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Experimental Investigation of Indoor Air Quality of a Public Bus Transport under Driving Conditions in a Tropical Climate

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African cities are growing fast, owing to the ongoing development and accelerated demography. This urbanization brings forth challenges for transport and mobility, where millions of passengers should be carried from their homes to various places: schools, markets, hospitals, etc. Several means are available: motorbikes, taxicabs, buses, modified pickups, trucks and vans, trams and undergrounds. Road transport appears as the dominant transportation mode, and massive public transport by public bus transport linking city centers and sub-urban areas are being preferred by passengers on long distances. In recent years, urban air pollution has become an emergent crisis aggravated by unregulated traffic, unpaved and degraded roads, low quality fuels and massive vehicles imports. Even though, the health impacts are now, there is a paucity of studies on air quality in bus cabins moving in sub-Saharan Africa. In this study, the quality of air inside a bus cabin in real conditions is investigated. An AFTU bus in the city of Thiès, in Senegal moving on line 2, from the North to the South is investigated. Two main instruments, a GPS app and an optical particle counter (Particle Plus 8301-AQM2) were used. Bus speed (m.s⁻¹) and position (longitude, latitude), Carbon dioxide concentration (ppm), temperature (°C) and relative humidity (RH) were monitored at various periods of the days for three days. The average speed was low, 1.80-2.80 m/s and showed very low correlation with environmental parameters. Mean carbon dioxide concentrations, were in the range 560-810 ppm and relative humidity, 48-73%. The mean temperature was high: 29-36 °C. Temperature correlates with carbon dioxide concentration during the days but poor correlation seems to appear in the evening. The optimal conditions were not met, and it is found that in absence of an AC, keeping doors and windows open help in eliminating excess CO₂ but ends in high temperature.

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