An Overview of Air Pollutants Inside the Subway and the Influencing Factors

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ABSTRACT

Introduction: In recent years, air pollution has become one of the most basic and widespread problems in many big cities. This problem is especially evident in closed, busy urban environments like the subway. Air pollutants inside the subway can endanger the health of passengers and employees and negatively affect their quality of life. This research reviewed the air pollutants inside the Bangkok, Shanghai, and Munich subways and the influencing factors. The control and management strategies for these pollutants were also discussed.
Search Strategy: We selected, summarized, and discussed the database's original research articles. From 2014 to 2024, 59 articles were obtained. All of them were carefully screened to include only original research articles with an error-free level. Most of the microbial pollutants and suspended particles in the air inside the metro were considered. The amount and type of these pollutants in the air inside the subway were compared in Bangkok, Shanghai, and Munich.
Results: Bioaerosols were collected over four months in the Bangkok subway station study. The bacteria obtained included Proteobacteria, firmicutes, and actinobacteria. These aerosols differed in gender and species among the samples obtained in other months. Most of these bacteria were likely derived from external environments and human body sources. In the study of air pollutants inside the subway in Shanghai, 18 aerosol samples were collected from two standard subway stations (A and B) in the summer and winter seasons. In this study, bacteria were dominant, with a relative frequency of 88.28%. A total of 5,303 species of bacteria were detected in metro stations A and B. Microbial communities were significantly different between the two seasons. In the study of Munich metro air, particle concentration was measured in terms of mass and number, with a sampling rate of 0.1 to 1 Hz. In the U5 metro line, the concentration of PM10 (particle matter), PM2.5, and PM1 in the platforms varied between 59-220, 27-80, and 9-21 µg per cubic meter, respectively. During the ride towards the city center, the average PM10, PM2.5, and PM1 increased by 8-220, 2-71, and 2-20 µg/m3, respectively.
Conclusion and Discussion: Air pollutants in subways are essential for air quality assessment and monitoring, especially concerning public health.

Keywords: Aerosols, Air pollutants, Thailand

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