**Junior Science Communications**
Faculty of Applied Sciences, UiTM Shah Alam
https://journal.uitm.edu.my/ojs/index.php/JSC

E-ISSN 2637-0689
Vol 69 2026

Colloquium on Applied Sciences 1 2026
19-22 January 2026, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

# Indoor Air Quality and Health Risk Assessment

Nur Syhirah Mohd Suzain[a], Chia Chay Tay[a*]

**Structured Abstract**

**Background:** The study aimed to assess Indoor Air Quality (IAQ) and Health Risk Assessment (HRA) at UiTM Puncak Perdana Facility Office 2, in compliance with the Industry Code of Practice on Indoor Air Quality (ICOP) 2010. It was conducted based on the occupant complaints and renovation activities. The objectives were to assess IAQ parameters, evaluate occupants' health symptoms through questionnaires, and determine health risks during working hours.

**Methods:** The methodology included ethics approval, research location selection, sampling point determination, complaint procedure, questionnaire survey. Walkthrough investigation was conducted followed by IAQ monitoring, data analysis, and health risk assessment for non-carcinogenic and carcinogenic risk that was calculated using the United States Environmental Protection Agency (US EPA) inhalation exposure model. Physical parameters were measured by EVM Environmental Monitor, followed by chemical parameters, which were measured by the EVM Environmental Monitor, the Temptop Formaldehyde Detector, and the Aeroqual Handheld Monitor. Furthermore, biological parameters collected using Trypticase soy agar (TSA) for total bacteria count and Malt extract agar (MEA) for total fungi count, which measured by Biostage Single-stage Impactor and Biological Sample Pump. All instruments were calibrated, and biological samples were sent and analysed.

**Results:** Temperature at SP1 recorded the highest of 27.0 °C, exceeded the 26.0 °C acceptable limits by ICOP IAQ (2010). Furthermore, RH with the highest 62.1% at SP1 in Cycle 3 exceeded the ASHRAE 55 (2020) recommended acceptable limit of 60 %. The average $PM_{2.5}$ concentration of 12.9 $\mu g/m^3$ exceeded the acceptable limits of 12 $\mu g/m^3$ by ASHRAE 62.1 (2022). For total bacteria count, SP1 recorded the highest, 583.92 $CFU/m^3$ and exceeded the 500 $CFU/m^3$ acceptable limit of ICOP IAQ (2010). Furthermore, 75% of respondents reported dust and dirt, while 50% experienced dizziness, coughing, and an irritated or stuffy nose over last 3 months. Additionally, carcinogenic risk of $PM_{2.5}$ exceeded acceptable limit of $1.0\times10^{-6}$ and $1.0\times10^{-4}$, while non-carcinogenic risk was below the threshold of 1.0.

**Conclusion**: In conclusion, increasing fresh air ventilation through open windows improves airflow to enhance air exchange and dilute indoor contaminants. In addition, upgrading HVAC systems with MERV-13 filters and implementing continuous real-time monitoring effectively improve IAQ control and protect occupant health.

**Keywords:** Indoor air quality, health risk assessment, $PM_{2.5}$, office area, occupants comfort

*Correspondence: taychiay@uitm.edu.my

[a] School of Chemistry & Environment, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia