

**DETECTION OF *LEGIONELLA* SPECIES AND OTHER
MICROBIOLOGICAL AND PHYSICOCHEMICAL PROPERTIES IN
NATURAL AND MAN-MADE WATER SYSTEMS IN THE COLOMBO
DISTRICT**

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Legionella is a gram negative, aerobic, flagellated rod shaped bacterium found in aqueous environments, and exists as free living plankton, as an intracellular parasite in some free-living amoeba and as inhabitants of biofilms. Forty eight species of *Legionella* have been discovered so far, of which 21 are pathogenic to human. Occurrence of *Legionella* spp., in cooling towers in Sri Lanka has been previously recorded. However, there is no information regarding the prevalence of this bacterium in environmental sources. Therefore, the objective of this study was to evaluate the occurrence of *Legionella* spp., in natural and man made water systems. Thirty six water and biofilm samples were collected to cover six different types of water sources from various parts in the Colombo district. They were decorative water features, domestic water supplied by wells, domestic water supplied by municipal, domestic hot water (initial supply from wells or municipal) and natural water bodies. Samples were analyzed by standard culture methods (ISO 11731:1998E) for *Legionella* sp. The colonies which grew on BCYE but failed to grow on blood agar, were regarded as *Legionella*, and further confirmed serologically by latex bead agglutination. Simultaneously, water samples were also assessed for aerobic plate counts (SLS 516 part 1: 1991, AMD 371), total coliform and *Escherichia coli* (SLS 614 part 2: 1983) and physicochemical properties, viz; turbidity, pH, colour, odour, temperature, free chlorine, electrical conductivity, iron and total hardness (SLS 614: part 1). Algae were detected microscopically. The results indicated that *Legionella* spp. were not present in detectable numbers in natural and man made water systems that were investigated in the current study. However, the natural water bodies were contaminated with total coliforms, in the range of 900-1800 MPN per 100 ml, while 60% of domestic water systems supplied by well water was faecally contaminated (*Escherichia coli*) in the range of 5-80 MPN per 100 ml. Domestic water systems supplied by municipal water was free of total coliforms and *E. coli*. Algae (*Chlorella*, diatoms, *Ulothrix*, *Pedastrium*, *Netrium*, *Zygnoma*, *Eudorina*, *Anacystis*, *Spirogyra* and some unidentified alga) were detected in decorative water features and natural water bodies while they were not detected in municipal and well water. All physicochemical parameters investigated were within the permissible levels other than pH levels of well water, which were in the range of 4.4 - 5.8 and the high turbidity of natural water bodies and decorative water features. According to the current study it can be concluded that *Legionella* spp. is not an environmental threat in the Colombo district. Several biotic and abiotic factors such as high aerobic plate counts, absence of algae and protozoa, low electrical conductivity levels and iron in water may be contributory to the non detectable levels of *Legionella* in the water samples analyzed in the current study.