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**Physico-Chemical and Pathogenic Contamination Status of Groundwater in the
Kilinochchi District, Sri Lanka.**

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Abstract

Groundwater is a rare and significant natural resource in the world. The rural society in the Kilinochchi District area depend mostly on groundwater sources as the area does not get treated water. Majority of the population in the district are farmers. The present study was carried out to determine the ground water quality along with pathogenic contamination status of groundwater in Kilinochchi area. Thirty wells were sampled in April 2017 and water temperatures, Dissolved Oxygen (DO), pH, conductivity, Total Dissolved Solids (TDS), salinity were measured at the site itself using standard meters. N-NO₃⁻, N-NO₂⁻, N-NH₃, Total Phosphate (TP), Chemical Oxygen Demand (COD) and total hardness were measured by the following standard spectrophotometric and titrimetric methods. Total coliform and fecal coliform count were obtained from membrane filtration methods. *Salmonella* sp. and *Shigella* sp. were identified using WHO standard methods. The ground water pH varied between 4.30 to 8.40 whereas DO was between 1.13 mg/l to 9.18 mg/l. Water TDS, salinity and conductivity ranged between 38 to 5569 mg/l, 27 to 3978 mg/l, 60 to 8840 µs/cm respectively. It was found that most of the wells exceeded the values given by Sri Lankan Standard Institution (SLSI) for drinking water standard. N-NO₃⁻, N-NO₂⁻, N-NH₃ concentration ranged between <1.00 to 17.56 mg/l, <1.00 to 2.50 µg/l and <1.00 to 21.51 µg/l respectively. TP, COD and total hardness ranged between 47.67 to 191.42 µg/l, 12.81 to 420.90 mg/l and 62.0 to 796 mg/l. Almost all ground water samples exceeded SLSI drinking water standard for COD (10 mg/L). Thirty seven percent of samples exceeded SLSI drinking water standard for total hardness (250 mg/l) as well. Sixty percent of samples were contaminated with total coliform whereas 47% of samples were contaminated with fecal coliform bacteria. Interestingly 37% of samples were positive for *Salmonella* sp. and one groundwater source was contaminated with *Shigella* sp. The result of the present study revealed that 50% of ground water sources were not within the SLSI drinking water quality standards. Microbial contamination with *Salmonella* sp. shows that continuous monitoring is essential to safeguard ground water consumers and take action accordingly. Therefore, prior treatment is a must before consumption of groundwater for drinking is recommended.

Keywords: Groundwater, Kilinochchi District, Water quality, *Salmonella* sp, *Shigella* sp.