote public awareness of safe water consumption.

KEYWORDS : Coimbatore, Ground Water, Polluted Waters, Most Probable Number, Coliforms

INTRODUCTION

Coimbatore city has several water supply projects designed to meet the growing water demands of its population. However, the city continues to experience water scarcity due to various factors, including irregular monsoon rainfall, excessive groundwater extraction, pollution of water sources These challenges adversely affect both domestic water supply and agricultural activities. Furthermore, several water bodies in Coimbatore, including Ukkadam Lake, Singanallur Lake, and ponds in Selvampalayam, are facing increasing pollution due to sewage discharge, industrial effluents, improper waste disposal, and encroachment. These environmental issues contribute to the deterioration of water quality, threaten aquatic ecosystems, and highlight the urgent need for effective water conservation measures and sustainable water resource management practices.

Scientific studies have reported the presence of *Escherichia coli* (*E. coli*) in drinking water, indicating potential microbial contamination. However, water treatment processes such as chlorination, filtration, and reverse osmosis are implemented by water quality management authorities in Tamil Nadu to reduce microbial contamination and ensure compliance with drinking water quality standards. In the present study, water samples were collected from various locations across Coimbatore district and analyzed to assess their physicochemical and microbiological characteristics. The physicochemical parameters examined included pH, turbidity, colour, odour, and taste. Microbiological analysis was carried out using the Most Probable Number (MPN) method and coliform tests.

Processing of Water samples



Fig 1:Water Quality Analysis by MPN Testz

The water samples were collected in sterile screw capped containers. The collected samples were inoculated on selective medium like EMB agar, Endo agar and further processed using MPN test. The positive samples from the completed test indicated the presence of *E.coli* in water.

Characterization of Water Quality by MPN Test

Isolation of *E.coli* from Water Sample

Water samples collected from various locations across Coimbatore were analyzed for the presence of micro-organisms using different microbiological techniques, including the membrane filtration method and total coliform count. The presence of *Escherichia coli* (*E. coli*) in the collected water samples was assessed using the Most Probable Number (MPN) method to evaluate their microbiological quality and determine the extent of potential microbial contamination.

MPN test estimates the number of faecal coliforms in water sample based on the degree of lactose fermentation by the organisms in the sample. Coliform group comprises of all aerobic, facultative and anaerobic gram negative, non spore forming rod shaped bacteria that ferment lactose with gas formation within 48 hrs at 37 °C. The standard test for this group may be carried out by MPN. It consists of three stages.

- Presumptive test
- Confirmatory test
- Completed test .

Antibiotic Susceptiblity Testing

The *E. coli* strains isolated from water samples were subjected to antibiotic susceptibility testing to evaluate their resistance patterns against commonly used antibiotics. The antibiotics tested included Amikacin, Ampicillin, Amoxicillin, Cefaclor, Ceftazidime, Gentamicin, Ofloxacin, Piperacillin, Tetracycline, and Trimethoprim. Antibiotic susceptibility was assessed by measuring the zones of inhibition and comparing the results across the tested antibiotics. The isolates exhibited the highest resistance to Chloramphenicol and Cefmetazole, followed by Cefaclor.

CONCLUSION

Government initiated Sustainable water management in Coimbatore had improved water infrastructure, groundwater recharge, regulated extraction, public awareness, and strict control of industrial effluent disposal. Regular monitoring of physicochemical and microbiological water quality in accordance with WHO guidelines had increased research towards protection of public health and conservation of water resources.

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