

**DETECTION AND IDENTIFICATION OF  
BACTERIOLOGICAL CONTAMINATION AND  
SOME HEAVYMETALS (Fe, Mn & Zn)  
CONTAMINATION OF GROUNDWATER IN  
GURUNAGAR AREA, JAFFNA PENINSULA.**

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## ABSTRACT

Jaffna Peninsula is mainly depends on groundwater sources because other fresh water sources are not available. Groundwater contaminated with microbiological and heavy metals constituents can cause a variety of water related diseases. Groundwater intended for human consumption should be safe, palatable and aesthetically pleasing. Coliform group has been extensively used as an indicator of drinking water quality and historically led to the public health protection concept. The aim of the present study were carried out to determination and identification of bacterial species of groundwater and to determine the concentrations of heavy metals (Fe, Mn, Zn) in groundwater at gurunagar located in Jaffna compare the results with guidelines from WHO.

Seventeen sampling points were collected from different places in Gurunagar area. Sixty one Water samples were collected from these sampling points. Most Probable Number (MPN) method has been currently used for assessment of the microbiological quality of drinking water. Bacterial identification was carried out using biochemical tests. Water samples were analyzed by Flame Atomic Absorption Spectroscopy for their heavy metals concentration.

A total of bacterial species: *Escherichia coli*, *Klebsiella* spp, *Salmonella*, *Shigella* and *Enterobacter* were identified form groundwater samples. The bacteria belonging to the family *enterobacteriaceae* (coliforms) showed the maximum occurrences in water samples. The high total coliforms count 2400 MPN index/100 ml in groundwater samples. Different selective media like Eosine Methylene Blue (EMB) and MacConkey were used to isolate bacteria rather than one increased the chances of successful isolation/identification. The identified bacteria were reconfirmed through the use of biochemical (IMViC) tests made for this purpose. The average abundance order of trace element contents in groundwater samples are: Fe > Mn > Zn, respectively. The maximum determined concentrations of Fe, Mn and Zn are 0.0339, 0.0100 and 0.0017 mg/l.

The present study showed high index of coliform bacteria in groundwater. Bacterial identification indicated the presence of *E.coli*, *Klebsiella* spp, *Salmonella* spp, *Shigella*

and *Enterobacter* in groundwater samples. These heavy metals results don't denote the potential toxicity in the studied groundwater. In this respect, suggested that the groundwater quality deterioration in rural habitations of this region was due to poor sanitation and unawareness about personal hygienic practices. The occurrences some pathogenic bacteria in drinking water may increase the risks of water related diseases and health problems in local residents.

Key words: Groundwater, Bacterial contamination, Heavy metals, waterborne disease, Coliform bacteria, biochemical tests.