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Identification of *Salmonella* sp., *Shigella* sp., and Pathogenic *E. coli* in Dug Wells Water Around Karadiyana, Meethotamulla, and Kerawalapitiya Open Dump Sites

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Abstract

The contamination of groundwater by pathogenic microorganisms is a crucial health concern worldwide. *Salmonella* sp., *Shigella* sp., and virulent *E. coli* are the major pathogenic microbial species causing severe health consequences for the general public. Therefore, the present study focused on identifying *Salmonella* sp., *Shigella* sp., and pathogenic *E. coli* in the dug wells water around the Karadiyana, Kerawalapitiya and Meethotamulla dump sites in Sri Lanka. The samples were collected in October 2022, and they were filtered using sterilized 0.45 µm filter papers. The enrichment study for *Salmonella* sp., *Shigella* sp. was done using the Rappaport Vassiliadis Soya peptone broth (RVS) and Selenite Cystine broth (SCB) medium. Further, the broth cultures were streaked on Xylose Lysine Deoxycholate (XLD) selective medium, and the positive colonies were confirmed following biochemical tests. In addition, the Congo red method was followed to confirm the pathogenic *E. coli* strains and the water quality analysis were performed following the APHA standards method. Based on the study's results, 70% from Karadiyana and 100% of Meethotamulla and Kerawalapitiya were contaminated with *Salmonella*. In contrast, the *Shigella* contamination was recorded as 80%, 67%, and 50% from Karadiyana, Meethotamulla and Kerawalapitiya, respectively. The water quality analysis results for pH, DO, Electrical Conductivity (EC), Chemical Oxygen Demand (COD), N-NO₃⁻, N-NO₂⁻, N-NH₃, and total phosphate ranged between 4.25-7.8, 0.5-7.64 mg/L, 163.9-5,248 µS/cm, 150-596 mg/L, 1.05-5.25 mg/L, 0.52-5.04 mg/L, 0-0.58 mg/L, and 0-3.52 mg/L respectively. The results of water quality and pathogenic microorganisms in the selected dug wells were significantly correlated (p<0.05). Further, the COD in all the wells had exceeded the maximum tolerance level (10 mg/L) of SLSI ambient drinking water quality standards. Therefore, it can be concluded that all the ground water around these three dump sites is not suitable for drinking purposes.

Keywords: *Salmonella* sp., *Shigella* sp., *Escherichia coli*, Water quality, Municipal dump sites