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EVALUATION OF CULTURABLE AIRBORNE BACTERIA AND FUNGI DISTRIBUTION BY USING GIS-BASED 3D MODEL IN LECTURE THEATERS

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Abstract

Precise approaches for monitoring and modeling air quality based on advanced spatial technologies for understanding the three-dimensional (3D) spread of the air quality in an indoor environment are essential. This research aims to assess and 3D visualization of the indoor air quality and explore the distribution pattern of culturable airborne bacteria (CAB), *Staphylococcus* spp., and culturable airborne fungi (CAF) concentrations in two identical lecture theatres (LTs) before and after usage of them under natural ventilation. To achieve these assessments and visualizations of 3D distributions in different layers of the LTs, 3D models were created using point cloud data from a terrestrial laser scanner (TLS). A 3D geostatistical study based on a Geographic Information System (GIS) was realized to demonstrate the 3D distribution in LTs utilizing measurements taken at 15 sampling points in each LT. 3D models were displayed using geostatistical tools in GIS software to visualize the distributions. The statistical distributions were also represented graphically. Results showed that the distributions of CAB, *Staphylococcus* spp., and CAF concentrations varied between 1- 460 CFU/m³, 1- 420 CFU/m³ and 1-980 CFU/m³ respectively. The conclusions of this research might be used for future studies.

Key words: culturable airborne bacteria (CAB), culturable airborne fungi (CAF), GIS, *Staphylococcus* spp., 3D interpolation

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