

**COMPARISON OF MICROBIAL LOAD AND DIVERSITY DURING HAZE
EVENTS: A CASE STUDY IN KANDY, SRI LANKA (2022-2024)**

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Air pollution refers to the presence of physical, chemical, or biological contaminants in the air. Sri Lanka experiences an annual haze due to high pollution levels from the Indian subcontinent, affecting air quality and visibility. This study aimed to investigate the microbial load (ML) and bacterial diversity during the 2024 haze event and compared it with the 2022 event. Air samples were gathered thrice daily (0800-0830, 1200-1230, and 1700-1730) from 12th to 27th March and 2nd to 17th April 2024, based on the Air Quality Index (AQI) and haze visibility, at a location situated 1.7 km away from Kandy City. Control samples were taken on clear, non-hazy days at the same location. The same methodology and location were applied during the haze event that occurred from 9th to 16th December 2022. Samples were collected using fine-particulate air samplers on sterile filter papers (PTFE, 2µm pore size, and QMA, 2.2 µm pore size). Filter papers were cut and transferred into 8 mL of sterile water, then shaken in an orbital shaker at 100 rpm for 2 hrs before centrifugation. The Muse cell analyser was used to count the total ML using the flow cytometry technique. The highest microbial count, 1.44×10^7 cells/m³ of air, occurred on the evening of 14th March during the haze, while the lowest, 1.11×10^6 cells/m³ of air, was recorded on the evening of 17th April under non-hazy conditions. Significantly higher ($p < 0.05$) microbial levels were reported consistently in the evenings compared to mornings and noons. The AQI, wind speed, and atmospheric temperature all showed a positive correlation with ML. The ML was notably higher in 2024, approximately 18 times greater than in 2022. These findings suggest that microbial diversity and abundance during haze events are affected by air quality and meteorological factors, though further studies are needed.

Keywords: Air quality, Bacterial diversity, Haze event, Meteorological factors, Microbial load