

Area of the abstract: Health Effects Caused by Air Pollution

IDENTIFICATION OF SPECIFIC BACTERIA IN ATMOSPHERE IN KANDY CITY USING REAL-TIME PCR TECHNIQUE

R. W. K. Amarasekara¹, P. Samaraweera², M. Vithanage³, D. N. Magana-Arachchi^{1*}

¹ Molecular Microbiology and Human Diseases Research Group, National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka

²Department of Molecular Biology and Biotechnology, University of Peradeniya, Peradeniya, Sri Lanka

³Faculty of Applied Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

Airborne bacteria are considered as causative agents of many infectious diseases. Not only the living bacteria, but also the components of them are linked to health outcomes. But, there are fewer studies based on the bacteria in the atmosphere when compared to the studies on chemical components of the atmosphere. Therefore, the study was aimed to determine the presence of health related specific bacterial species in the atmosphere of Kandy where the studies based on this particular area is absent. Samples were collected in nine sites in Kandy city limits: Children's Park, Dodanwela Site, Fire Brigade, National Institute of Fundamental Studies, Lewalla, Police Station, Railway Station, Trinity College, and Tea Research Institute. The plates containing filter papers were mounted on air sampler systems at each site which were fixed at a height of 1.5 m above ground to determine the concentration of microorganisms at human respiration level and to minimize contamination from re-suspended particles from the ground. Filter papers were cut into pieces and shaken in 8 ml of Mili-Q water at 200 rpm for 2 hours in a flask. DNA was extracted from the solution suspended with particulate matter. Real-time PCR analysis was done using specific primers for the extracted DNA samples and tested for the presence of Genus *Mycobacterium*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Escherichia coli*, and Genus *Salmonella*. Real-time PCR curves were generated using standard cultures and melting curves were detected at 63, 60, 61.5, 60 and 65 °C for *Mycobacterium*, *P. aeruginosa*, *S. aureus*, *E. coli*, and Genus *Salmonella* respectively. Out of 108 samples collected, *P. aeruginosa*, *S. aureus* and *E. coli* were detected in 5, 5, and 13 samples respectively. However, none of the samples were positive for genus *Mycobacterium* and *Salmonella*. Thus, it was concluded that the particulate matter of the Kandy City atmosphere is associated with *P. aeruginosa*, *S. aureus* and *E. coli*, but free of the two genera *Mycobacterium* and *Salmonella*. Accordingly, a likelihood exists that *P. aeruginosa*, and *S. aureus* can enter the respiratory systems of immune-compromised individuals via inhalation causing respiratory diseases. Although there is low of risk of bacteria such as *E. coli* entering through the respiratory system, these organisms can be introduced to water sources and plant surfaces through precipitation.

National Science Foundation, Sri Lanka (Grant no. RG/2014/EB/03) is acknowledged for providing financial support for the study.